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Method for advancing products arranged consecutively in at least one row which are moved forwards into a packaging machine

Abstract

A method advances products arranged consecutively in at least one row which are moved forwards into a packaging machine to be wrapped in at least one stretch film. The method includes ordering and advancing the products arranged consecutively in at least one continuous row, followed by wrapping the products arranged consecutively in at least one continuous row in at least one stretch film. The products arranged consecutively in at least one continuous row and wrapped in the at least one stretch film are evacuated. In at least one of the steps, guides with a minimum friction coefficient are used for guiding and/or supporting the products arranged consecutively in at least one continuous row and/or wrapped in the at least one stretch film.

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Background/Summary

CROSS-REFERENCE TO RELATED APPLICATIONS

(1) This application is a national stage of International Application No. PCT/IB2020/062165, filed on Dec. 18, 2020, which is incorporated herein by reference in its entirety.

TECHNICAL FIELD

(2) The present invention relates to a method for advancing products arranged consecutively in at least one row to be packaged wrapped in at least one stretch film.

BACKGROUND

(3) Products of various types, such as bottles, variously sized boxes, etc. in order to be transported and/or distributed in groups of two or more products, are currently packed and packaged for example in stretch film.

(4) This packaging creates a series of operational problems both in packaging and in the formation of the single group of products or packaging, in particular, for example, in moving them for reaching the packaging.

(5) There are in fact problems of stability of the products moving forwards and also problems connected with the forces to be applied to allow their correct advancement in the packaging phase.

(6) It is in this step that the products, for example arranged in groups or continuously, are positioned within a film of plastic stretch material which is wrapped around them.

(7) For their handling, rigid sustaining and containment supports, or conveyor belts or roller conveyors or mechanical guides are generally used, that keep them both arranged consecutively in one or more rows both before being wrapped and during wrapping and finally after wrapping in order not to damage the packaging.

(8) For correctly effecting the packaging in bundles, it is obviously necessary to have a good repeatability of the various packaging phases, especially regardless of the friction conditions involved. There is in fact considerable contact friction between the wrapping film and the wrapping guides and between the containment guides and the products moving forwards, such as for example advancing bottles. The reciprocal friction conditions between these elements is variable depending on various parameters, such as the process speed or the ratio between the wrapping angle and the advancement percentage of the products.

(9) As the frictional forces are generated by a contact force for a friction coefficient, it is necessary to ensure that the latter tends towards zero, so that as the contact forces vary physiologically over time, the friction conditions remain tending towards “zero”.

SUMMARY OF THE INVENTION

(10) The general objective of the present invention is to identify a method for advancing products into a packaging machine capable of solving the above-mentioned drawbacks of the prior art in an extremely simple, economical and particularly functional way.

(11) A further objective of the present invention is to provide a method for advancing products arranged consecutively in at least one row and wrapped in at least one stretch film which are moved forwards into a packaging machine which eliminates the above-mentioned drawbacks of the known art.

(12) Another objective of the present invention is to provide a method for advancing products in a packaging machine that is simple to apply and independent of the products involved.

(13) Yet another objective of the present invention is to provide a method for advancing products into a packaging machine that does not cause any deformation on the products being packaged.

(14) The above-mentioned objectives are achieved by a method implemented and effected according to independent claim **1** and the following subordinate claims.

Description

BRIEF DESCRIPTION OF THE DRAWINGS

(1) The structural and functional characteristics of the present invention and its advantages with respect to the known art will appear even more evident from the following description, referring to the attached schematic drawings, which show a non-limiting but purely illustrative implementation example of the invention itself.

(2) In the drawings:

(3) FIG. **1** is a schematic perspective view of a section of a packaging machine of products wherein the method according to the present invention is implemented;

(4) FIG. **1***a* is an enlarged detail of the machine of FIG. **1**;

(5) FIGS. **2** and **3** are respectively a raised side view and a plan view from above of the machine section shown previously in FIG. **1**.

DETAILED DESCRIPTION

(6) With reference to the illustrative and non-limiting figures, a section of a packaging machine of products is shown in which the method for advancing products according to the present invention is implemented:

(7) Part of a packaging machine of products in stretch film fed in groups, such as bottles, boxes or other objects, or individually as a single product **11**, is in fact shown.

(8) It should be considered that upstream of this section of the machine, the individual products **11** can be arranged in order, for example in one or more rows, aligned consecutively and/or in adjacent rows.

(9) Said products **11** must be moved forwards as far as a wrapping group **12** in which a stretch film **14** wraps at least one row of products **11**.

(10) The figures show, for example, two rows of products **11**, such as bottles, carried forward towards the wrapping group **12** which in the example consists of a winding ring **15** on which a trolley **16** carrying a reel **17** of stretch film **14** is arranged.

(11) The two rows of products **11** positioned adjacently move within guides arranged specifically for guiding and/or supporting said products **11** to be packaged.

(12) FIG. **1**, for example, shows a first section of the packaging machine in which the products **11** are sorted in consecutive rows perfectly aligned. In particular, in this section, in the non-limiting but purely illustrative example, the machine is provided with a group suitable for arranging two rows of products **11** in the form of pairs of bottles paired with each other up to an inlet section of the wrapping unit **12** consisting of the winding ring **15**.

(13) Already in this section, guides with a minimum friction coefficient are positioned for guiding and/or supporting said products **1**. In the figure, these guides comprise for example tubular elements **18** which come into contact exclusively with the products **11**. The tubular elements **18** are positioned both laterally and as a support in the lower part of the products **11** and can have a circular section.

(14) Furthermore, flat elements **19** are fixed to these tubular elements **18**, for example made of sheet metal, which, in contact with the products **11** (the bottles), support them below and guide them laterally.

(15) And again these guides, comprising tubular elements **18** having a circular section to which the flat elements **19** are fixed, are vibrated at ultrasonic frequency by means of piezoelectric motors **20** in order to reduce or almost eliminate the friction that is created between the products **11** and the guides themselves.

(16) In the example shown, the products **11** already wrapped in a first stretch film **14** are also illustrated and the above-mentioned guides therefore support below and laterally guide the products **11** already wrapped in a first stretch film **14** (which however may not be present).

(17) The subsequent passage within the winding ring **15** of the wrapping group **12** would therefore have a second stretch film above the first stretch film **14** containing the products **11**.
(18) An arrangement according to the present invention ensures that, unlike what is provided for in the presence of inert guides, where the friction that is generated between the film and the guides restrains the advancement of the products **11**, this friction is eliminated.
(19) Furthermore, with inert guides, a pressure is generated between the same products (necessary for advancing the products), which is harmful for the process.
(20) According to this document, however, the friction between guides/film and/or products is greatly reduced which favours the advancement of the products that no longer undergo deformation due to the pressure.
(21) A method according to the present invention achieves a significant improvement in containment/guiding systems for products such as containers to be arranged or already arranged in the film in a secondary packaging process with stretch film.
(22) For the correct management of the packaging in general and in particular of the bundling in stretch film, a large part of the qualitative repeatability depends on the stable conditions of the contact friction between the film and/or advancing products and the guides. The reciprocal friction conditions between these elements is variable depending on various parameters, such as the process rate or the ratio between the winding angle and the advancement percentage of the products.
(23) As the friction forces are generated by a contact force for a friction coefficient, it must be ensured that the latter tends towards zero, so that as the contact forces vary physiologically over time, the friction conditions remain tending towards “zero”. The acoustic generation systems (ultrasounds) of the invention provide for mechanical/acoustic dimensioning in relation to a variation in the friction forces.
(24) And this is what is achieved according to the invention set forth above where the desired effect has been obtained using a method and containment and conveyance systems produced in wrapping film by means of acoustic generation (ultrasounds). All this with the aim of bringing the guides into harmonic frequency so as to generate a surface vibration of the same, capable of zeroing the contact friction of anything on the guides.
(25) The acoustic system used in a non-limiting way is a 35 KHz system coupled with an amplification booster associated with containment guides with geometric relationships having more than one harmonic and more than one nodal point. Depending on the reactivity requirements of the system, however, a variation in the application frequencies between 20 and 100 KHz can be provided for without altering the functional and claimed concepts of the invention.
(26) In short, according to the present invention, a new method has been created and implemented for advancing products **11** arranged consecutively in at least one row (and possibly already wrapped in at least one stretch film) which are moved forwards into a packaging machine.
(27) In the method of the invention, after a step for ordering the products **11** arranged consecutively in at least one continuous row, they are also moved forwards into the packaging machine.
(28) As already mentioned, a further step can be provided for wrapping the products **11** arranged consecutively in at least one continuous row in at least one stretch film **14**.
(29) After packaging, the products **11** are naturally evacuated, arranged consecutively in at least one continuous row and wrapped in at least one stretch film **14**.
(30) The method is characterized in that in at least one of said steps, guides with a minimum friction coefficient are used for guiding and/or supporting the products **11** arranged consecutively in at least one continuous row and/or wrapped in the at least one stretch film **14**.
(31) The method typically provides for using acoustic generation systems (ultrasounds) as guides with a minimum friction coefficient for guiding and/or supporting the products **11**, which are such as to generate a surface vibration of the guides, such as for example those previously described, capable of eliminating contact friction with the same with respect to the products alone or the products **11** already wrapped in the at least one stretch film **14**.

(32) The objective mentioned in the preamble of the description has thus been achieved.
(33) The protection scope of the present invention is defined by the enclosed claims.

Claims

1. A method for advancing products arranged consecutively in at least one row which are moved forwards into a packaging machine to be wrapped in at least one stretch film comprising the following steps: ordering and advancing said products arranged consecutively in the at least one continuous row; wrapping said products arranged consecutively in the at least one continuous row in said at least one stretch film; evacuating said products arranged consecutively in the at least one continuous row and wrapped in said at least one stretch film; wherein in at least one of said steps, guides with reduced friction are used for guiding and/or supporting said products arranged consecutively in the at least one continuous row and/or wrapped in said at least one stretch film; wherein acoustic generation systems comprise the guides with reduced friction for guiding and/or supporting said products, which are configured to generate a surface vibration of said guides capable of reducing contact friction with the guides with respect to said products wrapped in said at least one stretch film.
2. The method according to claim 1, wherein said acoustic generation systems provide mechanical/acoustic dimensioning in relation to a variation in friction forces.
3. The method according to claim 2, wherein a 20 to 100 KHz system is used as said acoustic generation systems, coupled with an amplification booster associated with said guides.
4. The method according to claim 3, wherein a system is used as said acoustic generation systems.
5. The method according to claim 3, a system is used as said acoustic generation systems at 35 KHz.
6. The method according to claim 1, wherein piezoelectric motors are used as said acoustic generation systems.
7. The method according to claim 1, wherein said guides with reduced a friction are used below said products arranged consecutively in the at least one continuous row and/or wrapped in said at least one stretch film.
8. The method according to claim 1, wherein said guides with reduced friction are used laterally with respect to said products arranged consecutively in the at least one continuous row and/or wrapped in said at least one stretch film.
9. The method according to claim 1, wherein sheet metal plates are positioned between said guides with reduced friction and said products arranged consecutively in the at least one continuous row and wrapped in said at least one stretch film.
10. The method according to claim 1, wherein the guides with reduced friction comprise guides with a circular section.