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(54) **Method to palletize textile packages.**

(57) Method to palletize textile packages, which includes:

- the enclosure of each single package in an individual bag before positioning the package on the pallet,
- the positioning of the packages thus bagged in an orderly manner in the various layers arranged on the pallet, the packages thus positioned being substantially in contact with one another along, or along part of, their lateral surface,
- the interposing of separating cardboard sheets by merely placing the same between one layer of packages (10) and the next layer, and
- the final finishing of the loaded pallet by wrapping the same in a suitable material.

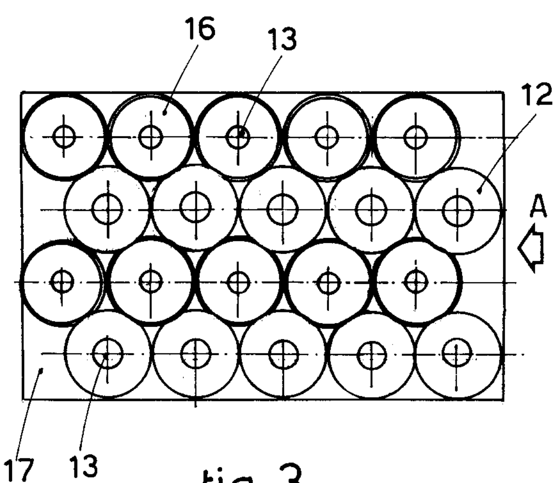

fig.3

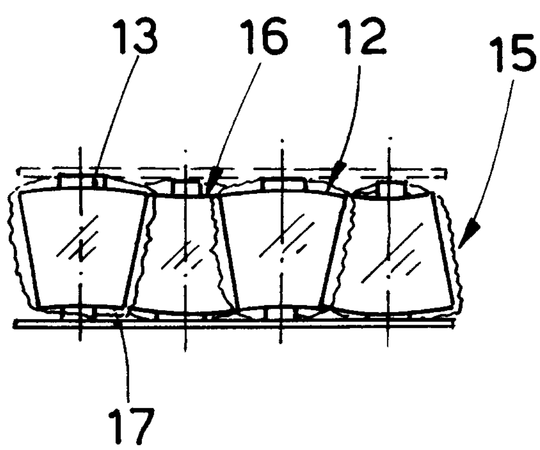

fig.4

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This invention concerns a method to palletize textile packages. To be more exact, the invention concerns a method which includes the positioning of the textile packages on pallets after the packages have been enclosed in bags, and also the subsequent operations of finishing the pallets thus loaded.

The words "textile packages" are to be understood as meaning generically any type of package of yarn or sliver wound normally in cylindrical or truncated-cone shapes and may also concern materials consisting of continuous fibres, such as manmade fibres for instance, or of discontinuous fibres, such as the fibres of cotton, wool, etc. for instance.

The state of the art covers a plurality of methods and devices suitable to palletize the packages made on textile machines and particularly on automatic winding machines and open-end spinning machines.

These packages are advantageously of a truncated-cone type, to which we shall refer in particular in the description that follows.

Such packages are doffed from the above textile machines by hand or by means of appropriate devices such as robots, manipulators or specific palletization devices, which have the task of arranging the packages in an orderly manner on the relative pallets.

The packages are positioned in superimposed layers which are separated from one another by known perforated cardboard sheets.

The palletization operations may be carried out by hand or else wholly automatically since fully automated devices specifically prepared for these operation are available nowadays.

The packages, while being arranged in each layer, are positioned at a suitable distance from each other in each layer so as to avoid damage to the yarn or disarrangement of the coils of the yarn.

This distancing of one package from another has to be maintained over a period of time and therefore the packages are clamped in their position by means of the cardboard sheets placed between one layer and the next.

For this purpose the cardboard sheets contain holes or slots in which the ends of the tubes of the packages are held.

The distancing of the packages from one another in the state of the art entails a poor use of the space available and leads to the pallets being loaded with a low filling density and with relatively low weights in proportion to the volumes available.

Various sizes of packages and tubes are offered on the market, and therefore it is also necessary to have available a plurality of specific cardboard sheets to cover relatively limited fields of application.

Pre-moulded vessels of a plastic material which include an impression of the shape of the package have been proposed for interposing between one layer of packages and the next layer, but this solution still involves the problems of the low density of filling of a loaded pallet.

When the superimposed layers of packages have been positioned on the pallet, the whole loaded pallet can be suitably packaged by winding about the same a stretchable film material.

The present applicant has studied, tested and achieved a palletization method able to overcome all the drawbacks of the state of the art and to provide a plurality of further advantages.

The invention is set forth in the main claim, while the dependent claims describe various features of the invention.

The method according to the invention arranges that the packages doffed from the respective production machines are first enclosed individually in protective bags and then positioned next to each other in the various layers placed on the relative pallet.

The bagging of the packages is preferably carried out automatically at the position of the device that doffs the packages from the production machines, but the bagging can also take place at any other suitable place to which the packages can be conveyed for this purpose.

The packages thus bagged are then engaged preferably by automatic means able to stack them in an orderly manner in layers on the pallet, a separating cardboard sheet being placed between one layer and the next layer.

The packages can be placed in each single layer according to preset sequences or at random.

The normal, widely employed truncated-cone packages, when used, can be positioned alternately right-way-up and upside-down, namely with their end surfaces rotated by 180° in relation to each other, so as to use as well as possible the space taken up. This is admissible since the sides of the packages are protected by the bags and can be placed in contact with each other.

As it is not necessary to keep the packages distanced horizontally from each other, the separating cardboard sheets can be devoid of holes and can have a very modest thickness since they are only required to act as supporting means dividing one layer from the next layer.

When the bagged packages and cardboard sheet have been arranged on their pallets, the whole pallet load will advantageously be wrapped in a stretchable film for storage and/or despatch.

The advantages which can be achieved with the method according to the invention can be summarized as follows:

- protection of each package on the pallet against outside means and against rubbing against the neighbouring packages;

- maximum use of available space, especially with truncated-cone packages;
- separation of the layers of packages by means of cardboard sheets devoid of holes and having a minimum thickness;
- elimination of the problems of positioning the packages and cardboard sheets very accurately (so as to make the holes in the sheets coincide with the tubes of the packages) where palletization is being carried out with automatic means;
- facilitation of full automation of the palletizing and packing cycle;
- great reduction in the costs of materials employed in the packing cycle per unit of weight of packaged yarn.

The attached figures, which are given as a non-restrictive example, show the following:-

Fig.1 is a diagrammatic plan view of the lay-out of a layer of tapered packages on a pallet according to the state of the art;

Fig.2 is a partial side view, according to the arrow A, of the layer of packages of Fig.1;

Fig.3 is a diagrammatic plan view of the lay-out of a layer of tapered packages on a pallet according to the invention;

Fig.4 is a partial side view, according to the arrow A, of the layer of packages of Fig.3;

Figs.5 and 6 show further lay-outs of tapered packages in a layer on a pallet according to the state of the art and according to the invention respectively.

Figs.1 and 2 show a traditional lay-out of truncated-cone packages 10 on a perforated cardboard sheets 11 so as to form a layer of packages 10 positioned on a respective pallet, which is not referenced in the figures.

In this example the packages 10 are arranged in a plurality of rows in an upside-down position with their greater end surface 12 facing upwards.

The point of each tube 13 of the packages 10 cooperates with coordinated holes 14 made in the cardboard sheet 11, and in the same way the base of each tube 13 cooperates with an analogous cardboard sheet 11 shown with lines of dashes in Fig.2.

The holes 14 have the purpose of keeping the packages 10 in reciprocally distanced positions so that the packages 10 do not touch each other when the loaded pallets are being moved.

Figs.3 and 4 show a situation analogous to that of Figs.1 and 2, but in this case the packages 10 have been placed beforehand in bags referenced with 15 in Fig.4 as an example. The bags 15 may be of a known type, such as polythene bags closed by heat-sealing.

In the embodiment according to the invention the packages 10 in their bags 15 are still arranged in a plurality of rows, but in each row the packages 10 are placed alternately right-way-up and upside-down, the positioning in the rows too being alternated.

As we said earlier, by right-way-up are meant the packages 10 which have their smaller end surface 16 facing upwards.

The enclosure of the packages 10 in bags 15 enables the packages to be arranged alternately upside-down and right-way-up, and the packages 10 can be positioned substantially with their lateral surfaces touching each other so as to cover the interspaces between one row of packages and the next row and between one package and the next package.

The lack of any risk of damaging the packages 10 in this manner enables them to be left "free" in their rows and also enables cardboard sheets 17 to be used which are thin and do not contain holes, since these sheets 17 become mere supports for the packages 10 in the superimposed layers.

As an example, we can indicate that in the situation of Fig.1 and with pallets having the usual dimensions of 800 x 1200 mm. and with truncated-cone packages having a maximum diameter within the range of 200 to 220 mm. each layer may contain up to fifteen packages 10 according to the lay-out of Fig.1.

Under the same conditions the situation according to the invention, as shown in Fig.3, enable four rows of packages 10 to be accommodated with five packages 10 per row, namely a total of twenty packages 10 per layer, the packages 10 being positioned alternately right-way-up and upside-down.

In this way each layer contains five extra packages 10, with a relative increase in weight per area available.

Figs.5 and 6 show a situation analogous to that of Figs.1 and 3 but referring, as an example, to pallets of greater sizes and to packages also of greater diameters.

The dimensions of the pallets may be the widely used 1000 x 1200 mm. to accommodate packages 10 having a maximum diameter ranging from 220 to 240 mm.

In the solution of the state of the art (Fig.5) fifteen packages 10 positioned right-way-up can be positioned on a perforated cardboard sheet 11, whereas in the solution of the invention (Fig.6) twenty-three packages 10 can be accommodated, with a further increase in weight per surface area available as compared to the solutions of Figs.1 and 3.

Fig.6 shows that the packages 10 are arranged alternately right-way-up and upside-down in each row accommodated.

Claims

1. Method to palletize textile packages and, in particular, packages (10) produced on machines such as free-fibre spinning machines, winding machines and the like, the packages (10) having to be positioned in an orderly manner in superimposed layers on pallets, each layer being separated from the adjacent layer by interposing a cardboard sheet, the method being characterized in that it includes the following operational steps:
   - the enclosure of each single package in an individual bag before positioning the package on the pallet,
   - the positioning of the packages thus bagged in an orderly manner in the various layers arranged on the pallet, the packages thus positioned being substantially in contact with one another along, or along part of, their lateral surface,
   - the interposing of separating cardboard sheets by merely placing the same between one layer of packages (10) and the next layer, and
   - the final finishing of the loaded pallet by wrapping the same in a suitable material.

2. Method as claimed in Claim 1, in which the packages (10) enclosed in bags are deposited in rows on their relative cardboard sheet (17).

3. Method as claimed in Claim 1, in which the packages (10) enclosed in bags are deposited at random on their relative cardboard sheet (17).

4. Method as claimed in Claim 1 or 2, in which each row of packages (10) placed in their relative layer comprises either only right-way-up packages or only upside-down packages.

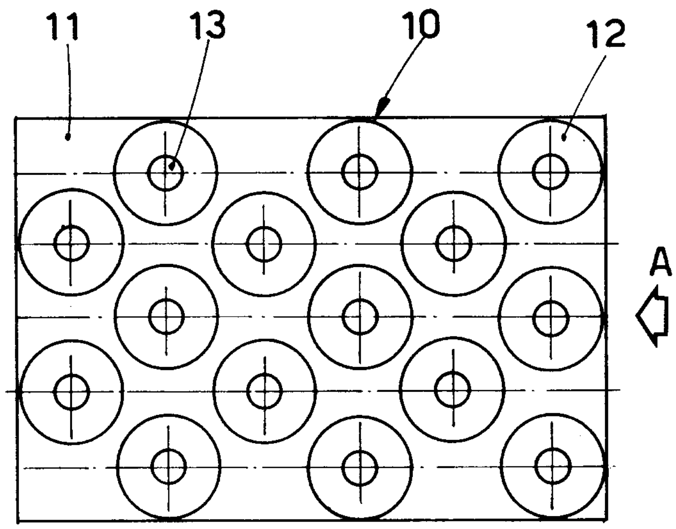
5. Method as claimed in Claim 1 or 2, in which each row of packages (10) placed in their relative layer comprises adjacent alternately positioned packages, that is to say, right-way-up, upside-down, right-way-up, and so on.

6. Method as claimed in one or another of the claims hereinbefore, in which the bagging of the packages (10) is carried out automatically or manually at the point of doffing of the packages (10) from the production machine.

7. Method as claimed in any of Claims 1 to 5 inclusive, in which the bagging of the packages (10) is carried out automatically or manually in an appropriate station that collects packages (10) doffed from the production machines.

8. Method as claimed in one or another of the claims hereinbefore, in which the bagged packages (10) are manipulated and placed in layers on pallets by automatic palletization means.

9. Method as claimed in one or another of the claims hereinbefore, in which the packages (10) placed in layers on pallets are caused to cooperate with thin cardboard sheets (17) devoid of positioning holes.



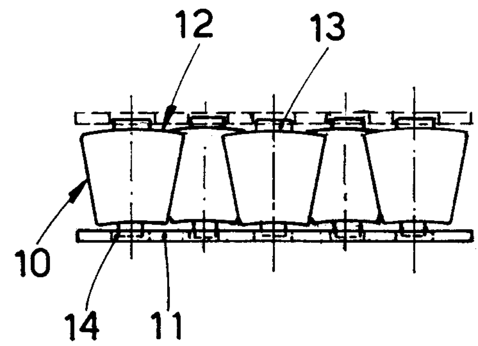
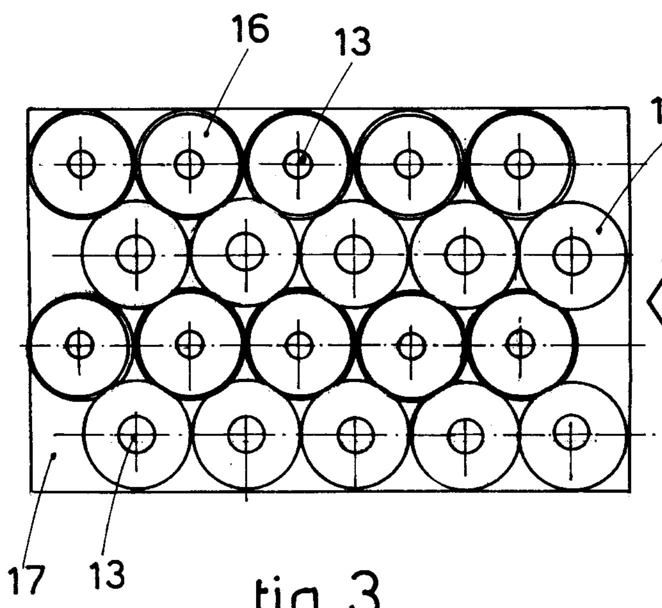


fig.2

fig.1



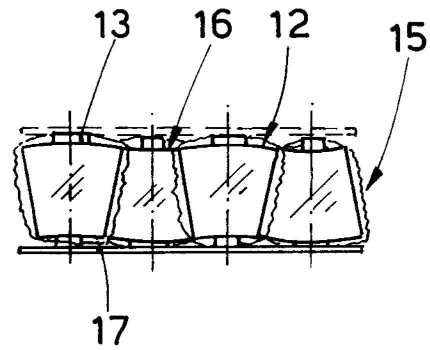


fig.4

fig.3

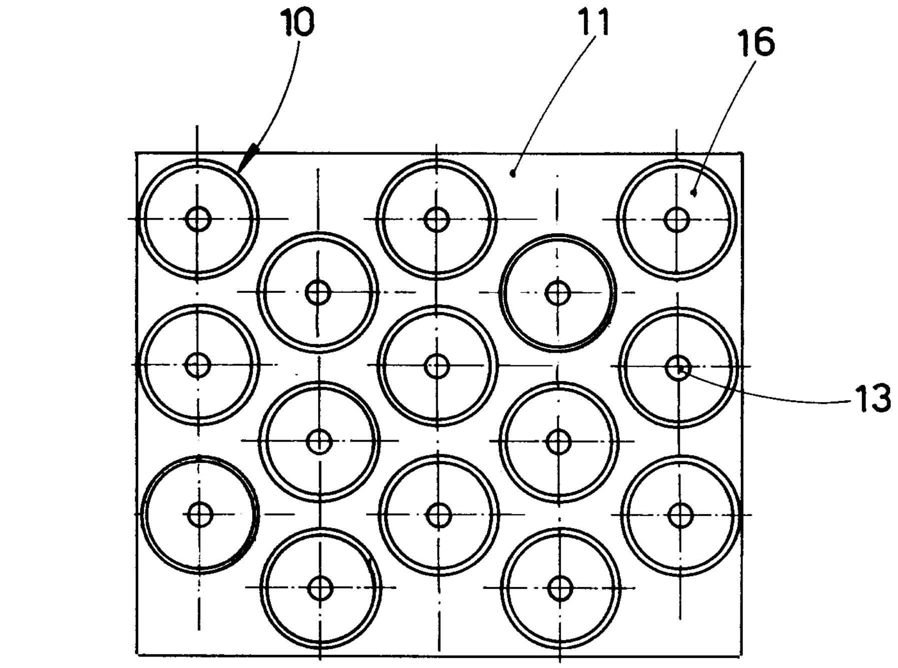


fig.5

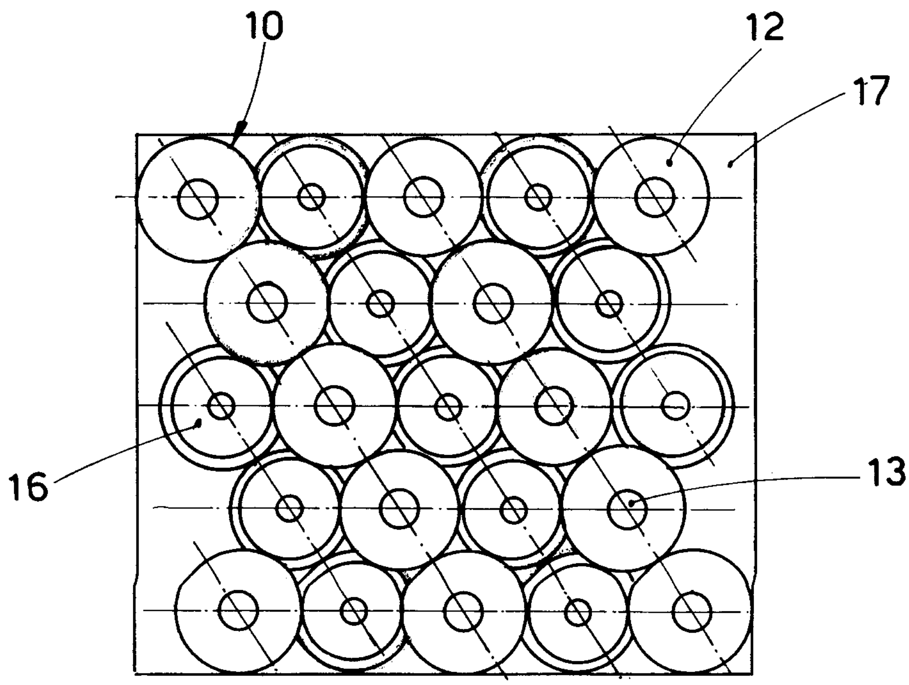


fig.6