



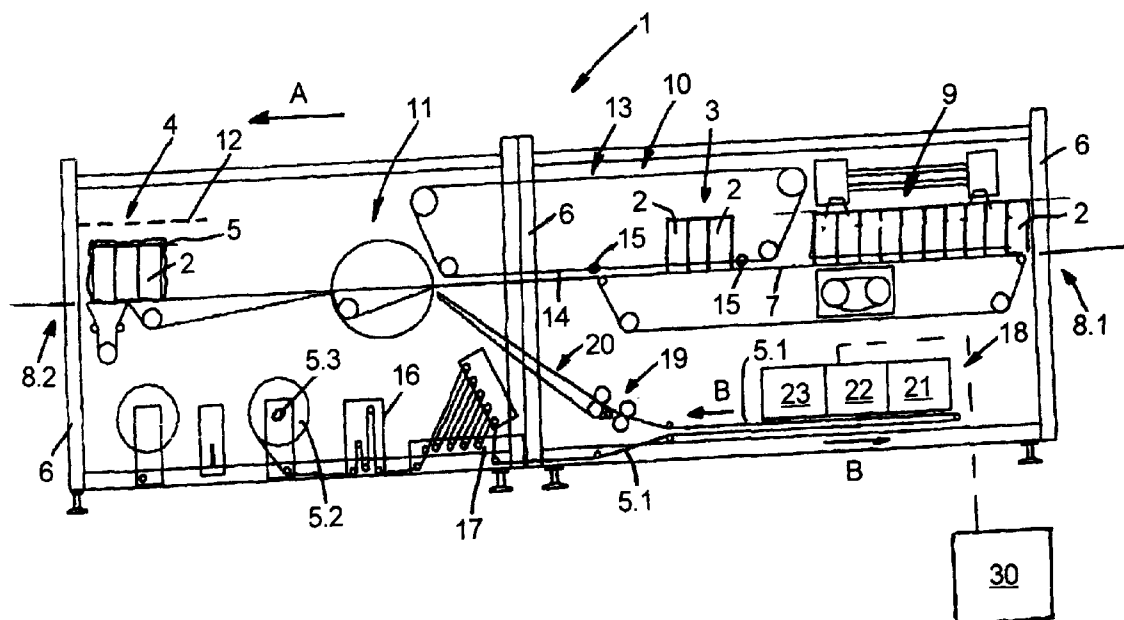
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(19) **United States**(12) **Patent Application Publication**
TILL(10) **Pub. No.: US 2009/0211464 A1**(43) **Pub. Date: Aug. 27, 2009**(54) **METHOD OF OPERATING A MULTIPLE
CONTAINER SHRINK WRAPPING MACHINE
HAVING A PRINTING ARRANGEMENT TO
PRINT ON THE SHRINK WRAP MATERIAL
SIMULTANEOUSLY WHILE WRAPPING
CONTAINERS AND A MULTIPLE
CONTAINER SHRINK WRAPPING MACHINE
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GREENSBURG, PA 15601-0130 (US)**(21) Appl. No.: **12/202,610**(22) Filed: **Sep. 2, 2008****Related U.S. Application Data**(63) Continuation-in-part of application No. PCT/EP2007/
000888, filed on Feb. 2, 2007.(30) **Foreign Application Priority Data**

Mar. 1, 2006 (DE) 10 2006 009 348.8

Publication Classification(51) **Int. Cl.**
B65B 13/02 (2006.01)(52) **U.S. Cl.** **100/2**(57) **ABSTRACT**

A method for the formation of containers and device for the performance of the method. The abstract of the disclosure is submitted herewith as required by 37 C.F.R. §1.72(b). As stated in 37 C.F.R. §1.72(b): A brief abstract of the technical disclosure in the specification must commence on a separate sheet, preferably following the claims, under the heading "Abstract of the Disclosure." The purpose of the abstract is to enable the Patent and Trademark Office and the public generally to determine quickly from a cursory inspection the nature and gist of the technical disclosure. The abstract shall not be used for interpreting the scope of the claims. Therefore, any statements made relating to the abstract are not intended to limit the claims in any manner and should not be interpreted as limiting the claims in any manner.



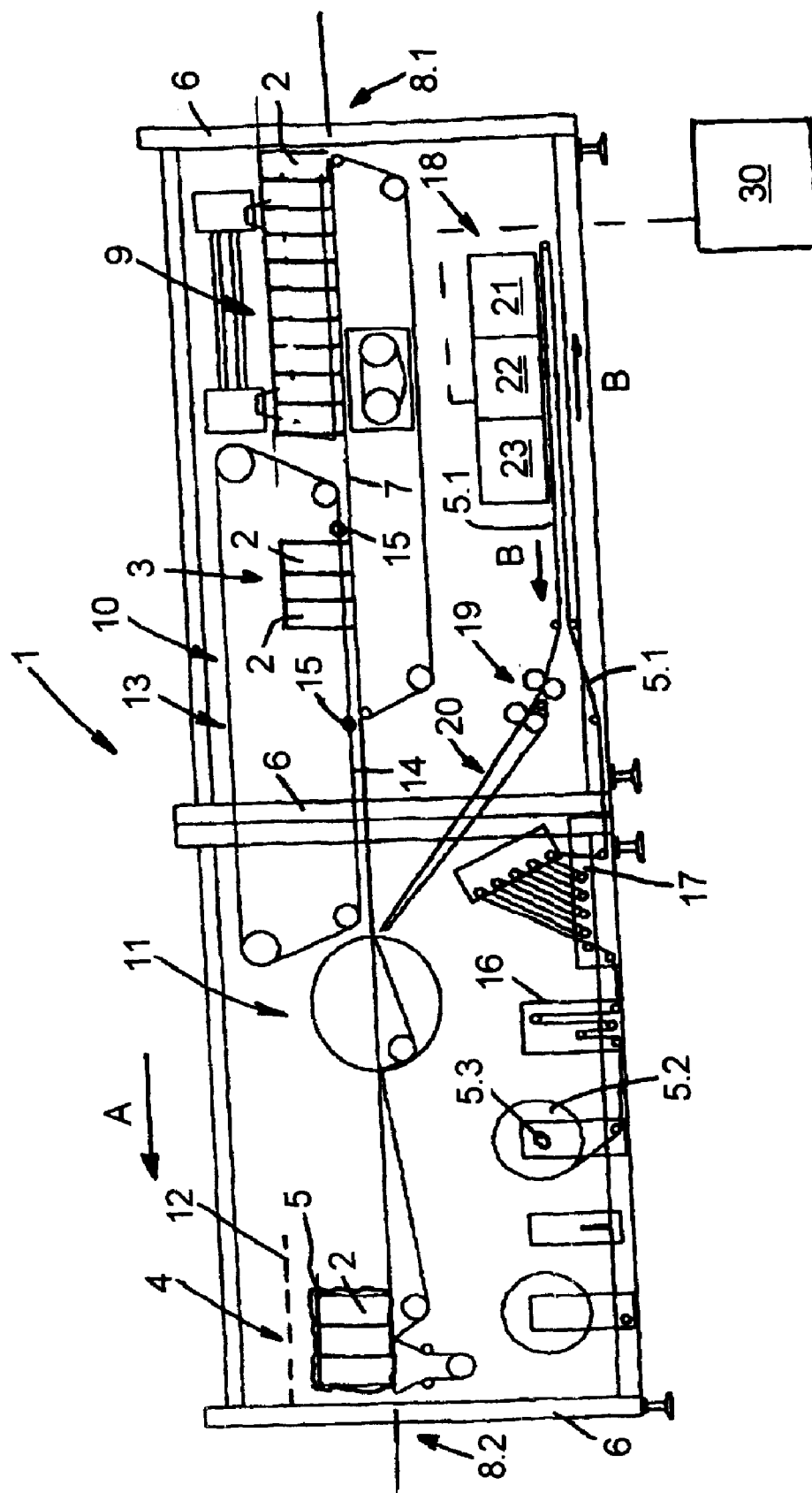


FIG. 1

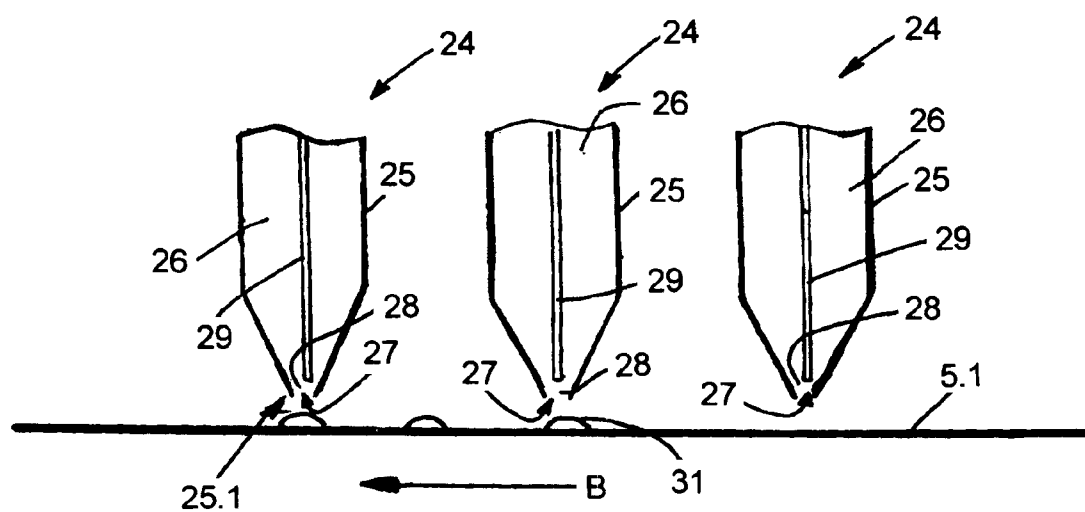


FIG. 2

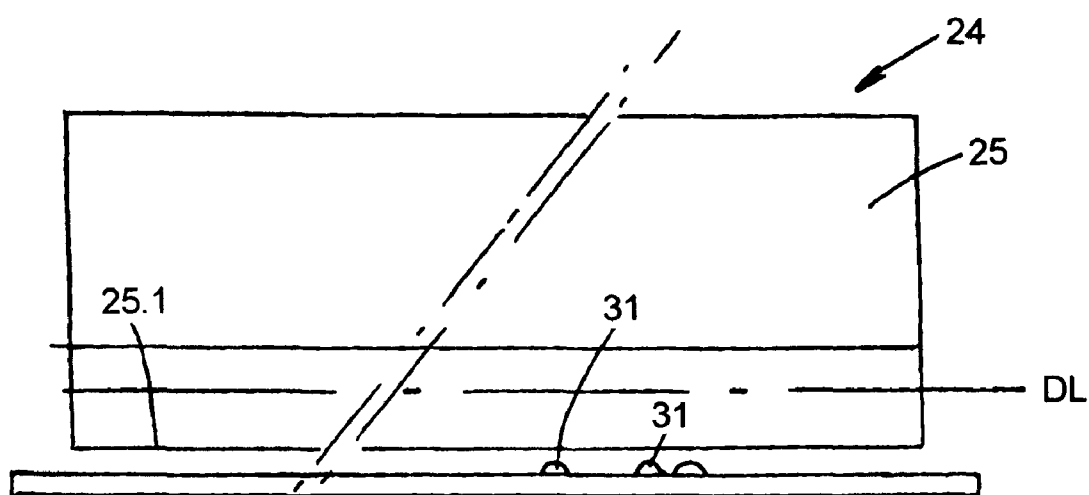


FIG. 3

**METHOD OF OPERATING A MULTIPLE
CONTAINER SHRINK WRAPPING MACHINE
HAVING A PRINTING ARRANGEMENT TO
PRINT ON THE SHRINK WRAP MATERIAL
SIMULTANEOUSLY WHILE WRAPPING
CONTAINERS AND A MULTIPLE
CONTAINER SHRINK WRAPPING MACHINE
THEREFOR**

CONTINUING APPLICATION DATA

[0001] This application is a Continuation-In-Part application of International Patent Application No. PCT/EP2007/000888, filed on Feb. 2, 2007, which claims priority from Federal Republic of Germany Patent Application No. 10 2006 009 348.8, filed on Mar. 1, 2006. International Patent Application No. PCT/EP2007/000888 was pending as of the filing date of this application. The United States was an elected state in International Patent Application No. PCT/EP2007/000888.

BACKGROUND

[0002] 1. Technical Field

[0003] The present application relates to a method for the formation of bundles comprising a plurality of containers. The present application also relates to a device for the performance of this method.

[0004] 2. Background Information

[0005] Background information is for informational purposes only and does not necessarily admit that subsequently mentioned information and publications are prior art.

[0006] Devices for the formation of bundles consisting of a plurality of containers by wrapping them with a shrinkable film material that is extracted from a storage unit, i.e. from a roll, and by shrinking the film material to form a shrink wrapping in the form of a shrink-wrapped film that holds the bundles together are known in a wide variety of realizations. The containers are thereby filled with a product, for example, and closed packages such as bottles, cans and packages of a single-ply or multi-ply flats, etc.

[0007] For the formation of the bundles, a plurality of containers are assembled into a pack and then wrapped with shrinkable film material. The packs can be assembled, for example, in or on pan-shaped or flat carriers (e.g. on trays) made of a suitable material. Regardless of the type of containers and the type of formation of the packs, conventional practice also includes the use as the film material of a pre-printed material, the impression or pattern on which, in terms of the pictorial and/or graphic and/or color and/or textual features can be related to the product and/or brand can be very different from one product or container to another, so that it can be desired, among other things, to change the film material when containers with different products are packaged into bundles.

[0008] The prior art also describes a printhead which is intended for the printing of flat print stock and with which a plurality of printed dots can be produced in a line adjacent to one another or at a very slight distance from one another, for example one hundred fifty printed dots per inch on a surface of the print stock to be printed, and namely by a plurality of individually controllable nozzles. The active printing width of this printhead, which is also known by the name "Tonejet," may be dependent on the capacity of the computer power of a computer that controls the printhead. For example, printheads

with printing widths of 1.7-6.8 inches (corresponding to a 256-hit control or a 1204-hit control) can be used. With this printhead, a two-dimensional impression with a significantly large surface area can be printed by a relative movement between the surface to be printed and the printhead in possibly one axial direction.

OBJECT OR OBJECTS

[0009] The object of the present application is to indicate a method with which bundles, each consisting of a plurality of containers and held together by a printed, shrunk film, can be formed efficiently with different packaging or different printing. This object can be accomplished by a method for the formation of bundles, such as, in one possible embodiment, the bundles comprising a plurality of containers are wrapped together by a strip-format film material in a packaging station to which the film material taken from a supply is fed. The film material is printed at least partly in one or more colors at a printing unit, which is upstream of the packaging station in the direction of transport of the film. The film material pulled off the supply is a neutral film with or without an imprint and is printed on using at least one printing unit, which produces the print and/or the printed image as a function of an electronic actuator device, by generating the printed image as a function of templates that are stored electronically or in the form of software in the control device. The printing takes place during relative movement between the film material and the printing unit or at least one printhead of the printing unit. Another object of the present application is to indicate a device for the performance of the method, such as, in one possible embodiment, for the formation of bundles consisting of a plurality of containers which wraps bundles with a film material in a wrapping or packaging station to which film material pulled from a supply is fed in a feed direction. Between the supply and the packaging station, there is at least one printing unit for the printing of the film material, in which the at least one printing unit is realized for a single-color or multiple-color printing of the film material and the image is produced as a function of an electrical control unit. Means are provided to produce the relative movement between the film material and the at least one printing unit or at least one printhead of this printing unit during the printing.

SUMMARY

[0010] One feature of a method according to one possible embodiment is that not only information for the overall appearance of the bundle in question, but also at least a significant portion of the printing on the film that surrounds the containers and holds the bundle together, and thus the packaging of the bundle, is printed immediately or substantially immediately before the formation of the respective bundle in a printing unit on the film material that is extracted from a supply roller. It is thereby possible, using one and the same primary or film material to modify the packaging of the bundle by a corresponding adjustment or conversion.

[0011] In one possible embodiment of the present application, the printing unit is realized so that it produces the respective image on the film material as a function of its actuation by an electronic control unit or a computer, and possibly on the basis of a dataset formed electronically or by software and a template that can be stored, for example in a memory of the control device or of the computer. By modifying this template, it is easily possible to modify and convert the packaging

of the pack, and possibly in many respects, i.e. in terms of text, graphics, color, image, etc., as well as with respect to the size and shape of the respective printed image. The present application also makes it possible, among other things, to easily modify and/or update as desired the respective packaging of the bundle, and possibly also as a function of the respective product and/or of the respective brand. It is also possible to select and to use the product packaging desired for printing the film material, to adjust the size of the printing to the size of the bundle and/or also to vary the printed image or parts of the printed image during the process.

[0012] The printing unit may have at least one printhead, which is possibly realized in the form of a "Tonejet" printhead and/or in the form of a printhead that is equivalent to such a "Tonejet" printhead. A print-head of this type has, in a printing area which, during the printing of the area to be printed, is located facing and at a slight distance from this surface, a plurality of individual nozzles which are provided close after one another in a longitudinal axis of the printhead, and each of which is formed by a nozzle aperture and by an electrode that corresponds to each nozzle aperture. The ink that is present in the printhead is released from each individual nozzle or from the corresponding nozzle aperture when, for the activation of an individual nozzle, an electrical voltage is applied to the electrode corresponding to said individual nozzle, the polarity and/or potential of which differs from the polarity and/or potential of the printhead or of the ink in the printhead, so that a certain quantity of ink is ejected or expelled from the nozzle aperture of the activated individual nozzle. A printhead of this type is referred to below as an "electrostatic printhead".

[0013] Containers within the meaning of the present application are in turn any packages that are filled with a product and closed, including but not limited to bottles, cans, boxes, cartons, tubes made of cardboard or another flat material, for example packages manufactured from a multiple-ply flat material, etc.

[0014] Bundling units within the meaning of the present application are a plurality of containers combined into a group with or without a carrier that supports or partly comprises these containers.

[0015] Bundles within the meaning of the present application are packs of the type described above which are held together or fixed in position by a shrinkable film material by wrapping them with this material and then shrinking this material, i.e. by shrink wrap.

[0016] The above-discussed embodiments of the present invention will be described further herein below. When the word "invention" or "embodiment of the invention" is used in this specification, the word "invention" or "embodiment of the invention" includes "inventions" or "embodiments of the invention", that is the plural of "invention" or "embodiment of the invention". By stating "invention" or "embodiment of the invention", the Applicant does not in any way admit that the present application does not include more than one patentably and non-obviously distinct invention, and maintains that this application may include more than one patentably and non-obviously distinct invention. The Applicant hereby asserts that the disclosure of this application may include more than one invention, and, in the event that there is more than one invention, that these inventions may be patentable and non-obvious one with respect to the other.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017] The present application is explained in greater detail below with reference to one possible embodiment which is illustrated in the accompanying figures, in which:

[0018] FIG. 1 is a schematic illustration of a device for the manufacture of packs each comprising a plurality of containers;

[0019] FIG. 2 is a schematic illustration showing the printheads of a printing unit which is realized in the form of electrostatic printheads together with the film material to be printed; and

[0020] FIG. 3 shows one of the printheads of the printing unit illustrated in FIG. 2.

DESCRIPTION OF EMBODIMENT OR EMBODIMENTS

[0021] In the figures, 1 is a device for the manufacture of bundles by combining a plurality of bundling units by combining a plurality of containers 2 into individual bundle arrangements and assembling each bundle arrangement 3 into a bundle 4 by means of a shrunken film 5 which surrounds the bundle arrangement 3.

[0022] The device 1 has, on an equipment frame 6, among other things, a conveyor 7 which forms an internal horizontal conveyor line with which the containers 2 are moved in a horizontal transport direction A through the device, and possibly in a multi-lane conveyor flow in which at least two containers 2 are located next to each other at a right angle to the direction of transport A.

[0023] As illustrated in detail in FIG. 1, the packs 2 are fed to the device 1 at an inlet 8.1 as a multi-lane conveyor flow, and then proceed to a buffer line 9 formed by the conveyor 7, in which the containers 2 are also close together in the direction of transport A. In a divider unit 10 that is downstream of the buffer line 9, individual groups of containers are formed, which then travel as a bundling unit 3 to a station 11, in which each bundling unit 3 is wrapped with a length of film material that has been separated from the film material 5.1, which then, by shrink wrapping in a shrink tunnel 12, forms the shrink wrap 5 that holds the respective bundle 4 together. The finished bundles 4 are fed to another application via a conveyor that is not shown but is adjacent to the outlet 8.2 of the device 1.

[0024] For the production of the individual packs 3, at the divider station 10 there is an additional conveyor 13 which in the illustrated embodiment comprises two conveyor belts 14, each of which forms a closed loop and is driven in circulation. These conveyor belts are oriented with the planes of their loops in the vertical direction and are located on both sides of the conveyor line formed by the conveyor 7. Between the conveyor belts 14, there are a plurality of webs or bars or arms 15 at intervals which act as pushers for the containers 2 and are separated from one another at a distance such that with each web 15, one bundling unit 3 from the buffer line 9 is driven in the direction of transport A.

[0025] The strip-format film material 5.1 is supplied in the form of a roll 5.2 that is held on a mandrel or a bracket 5.3 and is pulled off this roll in a direction of movement or transport B during the operation of the device 1. From the roll 5.2, the film material 5.1 is transported by means of a plurality of deflector pulleys first through various devices 16 and 17, among others, to define the correct length and/or to maintain a specified strip tension opposite to the direction of transport A, to a printing station 18, through which the strip-format film material 5.1, after a deflection in the direction of transport A, is moved, in which this material is printed in the manner described in greater detail below. In the direction of travel B of the film material 5.1, downstream of the printing station 18

is a cutting station 19, in which the length of the printed film material 5.1 desired to wrap one bundling unit 3 is separated and then transported by means of a conveyor 20 to the wrapping station 11.

[0026] The supply roll 5.2, the units 16 and 17, the printing station 19 and the conveyor element 20 are located inside the equipment frame 6 below the conveyor line formed by the conveyor 7.

[0027] A first characteristic of the present application is that the printing of the film material 5.1 in the device 1 takes place immediately or substantially immediately before the use of this material. It is thereby possible to use, as the film material 5.1, a neutral film which is then provided with the printed impression desired for the bundle 4.

[0028] In detail, the printing station 18 comprises, viewed sequentially in the illustrated embodiment in the direction of travel or transport B of the film material 5.1, a pre-heater unit 21, a printer unit 22 which is adjacent to the pre-heater unit 21, a unit 23 that follows the printing unit 22 for the drying of the individual impression or printed image, and possibly as a function of the ink used for the printing by heating or heat treatment or UV treatment, etc.

[0029] An additional feature of the device 1 is the realization of the printing unit 22. The printing unit 22, as illustrated in FIGS. 2 and 3, comprises a plurality of printheads 24 which are oriented at a right angle or virtually perpendicular to the direction of travel B of the film material 5.1 at a short distance above this material or above the printing plane formed by the film material 5.1. In the illustrated embodiment, this printing plane is a horizontal plane.

[0030] To promote optimum printing performance (number of impressions per unit of time) with the optimum possible printing quality, in this embodiment the print heads 24 are realized in the form of electrostatic printheads. For a multi-color printing there may be at least three printheads, each of which is used to print one color set of a multi-color printing. The printing heads thus comprise, in their coloring, different colors of ink, e.g. red, blue and yellow. Basically it is also possible to provide additional print-heads 24 on the printing unit 22, for example a fourth printhead 24 for black ink.

[0031] As also shown in FIGS. 2 and 3, the printhead 24 comprises of a housing 25 which forms, among other things, a closed interior compartment 26 which holds the liquid or viscous ink. Each housing 25 is designed so that the interior compartment 26 tapers in a cone or wedge shape toward a lower housing segment 25.1. On this housing segment 25.1, which extends over the entire length of each printhead 24 or its housing 25 and is oriented parallel or virtually parallel to a longitudinal axis DL of the housing or printhead and thus also parallel or virtually parallel to the printing plane, there are a plurality of individually activated nozzles 27 for the controlled dispensing of the ink, and possibly in at least one row sequentially in the direction of the longitudinal axis DL of the printhead and arranged close together, so that, for example, one hundred and fifty individual nozzles 27 per inch or more are formed on the housing segment 25.1. With the housing segment 25.1 that has the individual nozzles 27, each printhead 24 is located at the above mentioned short distance above the film material 5.1 to be printed or the printing plane. The film material 5.1 is continuously or discontinuously moved forward past the respective printhead 24 during the printing in the direction of travel B. As a result of the above mentioned orientation of the printheads 24, in at least one embodiment the direction of forward movement or travel B is

at a right angle, that is perpendicular or virtually perpendicular to the printhead longitudinal axis DL of the printheads 24. In the illustrated embodiment, the printheads 24 are arranged with their longitudinal axes DL of the printheads parallel or virtually parallel to one another in the horizontal direction, and in at least one embodiment in a common horizontal plane.

[0032] Each individual nozzle 27 comprises an aperture 28 and a needle-shaped electrode 29 that corresponds to this aperture 28. The axis of the electrode 29 is oriented equiaxially with the axis of the respective aperture 28 and ends at a slight distance from this aperture 28 inside the housing interior compartment 26. Each printhead 24 is also realized so that, at least during the printing process, the ink that is in the housing interior compartment 26 is pressed at a certain hydrostatic pressure toward the apertures 28 of the individual nozzles 27. The cross section of the openings 28, however, is selected taking the viscosity and/or the surface tension of the ink into consideration so that when the individual nozzle 27 is not activated, ink does not exit the apertures 28 in spite of the hydrostatic pressure.

[0033] The electrodes 29 can be actuated individually by means of a control device 30, and possibly so that when the individual nozzle 27 is not activated, the corresponding electrode 29 is at the same electrical potential as the ink in the interior 26 of the housing. When an individual nozzle 27 is activated, the potential of the corresponding electrode 29 is varied briefly or in a pulsed fashion by a corresponding activation or actuation by the control device 30, so that ink is dispensed via the aperture 28 to produce a printed dot 31 on the film material 5.1.

[0034] Because the printheads 24 are oriented with the longitudinal axis DL of their printhead at a right angle or perpendicular or virtually perpendicular to the direction B of forward travel of the film material 5.1, the printing on the film material 5.1 is often done in rows that run perpendicular or virtually perpendicular to the longitudinal direction or direction of forward travel B of the film material 5.2 over the entire width of the area to be printed, e.g. over a large part of the width of the film material 5.1, and possibly progressively in the direction of forward travel B of the film material 5.1. The individual nozzles 27 can be activated at high speed. For the printing, moreover, a single relative movement between the film material 5.1 and the respective printhead 24, namely only which movement, in at least one embodiment, comprises the forward movement of the film material 5.1. For these reasons a high print output can be achieved. The respective image is generated digitally in the control device 30 by a corresponding actuation of the individual nozzles 27 and is stored in the control device 30 or in a memory of the control device in the form of a digital dataset.

[0035] The film material 5.1 is printed in the printing unit 22 so that the imprint and/or the graphic and/or color layout or decoration of the film material 5.1 is produced completely by the printing unit 22 on the neutral film material 5.1 and/or an imprint that is already present on the film material 5.1 is supplemented in a desired fashion with the printer unit 22, e.g. text, colors or graphics can be added. Various advantageous capabilities, i.e. among others the ability to rapidly convert the device 1 to different products, to set and/or adjust the size of the current printed impression to the size of the bundle 4, etc., become possible because the film material is printed in the device 1, i.e. immediately or essentially immediately before the use of this material for the formation of the bundles 4, and as a result of the activation of the printer unit

22 or of the printheads 24 located in it by the electronic control unit 30 with the use of digital print forms or templates stored in the printer unit. It is also possible to easily modify the impression on the film material 5.1 simply by reprogramming or modifying a program in the electronic control device 30. It is also possible, among other things, during the printing process, to change the impression and thus the packaging of the bundle 4, e.g. to reformat or redesign the printed image for each bundle 4, often so that each printed image may be then composed of a constant, unchanging component and variable text and/or information. The components of the printed image that vary can, for example, be numerical or alphanumeric information, e.g. information relating to the manufacturing date, the use-by date or information in the form of a numerical code, etc.

[0036] It goes without saying that the forward movement of the film material 5.1, at least in the vicinity of the printheads 24, is regulated by the electronic control device 30, and possibly in synchronization with the actuation of the printheads 24, to thereby achieve a clear, high-quality printed image. It further goes without saying that centering and guide means for the film material 5.1 are provided in the vicinity of the printheads 24 to optimally orient this material with reference to the printheads 24, and/or to comply with the specified distance between the printheads 24 and the film material 5.1. [0037] In the pre-heater unit 21 that is upstream of the printing unit 22 and the printheads 24 in it, the film material 5.1 is preheated so that the ink of the ink sets produced by the individual printheads 24 sets or bonds to the surface at least to the extent that an undesirable mixing of the individual inks is restricted. To improve the printed image in terms of contrast and/or sharpness, the pre-heater device 21 can have additional elements, for example a corona element (not shown), with which the film material 5.1 is electrostatically charged before printing, at least on the side that will be printed.

[0038] The ink is dried or set in the unit 23 that is downstream of the printing unit 22 in the direction of forward travel B, namely by heating or in another suitable manner, e.g. by setting under UV light, etc.

[0039] The present application was described above on the basis of one possible embodiment. It goes without saying that numerous variations and modifications are possible without thereby going beyond the teaching of the present application.

[0040] In a method for the formation of bundles consisting of a plurality of containers by wrapping with a film material, the film material is printed immediately or essentially immediately before the wrapping by at least one printing unit which is provided in the direction of travel of the film material between the supply and the packaging station.

[0041] One feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in a method for the formation of bundles 4 consisting of a plurality of containers 2 by wrapping with a printed, strip-format film material 5.1 in a packaging station 11 to which the film material taken from a supply 5.2 is fed, whereby the film material 5.1 is printed at least partly in one or more colors at a printing unit 22 which is upstream of the packaging station 11 in the direction of transport B of the film 5 and the film material 5.2 pulled off the supply 5.2 is a neutral film with or without an imprint is done using at least one printing unit 22 which produces the print and/or the printed image as a function of an electronic actuator device 30, by generating the printed image as a function of templates that are stored electronically or in the form of software in the

control device 30, wherein the printing takes place during relative movement between the film material 5.1 and the printing unit 22 or at least one printhead 24 of the printing unit 22.

[0042] Another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the method, wherein the film material 5.1 is moved relative to the printing unit 22 and to the at least one printhead 24 located on the printing unit.

[0043] Yet another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the method as, wherein the at least one printing unit 22 has at least one electrostatic printhead 24 with a plurality of individually activatable individual nozzles 27 for the controlled dispensing of ink, and the individual nozzles 27 are arranged in at least one row one after another in a longitudinal axis DL of the printhead.

[0044] Still another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the method, wherein the printed image is modified at least partly during the formation of the bundle 4.

[0045] A further feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the method, wherein the film material 5.1 is printed in lines at a right angle to a longitudinal direction of the film material or at a right angle to the direction of transport B of the film material 5.1, and possibly, for example, over the entire width or a major portion of the width of the film material 5.1.

[0046] Another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the method, wherein the relative movement between the at least one printhead 24 and the film material 5.1 takes place at a right angle or perpendicular to the longitudinal axis DL of the printhead.

[0047] Yet another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the method, wherein the film material 5.1 is oriented horizontally or essentially horizontally during the printing.

[0048] Still another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the method, wherein the at least one printhead 24 is located above the film material 5.1 to be printed.

[0049] A further feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the method, characterized by at least two and preferably at least three printheads 24.

[0050] Another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the method, wherein for the production of a multi-color impression, one color set of this impression is produced with each printhead 24.

[0051] Yet another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the method, wherein the ink, after it has been applied to the film material 5.1, it is dried and/or set by the application of energy, e.g. by heating and/or UV light.

[0052] Another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the method, wherein the film material 5.1 is heated and/or statically charged before printing.

[0053] Yet another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the method, wherein the individual length of film material for the formation of a bundle 4 is separated in a cutting station 19 from the film material 5.1, and the printing of the film material takes place before the separation.

[0054] Still another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the method, wherein the individual length of film material for the formation of a bundle 4 is separated in a cutting station 19 from the film material 5.1, and the printing of the film material takes place after the separation.

[0055] A further feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the method, wherein the film material 5.1, after the winding for the formation of a shrunk film or wrapping 5 that surrounds the containers 2 is shrunk by the application of heat.

[0056] Another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in a device for the formation of bundles 4 consisting of a plurality of containers 2 by wrapping with a film material in a wrapping or packaging station 11, to which film material pulled from a supply 5.2 is fed in a feed direction B, whereby between the supply 5.2 and the packaging station 11 there is at least one printing unit 22 for the printing of the film material 5.1, in which the at least one printing unit 22 is realized for a single-color or multiple-color printing of the film material 5.1 and the image is produced as a function of an electrical control unit, wherein means are provided to produce the relative movement between the film material and the at least one printing unit 22 or at least one printhead 24 of this printing unit 22 during the printing.

[0057] Yet another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the device, characterized by feed means, with which the film material 5.1 is moved relative to the at least one printing unit 2 or to the at least one printhead 24 located in it.

[0058] Still another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the device, wherein the at least one printing unit 22 has at least one electrostatic printhead 24 with a plurality of individually activated individual nozzles 27 for the controlled dispensing of ink, and the individual nozzles 27 are arranged in at least one row one after another in a longitudinal axis DL of the a printhead.

[0059] A further feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the device, wherein the at least one printhead 24 is oriented with a printhead longitudinal axis DL at a right angle or perpendicular to the feed direction B of the film material 5.1.

[0060] Another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the device, wherein the at least one printing unit 22 produces the image as a function of templates that are stored electronically or in the form of software in the control device 30.

[0061] Yet another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the device, wherein the printing

unit 22 or at least one printhead 24 of this unit prints the strip-format film material 5.1 by rows at a right angle to the longitudinal direction of the strip, and possibly over the entire width or a major portion of this width.

[0062] Another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the device, wherein the film material 5.1 is oriented horizontally or essentially horizontally during printing.

[0063] Yet another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the device, wherein the at least one print head 24 is located above the film material 5.1.

[0064] Still another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the device, characterized by at least two and preferably by at least three printheads 24.

[0065] A further feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the device, wherein for the production of a multi-color impression, each printhead 24 corresponds to one color set of the impression.

[0066] Another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the device, characterized by means 23 for the drying of the ink after the application to the film material 5.1 by the action of energy, for example by heating and/or by UV light.

[0067] Yet another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the device, characterized by means 21 for the heading and/or electrostatic charging of the film material 5.1 before printing.

[0068] Still another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the device, characterized by a cutting station 19 for the separation of a length of the film material 5.1 that is fed to the packaging station 11 for the production of a bundle, whereby the at least one printing unit 22 is provide upstream of the cutting station 19 or downstream of the cutting station 19 in the direction of transport B of the film material 5.1.

[0069] A further feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the device, characterized by a conveyor line formed by at least one conveyor 7, on which the containers 2 that are fed to the device at an inlet 8.1 are combined into a pack 3, which is then wrapped in the packaging station 11 with the film material 5.1, and the at least one printing unit 22 is located underneath the conveyor line, and in particular preferably together with the supply of the film material 5.1 formed by a supply roller 5.2 and/or a holder 5.3 for this supply.

[0070] At least one feature or aspect of an embodiment of the German application No. 10 2006 009 348.8 was believed at the time of the filing of the German application to possibly reside broadly in a method for the formation of bundles 4 consisting of a plurality of containers 2 by wrapping with a printed, strip-format film material 5.1 in a packaging station 11 to which the film material taken from a supply 5.2 is fed, wherein the film material 5.1 is at least partly printed in a printing unit 22 that is upstream of the packaging station 11 in the direction of transport B of the film 5.1.

[0071] At least one feature or aspect of an embodiment of the German application was believed at the time of the filing of the German application to possibly reside broadly in the method, wherein the film material 5.1 pulled off the supply 5.2 is a neutral film without printing.

[0072] At least one feature or aspect of an embodiment of the German application No. 10 2006 009 348.8 was believed at the time of the filing of the German application to possibly reside broadly in the method, wherein the film material pulled off the supply 5.2 is preprinted, and the printing of the film material 5.1 is an addition to the printed image that is already present on this material.

[0073] At least one feature or aspect of an embodiment of the German application No. 10 2006 009 348.8 was believed at the time of the filing of the German application to possibly reside broadly in the method, wherein the film material 5.1 is printed in multiple colors.

[0074] At least one feature or aspect of an embodiment of the German application No. 10 2006 009 348.8 was believed at the time of the filing of the German application to possibly reside broadly in the method, wherein the film material 5.1 is printed using at least one printing unit 22 which generates the print or the printed image as a function of an electronic actuation unit 30.

[0075] At least one feature or aspect of an embodiment of the German application No. 10 2006 009 348.8 was believed at the time of the filing of the German application to possibly reside broadly in the method, wherein the printing unit 22 generates the printed image as a function of templates stored electronically in the control device 30 or by means of software.

[0076] At least one feature or aspect of an embodiment of the German application No. 10 2006 009 348.8 was believed at the time of the filing of the German application to possibly reside broadly in a device for the formation of bundles 4 consisting of a plurality of containers 2 by wrapping with a film material in a wrapping or packaging station 11, to which film material pulled from a supply 5.2 is fed in a feed direction B wherein, between the supply 5.2 and the packaging station 11 there is at least one printing unit 22 for the printing of the film material 5.1.

[0077] At least one feature or aspect of an embodiment of the German application No. 10 2006 009 348.8 was believed at the time of the filing of the German application to possibly reside broadly in the device, wherein the at least one printing unit 22 is realized for a multi-color printing of the film material 5.1.

[0078] At least one feature or aspect of an embodiment of the German application No. 10 2006 009 348.8 was believed at the time of the filing of the German application to possibly reside broadly in the device, characterized by means for the production of the relative movement between the film material 5.1 and the at least one printing unit 22 or at least one printhead 24 of this printing unit 22 during printing.

[0079] At least one feature or aspect of an embodiment of the German application No. 10 2006 009 348.8 was believed at the time of the filing of the German application to possibly reside broadly in the device, characterized by feed means, with which the film material 5.1 is moved relative to the at least one printing unit 2 or to the at least one printhead 24 located in it.

[0080] The components disclosed in the various publications, disclosed or incorporated by reference herein, may

possibly be used in possible embodiments of the present invention, as well as equivalents thereof.

[0081] The purpose of the statements about the technical field is generally to enable the Patent and Trademark Office and the public to determine quickly, from a cursory inspection, the nature of this patent application. The description of the technical field is believed, at the time of the filing of this patent application, to adequately describe the technical field of this patent application. However, the description of the technical field may not be completely applicable to the claims as originally filed in this patent application, as amended during prosecution of this patent application, and as ultimately allowed in any patent issuing from this patent application. Therefore, any statements made relating to the technical field are not intended to limit the claims in any manner and should not be interpreted as limiting the claims in any manner.

[0082] The appended drawings in their entirety, including all dimensions, proportions and/or shapes in at least one embodiment of the invention, are accurate and are hereby included by reference into this specification.

[0083] The background information is believed, at the time of the filing of this patent application, to adequately provide background information for this patent application. However, the background information may not be completely applicable to the claims as originally filed in this patent application, as amended during prosecution of this patent application, and as ultimately allowed in any patent issuing from this patent application. Therefore, any statements made relating to the background information are not intended to limit the claims in any manner and should not be interpreted as limiting the claims in any manner.

[0084] All, or substantially all, of the components and methods of the various embodiments may be used with at least one embodiment or all of the embodiments, if more than one embodiment is described herein.

[0085] The purpose of the statements about the object or objects is generally to enable the Patent and Trademark Office and the public to determine quickly, from a cursory inspection, the nature of this patent application. The description of the object or objects is believed, at the time of the filing of this patent application, to adequately describe the object or objects of this patent application. However, the description of the object or objects may not be completely applicable to the claims as originally filed in this patent application, as amended during prosecution of this patent application, and as ultimately allowed in any patent issuing from this patent application. Therefore, any statements made relating to the object or objects are not intended to limit the claims in any manner and should not be interpreted as limiting the claims in any manner.

[0086] All of the patents, patent applications and publications recited herein, and in the Declaration attached hereto, are hereby incorporated by reference as if set forth in their entirety herein.

[0087] The summary is believed, at the time of the filing of this patent application, to adequately summarize this patent application. However, portions or all of the information contained in the summary may not be completely applicable to the claims as originally filed in this patent application, as amended during prosecution of this patent application, and as ultimately allowed in any patent issuing from this patent application. Therefore, any statements made relating to the

summary are not intended to limit the claims in any manner and should not be interpreted as limiting the claims in any manner.

[0088] It will be understood that the examples of patents, published patent applications, and other documents which are included in this application and which are referred to in paragraphs which state "Some examples of . . . which may possibly be used in at least one possible embodiment of the present application . . ." may possibly not be used or useable in any one or more embodiments of the application.

[0089] The sentence immediately above relates to patents, published patent applications and other documents either incorporated by reference or not incorporated by reference.

[0090] All of the patents, patent applications or patent publications, which were cited in the International Search Report dated Oct. 24, 2007, and/or cited elsewhere are hereby incorporated by reference as if set forth in their entirety herein as follows: EP 1717151 issued on Nov. 2, 2006, entitled "Wrapping with Decorative Foil;" EP 1038780 issued Sep. 27, 2000, entitled "Method and Apparatus for Printing Blanks;" DE 10212889 issued Aug. 5, 2004, entitled "Blister Pack Manufacturing Device Has Markings Provided by Underlying Foil Detected for Providing Activation Signals for Printer Used for Printing Overlying Foil."

[0091] The purpose of incorporating U.S. patents, Foreign patents, publications, etc. is solely to provide additional information relating to features of one or more embodiments, which information may not be completely disclosed in the wording in the pages of this application. Words relating to the opinions and judgments of the author and not directly relating to the technical details of the description of the embodiments therein are not incorporated by reference. The words all, always, absolutely, consistently, preferably, guarantee, particularly, constantly, ensure, necessarily, immediately, endlessly, avoid, exactly, continually, expediently, need, must, only, perpetual, precise, perfect, require, requisite, simultaneous, total, unavoidable, and unnecessary, or words substantially equivalent to the above-mentioned words in this sentence, are not considered to be incorporated by reference.

[0092] The following U.S. Pat. No. 5,713,403, issued Feb. 3, 1998, to Clüsserath, is hereby incorporated by reference as if set forth in its entirety herein.

[0093] The corresponding foreign and international patent publication applications, namely, Federal Republic of Germany Patent Application No. 10 2006 009 348.8, filed on Mar. 1, 2006, having inventor Volker TILL, and DE-OS 10 2006 009 348.8 and DE-PS 10 2006 009 348.8, and International Application No. PCT/EP2007/000888, filed on Feb. 2, 2007, having WIPO Publication No. WO2007/101517 and inventor Volker TILL, are hereby incorporated by reference as if set forth in their entirety herein for the purpose of correcting and explaining any possible misinterpretations of the English translation thereof. In addition, the published equivalents of the above corresponding foreign and international patent publication applications, and other equivalents or corresponding applications, if any, in corresponding cases in the Federal Republic of Germany and elsewhere, and the references and documents cited in any of the documents cited herein, such as the patents, patent applications and publications, are hereby incorporated by reference as if set forth in their entirety herein.

[0094] The purpose of incorporating the Foreign equivalent patent application PCT/2007/000888 and Federal Republic of Germany Patent Application 10 2006 009 348.8 is solely

for the purpose of providing a basis of correction of any wording in the pages of the present application, which may have been mistranslated or misinterpreted by the translator. Words relating to opinions and judgments of the author and not directly relating to the technical details of the description of the embodiments therein are not to be incorporated by reference. The words all, always, absolutely, consistently, preferably, guarantee, particularly, constantly, ensure, necessarily, immediately, endlessly, avoid, exactly, continually, expediently, need, must, only, perpetual, precise, perfect, require, requisite, simultaneous, total, unavoidable, and unnecessary, or words substantially equivalent to the above-mentioned word in this sentence, are not generally considered to be incorporated by reference.

[0095] Statements made in the original foreign patent applications PCT/2007/000888 and DE 10 2006 009 348.8 from which this patent application claims priority which do not have to do with the correction of the translation in this patent application are not to be included in this patent application in the incorporation by reference.

[0096] All of the references and documents, cited in any of the documents cited herein, are hereby incorporated by reference as if set forth in their entirety herein. All of the documents cited herein, referred to in the immediately preceding sentence, include all of the patents, patent applications and publications cited anywhere in the present application.

[0097] The description of the embodiment or embodiments is believed, at the time of the filing of this patent application, to adequately describe the embodiment or embodiments of this patent application. However, portions of the description of the embodiment or embodiments may not be completely applicable to the claims as originally filed in this patent application, as amended during prosecution of this patent application, and as ultimately allowed in any patent issuing from this patent application. Therefore, any statements made relating to the embodiment or embodiments are not intended to limit the claims in any manner and should not be interpreted as limiting the claims in any manner.

[0098] The details in the patents, patent applications and publications may be considered to be incorporable, at applicant's option, into the claims during prosecution as further limitations in the claims to patentably distinguish any amended claims from any applied prior art.

[0099] The purpose of the title of this patent application is generally to enable the Patent and Trademark Office and the public to determine quickly, from a cursory inspection, the nature of this patent application. The title is believed, at the time of the filing of this patent application, to adequately reflect the general nature of this patent application. However, the title may not be completely applicable to the technical field, the object or objects, the summary, the description of the embodiment or embodiments, and the claims as originally filed in this patent application, as amended during prosecution of this patent application, and as ultimately allowed in any patent issuing from this patent application. Therefore, the title is not intended to limit the claims in any manner and should not be interpreted as limiting the claims in any manner.

[0100] The abstract of the disclosure is submitted herewith as required by 37 C.F.R. §1.72(b). As stated in 37 C.F.R. §1.72(b):

[0101] A brief abstract of the technical disclosure in the specification must commence on a separate sheet, preferably following the claims, under the heading "Abstract of the Disclosure." The purpose of the abstract is to

enable the Patent and Trademark Office and the public generally to determine quickly from a cursory inspection the nature and gist of the technical disclosure. The abstract shall not be used for interpreting the scope of the claims.

Therefore, any statements made relating to the abstract are not intended to limit the claims in any manner and should not be interpreted as limiting the claims in any manner.

[0102] The Innopack packaging machine, manufactured by KHS Maschinen und Anlagenbau AG, is an example of a packaging machine which may possibly be utilized or adapted for use in at least one possible embodiment. Some other examples of packaging machines which may possibly be utilized or adapted for use in at least one possible embodiment may possibly be found in the following U.S. Pat. No. 4,964,260, entitled "Packaging machine for cardboard boxes and process for packaging articles in cardboard boxes;" No. 4,785,610, entitled "Automatic machine for packaging products of different kinds in boxes;" No. 5,265,398, entitled "Automatic counting and boxing machine;" No. 5,943,847, entitled "Packaging machine for multi-packs;" No. 5,937,620, entitled "Packaging machine for multi-packs;" No. 5,711,137, entitled "Packaging machine and method of packaging articles;" and No. 5,706,633, entitled "Packaging machine and method of packaging articles."

[0103] The purpose of incorporating U.S. patents, Foreign patents, publications, etc. is solely to provide additional information relating to features of one or more embodiments, which information may not be completely disclosed in the wording in the pages of this application. Words relating to the opinions and judgments of the author and not directly relating to the technical details of the description of the embodiments therein are not incorporated by reference. The words all, always, absolutely, consistently, preferably, guarantee, particularly, constantly, ensure, necessarily, immediately, endlessly, avoid, exactly, continually, expediently, need, must, only, perpetual, precise, perfect, require, requisite, simultaneous, total, unavoidable, and unnecessary, or words substantially equivalent to the above-mentioned words in this sentence, are not considered to be incorporated by reference.

[0104] Some examples of shrink wrapping machines or machines for wrapping items in plastic film which may possibly be utilized or adapted for use in at least one possible embodiment may possibly be found in the following U.S. Pat. No. 6,826,893, entitled "Apparatus for wrapping products with plastic film;" No. 6,739,115, entitled "Equipment for wrapping groups of products in plastic film;" No. 5,878,555, entitled "Apparatus for wrapping articles in plastic film;" No. 5,787,691, entitled "Apparatus for wrapping articles in plastic film;" No. 5,519,983, entitled "Shrink wrap packaging system with an ultrasonic side sealer;" No. 4,956,963, entitled "Method of sealing a shrink wrap package;" No. 4,873,814, entitled "Method of making a shrink wrap package;" No. 4,214,419, entitled "Collating and shrink wrap packaging apparatus;" No. 6,484,475, entitled "Modular packaging machine;" No. 4,694,633, entitled "Film wrapping machine;" No. 4,118,916, entitled "Thermoplastic wrapping machine;" No. 4,118,916, entitled "Thermoplastic wrapping machine;" No. 5,371,999, entitled "Shrink film wrapping machine;" No. 4,748,795, entitled "Film wrapping machine;" and No. 5,115,620, entitled "Wrapping machine."

[0105] The purpose of incorporating U.S. patents, Foreign patents, publications, etc. is solely to provide additional information relating to features of one or more embodiments,

which information may not be completely disclosed in the wording in the pages of this application. Words relating to the opinions and judgments of the author and not directly relating to the technical details of the description of the embodiments therein are not incorporated by reference. The words all, always, absolutely, consistently, preferably, guarantee, particularly, constantly, ensure, necessarily, immediately, endlessly, avoid, exactly, continually, expediently, need, must, only, perpetual, precise, perfect, require, requisite, simultaneous, total, unavoidable, and unnecessary, or words substantially equivalent to the above-mentioned words in this sentence, are not considered to be incorporated by reference.

[0106] The Innopack Kisters ST shrink tunnels, manufactured by KHS Maschinen und Anlagenbau AG, is an example of a shrink tunnel which may possibly be utilized or adapted for use in at least one possible embodiment. Some other examples of shrink tunnels which may possibly be utilized or adapted for use in at least one possible embodiment may possibly be found in the following U.S. Pat. No. 7,363,728, issued Apr. 29, 2008, entitled "Shrink Wrap Tunnel with Variable Set Points;" U.S. Pat. No. 5,746,041, issued May 5, 1998, entitled "Shrinking Selected Portions of Film Wrapped Around a Product;" No. 5,740,659, issued Apr. 21, 1998, entitled "Shrink Tunnel and Methods Relating Thereto;" and No. 5,546,677, issued Aug. 20, 1996, entitled "Apparatus and Method for Shrinking Film Wrapped Around a Product."

[0107] The purpose of incorporating U.S. patents, Foreign patents, publications, etc. is solely to provide additional information relating to features of one or more embodiments, which information may not be completely disclosed in the wording in the pages of this application. Words relating to the opinions and judgments of the author and not directly relating to the technical details of the description of the embodiments therein are not incorporated by reference. The words all, always, absolutely, consistently, preferably, guarantee, particularly, constantly, ensure, necessarily, immediately, endlessly, avoid, exactly, continually, expediently, need, must, only, perpetual, precise, perfect, require, requisite, simultaneous, total, unavoidable, and unnecessary, or words substantially equivalent to the above-mentioned words in this sentence, are not considered to be incorporated by reference.

[0108] Some examples of shrink film that may possibly be utilized or adapted for use in at least one possible embodiment may possibly be found in the following U.S. Pat. No. 5,091,237, issued Feb. 25, 1992, entitled "Transparent Shrink Film Based on Polypropylene, Process for Its Manufacture, and Its Use for Shrink Labels;" No. 5,480,945, issued Jan. 2, 1996, entitled "Amorphous Nylon Copolymer and Copolyamide Films and Blends;" No. 6,479,138, issued Nov. 12, 2002, entitled "Low Shrink Tension Film;" and No. 6,344,250, issued Feb. 5, 2002, entitled "Multi-layered Polyolefin High Shrinkage, Low Shrink Force Shrink Film."

[0109] The purpose of incorporating U.S. patents, Foreign patents, publications, etc. is solely to provide additional information relating to features of one or more embodiments, which information may not be completely disclosed in the wording in the pages of this application. Words relating to the opinions and judgments of the author and not directly relating to the technical details of the description of the embodiments therein are not incorporated by reference. The words all, always, absolutely, consistently, preferably, guarantee, particularly, constantly, ensure, necessarily, immediately, endlessly, avoid, exactly, continually, expediently, need, must, only, perpetual, precise, perfect, require, requisite, simulta-

neous, total, unavoidable, and unnecessary, or words substantially equivalent to the above-mentioned words in this sentence, are not considered to be incorporated by reference.

[0110] The “Tonejet” printhead, developed by The Technology Partnership plc, is an example of a printhead which may possibly be utilized or adapted for use in at least one possible embodiment. Some examples of printheads that may possibly be utilized or adapted for use in at least one possible embodiment may possibly be found in the following U.S. Pat. No. 7,387,366, issued Jun. 17, 2008, entitled “Printhead;” No. 6,820,965, issued Nov. 23, 2004, entitled “Drop-on-Demand Printer;” No. 7,407,271, issued Aug. 5, 2008, entitled “Self-Cooling Thermal Ink Jet Printhead;” and No. 7,380,906, issued Jun. 3, 2008, entitled “Printhead.”

[0111] The purpose of incorporating U.S. patents, Foreign patents, publications, etc. is solely to provide additional information relating to features of one or more embodiments, which information may not be completely disclosed in the wording in the pages of this application. Words relating to the opinions and judgments of the author and not directly relating to the technical details of the description of the embodiments therein are not incorporated by reference. The words all, always, absolutely, consistently, preferably, guarantee, particularly, constantly, ensure, necessarily, immediately, endlessly, avoid, exactly, continually, expediently, need, must, only, perpetual, precise, perfect, require, requisite, simultaneous, total, unavoidable, and unnecessary, or words substantially equivalent to the above-mentioned words in this sentence, are not considered to be incorporated by reference.

[0112] Some examples of drying units that may possibly be utilized or adapted for use in at least one possible embodiment may possibly be found in the following U.S. Pat. No. 7,416,294, issued Aug. 26, 2008, entitled “Image Forming Apparatus and Liquid Control Method;” No. 7,413,278, issued Aug. 19, 2008, entitled “Image Forming Apparatus and Ejection Determining Method;” and No. 7,357,473, issued Apr. 15, 2008, entitled “Inkjet Recording Apparatus and Method.”

[0113] The purpose of incorporating U.S. patents, Foreign patents, publications, etc. is solely to provide additional information relating to features of one or more embodiments, which information may not be completely disclosed in the wording in the pages of this application. Words relating to the opinions and judgments of the author and not directly relating to the technical details of the description of the embodiments therein are not incorporated by reference. The words all, always, absolutely, consistently, preferably, guarantee, particularly, constantly, ensure, necessarily, immediately, endlessly, avoid, exactly, continually, expediently, need, must, only, perpetual, precise, perfect, require, requisite, simultaneous, total, unavoidable, and unnecessary, or words substantially equivalent to the above-mentioned words in this sentence, are not considered to be incorporated by reference.

[0114] Some examples of computer systems that may possibly be utilized or possibly adapted for use in at least one possible embodiment of the present application may possibly be found in the following U.S. Pat. No. 5,416,480 issued to Roach et al. on May 16, 1995; No. 5,479,355 issued to Hyde on Dec. 26, 1995; No. 5,481,730 issued to Brown et al. on Jan. 2, 1996; No. 5,805,094 issued to Roach et al. on Sep. 8, 1998; No. 5,881,227 issued to Atkinson et al. on Mar. 9, 1999; and No. 6,072,462 issued to Moshovich on Jun. 6, 2000.

[0115] The purpose of incorporating U.S. patents, Foreign patents, publications, etc. is solely to provide additional infor-

mation relating to features of one or more embodiments, which information may not be completely disclosed in the wording in the pages of this application. Words relating to the opinions and judgments of the author and not directly relating to the technical details of the description of the embodiments therein are not incorporated by reference. The words all, always, absolutely, consistently, preferably, guarantee, particularly, constantly, ensure, necessarily, immediately, endlessly, avoid, exactly, continually, expediently, need, must, only, perpetual, precise, perfect, require, requisite, simultaneous, total, unavoidable, and unnecessary, or words substantially equivalent to the above-mentioned words in this sentence, are not considered to be incorporated by reference.

[0116] The embodiments of the invention described herein above in the context of the preferred embodiments are not to be taken as limiting the embodiments of the invention to all of the provided details thereof, since modifications and variations thereof may be made without departing from the spirit and scope of the embodiments of the invention.

NOMENCLATURE

[0117]	1 Packaging device
[0118]	2 Container
[0119]	3 Group of containers or bundling
[0120]	4 Bundle
[0121]	5 Shrink shrink-wrap
[0122]	5.1 Film material
[0123]	5.2 Supply roll
[0124]	5.3 Mandrel or bracket
[0125]	6 Equipment frame
[0126]	7 Internal conveyor
[0127]	8.1 Inlet
[0128]	8.2 Outlet
[0129]	9 Buffer section
[0130]	10 Divider unit
[0131]	11 Unit for wrapping the container
[0132]	12 Shrink wrap tunnel
[0133]	13 Additional conveyor
[0134]	14 Conveyor belt
[0135]	15 Web
[0136]	16, 17 Device for regulating strip tension
[0137]	18 Printing station
[0138]	19 Cutting station
[0139]	20 Feed device
[0140]	21 Pre-heater unit
[0141]	22 Printer unit
[0142]	23 Unit for drying ink
[0143]	24 Printhead
[0144]	25 Housing
[0145]	25.1 Housing section
[0146]	26 Interior compartment
[0147]	27 Individual nozzle
[0148]	28 Aperture
[0149]	29 Electrode
[0150]	30 Electronic control device
[0151]	31 Printed dot
[0152]	A Direction of transport of the
[0153]	B Direction of forward motion of the film

What is claimed is:

1. A method of operating a multiple container shrink wrapping machine configured to shrink wrap multiple containers into a shrink wrapped pack of containers, said multiple container shrink wrapping machine comprising: a buffer line and a divider unit being configured and disposed to form a pack

comprising a plurality of containers; an arrangement to store shrink wrap film material with or without an imprint that has not yet been printed upon by said machine; a shrink wrapping station being configured and disposed to shrink wrap a plurality of containers with shrink wrap film material into a shrink wrapped pack; a printing arrangement configured to print on the shrink wrap film material simultaneously with the wrapping of the containers into a pack of containers; said printing arrangement comprising at least one printing unit disposed a substantial distance away from said shrink wrapping station; said at least one printing unit comprising at least one printhead; said printing unit being configured to print in at least one color; a supply arrangement configured to store the at least one color; a supply of shrink wrap film material with or without an imprint; and a control device being configured and disposed to control at least said printing arrangement; said control device comprising at least one of: printing templates and printing software stored electronically;

said method comprising:

feeding said shrink wrap film material from said supply to said printing arrangement;

moving said shrink wrap film material through said printing arrangement while simultaneously printing at least one color on a predetermined portion of said shrink wrap material with said at least one printing unit to make a predetermined portion of printed shrink wrap film material;

forming a predetermined pack of a predetermined plurality of containers; and

wrapping said predetermined pack comprising said predetermined plurality of containers with said predetermined portion of printed shrink wrap film material to identify said predetermined pack of containers.

2. A method of operating a multiple container shrink wrapping machine configured to shrink wrap multiple containers into a shrink wrapped pack of containers, said multiple container shrink wrapping machine comprising: an arrangement being configured and disposed to form a pack comprising a plurality of containers; an arrangement to store shrink wrap film material with or without an imprint that has not yet been printed upon by said machine; a shrink wrapping station being configured and disposed to shrink wrap a plurality of containers with shrink wrap film material into a shrink wrapped pack; a printing arrangement configured to print on the shrink wrap film material substantially simultaneously with the wrapping of a pack of containers; said printing arrangement comprising at least one printing unit disposed a distance away from said shrink wrapping station; said at least one printing unit comprising at least one printhead; said printing unit being configured to print in at least one color; a supply arrangement configured to store the at least one color; a supply of shrink wrap film material with or without an imprint; and a control device being configured and disposed to control at least said printing arrangement; said control device comprising at least one of: printing templates and printing software stored electronically;

said method comprising:

feeding said shrink wrap film material from said supply to said printing arrangement;

moving said shrink wrap film material through said printing arrangement;

moving at least one of said shrink wrap film material and said at least one printhead with respect to one another while substantially simultaneously printing at least one

color on a predetermined portion of said shrink wrap film material with said at least one printing unit to make a predetermined portion of printed shrink wrap film material;

forming a predetermined pack of a predetermined plurality of containers; and

wrapping said predetermined pack comprising said predetermined plurality of containers with said predetermined portion of printed shrink wrap film material to identify said predetermined pack of containers.

3. The method according to claim 2, wherein said step of moving at least one of said shrink wrap film material and said at least one printhead with respect to one another further comprises moving said shrink wrap film material with respect to said at least one printing unit.

4. The method according to claim 3, wherein said at least one printhead comprises an electrostatic printhead; said electrostatic printhead comprising a plurality of individually activatable nozzles;

said individually activatable nozzles:

being configured to control a dispensing of ink; and

being disposed in at least one row across the width of said shrink wrap film material.

5. The method according to claim 4, wherein:

said at least one row is disposed:

at a right angle with respect to at least one of:

a longitudinal dimension or length of said shrink wrap film material; and

a direction of transport of said shrink wrap film material;

over at least a substantial portion of the width of said shrink wrap film material; and

said printing on said predetermined portion of said shrink wrap film material comprises printing in lines.

6. The method according to claim 5, wherein said moving at least one of said shrink wrap film material and said at least one printhead with respect to one another comprises moving at a right angle to the height of said at least one printhead.

7. The method according to claim 6, wherein said shrink wrap film material is disposed essentially horizontally during said printing.

8. The method according to claim 7, wherein said at least one printhead is disposed above said shrink wrap film material.

9. The method according to claim 9, wherein said at least one printing unit comprises one of (A) and (B):

(A) at least two printheads; and

(B) at least three printheads.

10. The method according to claim 9, wherein each printhead is configured to print one color.

11. The method according to claim 10:

wherein said method further comprises drying and setting said predetermined portion of said printed shrink wrap film material by applying at least one of: energy, heat, and ultraviolet light to said predetermined portion of said printed shrink wrap film material;

wherein said method further comprises at least one of (C) and (D):

(C) heating said shrink wrap film material before said printing; and

(D) statically charging said shrink wrap film material before said printing;

said multiple container shrink wrapping machine including a cutting station, wherein said method further com-

prises cutting and separating said predetermined portion of printed shrink wrap film material from said shrink wrap film material;
 wherein said cutting and separating taking place before said printing;
 wherein said method further comprises:
 applying heat to said predetermined pack; and
 shrinking said predetermined portion of said printed shrink wrap film material; and
 wherein said predetermined portion of printed shrink wrap film material is modified at least partially during said wrapping of said predetermined pack.

12. A multiple container shrink wrapping machine configured to shrink wrap multiple containers into a shrink wrapped pack of containers, said multiple container shrink wrapping machine comprising:

- a packing arrangement being configured and disposed to form a pack comprising a plurality of containers;
- a storage arrangement being configured to store shrink wrap film material with or without an imprint that has not yet been printed upon by said multiple container shrink wrapping machine;
- a shrink wrapping station being configured and disposed to shrink wrap a plurality of containers with shrink wrap film material into a shrink wrapped pack;
- a printing arrangement being configured to print on the shrink wrap film material substantially simultaneously with the wrapping of packs of containers;
- said printing arrangement comprising:
 - at least one printing unit being disposed a distance away from said shrink wrapping station;
 - said at least one printing unit:
 - comprising at least one printhead; and
 - being configured to print in at least one color;
- a supply arrangement being configured to store the at least one color;
- a control device being configured and disposed to control at least said printing arrangement;
- said control device comprising at least one of:
 - printing templates; and
 - printing software stored electronically; and
- a moving arrangement being configured and disposed to move at least one of the shrink wrap film material and said at least one printhead with respect to one another while substantially simultaneously printing at least one color on a predetermined portion of the shrink wrap film material with at least one printing unit to make a predetermined portion of printed shrink wrap film material.

13. The multiple container shrink wrapping machine according to claim **12**, wherein said moving arrangement being configured and disposed to move at least one of the shrink wrap film material and said at least one printhead with respect to one another while substantially simultaneously printing is configured to move said shrink wrap film material with respect to said at least one printing unit.

14. The multiple container shrink wrapping machine according to claim **13**, wherein said at least one printhead comprises an electrostatic printhead;

- said electrostatic printhead comprising a plurality of individually activatable nozzles;

said individually activatable nozzles:

- being configured and disposed to control a dispensing of ink; and
- also being disposed in at least one row across the width of the shrink wrap film material.

15. The multiple container shrink wrapping machine according to claim **14**, wherein:

- said at least one row is disposed:
 - at a right angle with respect to at least one of:
 - a longitudinal dimension or length of the shrink wrap film material; and
 - a direction of transport of the shrink wrap film material; and
 - over at least a substantial portion of the width of the shrink wrap film material.

16. The multiple container shrink wrapping machine according to claim **15**, wherein:

- said at least one printhead comprises a height; and
- said moving arrangement machine is configured to move the shrink wrap film material and said at least one printhead with respect to one another at a right angle to the height of said at least one printhead.

17. The multiple container shrink wrapping machine according to claim **16** including guiding elements configured to guide the shrink wrap film material, said guiding elements being configured to dispose the shrink wrap film material essentially horizontally during printing.

18. The multiple container shrink wrapping machine according to claim **17**, wherein:

- said at least one printhead is configured to be disposed above the shrink wrap film material during printing; and
- said at least one printing unit comprises one of (A) and (B):
 - (A) at least two printheads; and
 - (B) at least three printheads.

19. The multiple container shrink wrapping machine according to claim **18**, wherein each printhead is configured to print in one color.

20. The multiple container shrink wrapping machine according to claim **19**,

- including a drying station being configured to dry and set the predetermined portion of the printed shrink wrap film material by being configured to apply at least one of: energy, heat, and ultraviolet light to the predetermined portion of the printed shrink wrap film material;

- including a heater being configured to heat the shrink wrap film material before printing and a static charging arrangement configured to statically charge the shrink wrap film material before printing;

- including a cutting station being configured to cut and separate a predetermined portion of printed shrink wrap film material from the shrink wrap film material and said cutting station is also configured to cut the shrink wrap film material and separate the cut shrink wrap film material before wrapping;

- including a pack heater being configured to apply heat to a predetermined pack and shrink the predetermined portion of printed shrink wrap film material; and

- a wrapping modifier being configured to modify, at least partially, the predetermined portion of printed shrink wrap film material while wrapping a predetermined pack.

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