SHRINK-ON PACKAGE FOR STACKED GOODS

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ABSTRACT

A package for stacking and transporting stacked goods of regular shape without using pallets. The package comprises plastic sheet material which is heat-shrunk over at least four surfaces including the bottom of the stack. The package also includes one or more strips of supporting material extending into the bottom portion of the stack. The supporting strips together with the wrapping rigidify select lower portions of the stack to support its upper portions. In one embodiment, the inserted strip of supporting material covers a central portion of the bottom of the stack and defines one side of each of a pair of tunnels through the stack. In other embodiments, two strips envelope the outer portions of three or more bottom layers of the stack, each of the strips additionally partially defining the sides of separate tunnels through the stack.

15 Claims, 5 Drawing Figures
SHRINK-ON PACKAGE FOR STACKED GOODS

BACKGROUND OF THE INVENTION

The invention pertains to a large package for stacked goods of regular shape, such as bricks, briquettes, or packaging containers, in which a wrapping is shrunk over at least four sides of the stack of goods.

When goods having a regular shape are shipped, standardized load carriers are largely used, especially in the form of pallets. Pallets loaded with goods can be transported and handled with comparative ease, provided the goods stacked thereon are protected against slipping or collapse of the stack when it is subjected to shocks during shipment. Many prior packages of this type have stacks tied together or onto the pallet with bands, cord, wire or shrink-on wrappings.

Shrink-on wrappings are particularly useful because of their simplicity of installation as well as their ability to protect the goods from adverse weather conditions. Prior shrink-on wrappings of this type, however, employ a returnable shipping pallet. The goods are stacked upon the pallet and a hood of heat-shrinkable material is slipped over the stack of goods and shrunk about them as well as the pallet. The use of a pallet is a particular disadvantage in that it contributes greatly to the cost of the overall package, requires an additional space both in shipping and in storage after the goods have arrived.

The present invention overcomes these and other disadvantages by a novel design as will be apparent from the following summary and description of the invention.

SUMMARY OF THE INVENTION

A preferred embodiment of the present invention comprises a heat-shrunk wrapping extending over at least four sides of a stack of goods, with a strip of supporting material inserted into the interior of the stack to help rigidify select lower portions of the stack of goods in order to support its upper portions.

In some embodiments the strip of supporting material extends from the bottom of the stack upwardly through the layers of goods and forms at least one side of each of a pair of horizontal tunnels through the stack of goods. In a particular preferred embodiment the strip of supporting material extends upwardly from the bottom of the stack in a U-shape and supports the central portion of the stack. In a second preferred embodiment two or more strips of supporting material encircle longitudinally the outer portions of the lowermost layers of the stacked goods.

In both the first and second embodiment portions of the strips are heat-sealed to the shrink-on wrapping. In embodiments where the shrink-on wrapping covers the bottom of the stack the strips of material are heat-sealed to the portion of the wrapping which is along the bottom of the stack, thereby reinforcing the wrapping. In still other embodiments the bottom of the package is reinforced with a sheet of non-shrunk material.

It is unnecessary to use a pallet in any of the preferred embodiments of the invention. The tines of a fork lift may be inserted into the two tunnels in the lower layers of the stack of goods to lift the stack of goods. The strip or strips of supporting material ensure that there is no troublesome sagging of the lower layers of the stack even in a large package of heavy objects, such as bricks for example. This allows a substantial advantage of economy of material and hence a reduction of costs per unit package.

Another advantage is a reduction of volume and weight, which is likewise highly advantageous for shipment and storage. Still another advantage is that the user can be rid of the packaging material comparatively easily be compressing it into bales, which can even be remelted and used again.

The shrink-on wrapping may be made of any of several well-known heat-shrinkable materials. Suitable heat-shrinkable materials might be a polyethylene, polypropylene, polyvinyl chloride, polyvinylidene chloride, or polyester. The wrapping material made of any of these compounds is specially treated to shrink in a predetermined direction when it is heated to a relatively high temperature, such as 220° centigrade.

In embodiments where a strip of supporting material is attached to the wrapping, the strip is made of the same material as the wrapping but is not specially treated to be heat-shrinkable. In still other embodiments the strip of supporting material is made of a fiber reinforced material, such as paper, coated for heat-sealability to the wrapper. The coating applied to the fiber reinforced paper strip is of the same material as the wrapping, but is not heat-shrinkable.

The stack of goods with the inserted strip of non-shrink material is covered by a loose foil wrapping and is then transported through a shrink-oven where the wrapping is caused to soften and shrink tightly about the stack of goods. The heat in the oven will also cause the non-shrink inserted strip and the wrapping to heat-seal together where they contact each other.

Still another advantageous embodiment of the invention involves covering the stack wrapping with a black foil upon leaving the shrink oven. The purpose of this black foil is to prevent ultra-violet light from destroying the wrapping. Pressing the black foil on immediately after the package has passed through the shrinking oven, while the shrink-on wrapping is still in a plastic state, bonds the black masking foil to the shrink-on wrapping, thereby affording reliable protection for the large packet.

Thus it is an object of the invention to provide a palletless package for stacked goods which is light in weight, requires little space beyond the size of the goods it encloses, and is relatively inexpensive compared to pallet packages.

The foregoing and other objectives, features, and advantages of the invention will be more readily understood upon consideration of the following detailed description of certain preferred embodiments of the invention, taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of one preferred embodiment of the invention covering a stack of goods with the near end of the package partially in cross-section for purposes of clarity;

FIG. 2 is a perspective view of a second preferred embodiment of the invention covering a stack of goods with the near end of the package partially in cross-section for purposes of clarity;

FIG. 3 is a diagrammatic sketch of a hood wrapping suitable for the embodiments of FIGS. 1 and 2;
FIG. 4 is a diagrammatic view of a second suitable hood wrapping produced by pulling a hood over the stack of goods of the embodiment of FIG. 2 and then shrinking it on.

FIG. 5 is a diagrammatic view of a band wrapping alternatively employed for the stack of goods of the embodiment of FIG. 2.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

A large package of stacked bricks 10 wrapped on all sides is shown in FIG. 1. The package is wrapped in a heat-shrinkable polyethylene film 12. A support strip of non-shrinkable polyethylene material 14 extends from the bottom of the wrapping 16 up into the interior of the stack through several layers of the stacked bricks 10. The strip 14 and the bottom of the wrapping 16 are heat-sealed together along their mid-axes designated generally as 18.

In the packaging operation, the wrapping 12 is turned back so that its bottom surface 16 lies exposed for stacking. The non-shrink strip 14 is spread out over the entire bottom 16. The bottom middle row 20 of bricks is first stacked on the non-shrink strip 14. The strip 14 is then turned up over the ends of the row of bricks 20, and the two outer bottom rows of bricks 22 and 24 are stacked on either side of the row of bricks 20.

The row of bricks 26 is then laid perpendicularly on top of the row of bricks 22 as the next succeeding outer layer. Likewise on top of the row of bricks 24 a perpendicular row of bricks 28 is laid as the next succeeding outer layer of bricks. Four rows of bricks 30, 32, 34 and 36 are laid on top of the row of bricks 20 and perpendicular thereto. The rows of bricks 30, 32, 34 and 36 are parallel to each other and parallel to the rows 26 and 28. The rows 30 and 36 extend slightly over the outer edges of the row of bricks 20 and are spaced apart from the rows 26 and 28, respectively.

A tunnel 38 is thus formed between the outer row of bricks 26 and the row of bricks 30. Likewise a tunnel 40 is formed between the row of bricks 36 and the outer row of bricks 28. The non-shrink strip 14 is drawn up over the outer long sides of the rows of bricks 30 and 36. Thereafter the non-shrink strip 14 partially defines one side of each of the tunnels 38 and 40.

The third layer of bricks is started by laying a middle row of bricks 42 perpendicularly to, and on top of the rows of bricks 30, 32, 34 and 36. Thus the bricks in the row 42 are substantially parallel to the bricks in the row 20. A row of bricks 44 and a row of bricks 46 are subsequently laid on either side of the row of bricks 42 and substantially parallel thereto. The row of bricks 44 covers the row of bricks 26 and the tunnel 38. The row of bricks 46 covers the row 28 and the tunnel 40. One end of the strip 14 is laid over the top of the row of bricks 44 and the other end of the strip 14 is laid over the top of the row of bricks 46.

Succeeding layers of bricks are then stacked in criss-cross fashion to a predetermined height. The foil wrapping 12 is pulled up over the stack of bricks 10, folded over itself and the ends 48 are heat-sealed together. The complete wrapping 12 is diagrammatically illustrated in FIG. 3.

The whole package then passes through a shrinking oven where a temperature of approximately 220° centigrade is maintained. This high temperature environment causes the wrapping 12 to shrink tightly about the stack of bricks 10 and heat-seal to the strip 14 where the two contact each other. The stack may be lifted by a fork lift by inserting the tines of the fork lift into the tunnels 38 and 40, piercing the foil wrapping 12. The wrapping does not tear any further and this piercing of the foil does not lower the strength of the entire package substantially.

The friction of the succeeding layers of stacked bricks upon the inserted, U-shaped strip 14 holds it in place. The strip 14 is thus in a supportive relationship with the rows of bricks 20, 30, 32, 34, 36 and 42, as well as the center sections of the succeeding layers of bricks above these rows. The strip 14 together with the wrapping 12 prevents the center part of the overall package from sagging, rigidifies the lower portion of the stack, and thus obviates the need for a pallet.

In FIG. 2, the stack of bricks 10 is assembled upon a bottom sheet 50. The bottom sheet 50 is thicker than the wrapping 12 and is not heat-shrinkable. The purpose of the bottom sheet is to reinforce the wrapping 12 when the stack 10 is very heavy. A strip of non-shrink material 52 is heat-sealed to the outer portion of the bottom sheet 50. The strip 52 longitudinally encircles the rows 22, 26 and 44. The ends 54 and 56 of the strip are overlapped and heat-sealed together above the row of bricks 44.

A second strip of non-shrink material 58 is heat-sealed to the outer portion of the bottom sheet 50 and encircles the rows 24, 28 and 46. The ends 60 and 62 of the strip 58 overlap each other and are heat-sealed together above the row 46.

Thereafter the stack of goods may be wrapped as in the embodiment of FIG. 1 or in any of several other ways. In some embodiments a polyethylene hood 64 of the type shown in FIG. 4 is pulled over the stack and the stack is then passed through a shrinking oven. The hood 64 will shrink tightly about the stack and because of the weight of the stack, the tension produced in the hood, and the temperature of the shrinking oven, the hood 64 will be heat-sealed to the bottom sheet 50 as well as to the other outer portions of the strips 52 and 58 where they are in contact with the hood. The strips together with the shrink-on wrapping rigidify the lower portion of the stack so as to enable it to act as a substitute for a conventional pallet in bearing the weight of the upper layers of goods when the stack is lifted.

The stack of bricks 10 is built up in the same manner as was done in the embodiment of FIG. 1, having the rows 22, 26 and 44 and the rows 24, 28 and 46 forming channels to partially define the longitudinal tunnels 38 and 40 in the lower levels of the bricks. As in the embodiment of FIG. 1 the tines of the fork lift may be inserted through the wrapping in order to lift the package.

Still another wrapping shown diagrammatically illustrated in FIG. 5 as comprising a band 66 of heat-shrinkable foil wrapped around the stack 10 and the bottom sheet 50 of the embodiment of FIG. 2. The ends 68 of the band are heat-sealed together and the whole package is then passed through a shrinking oven where the wrap-around band 66 becomes heat-sealed to the bottom sheet 50 as well as the outer portions of the strips 52 and 58. The band of wrapping material 66 also
heat-shrinks tightly about the stack 10 to hold it firmly in place.

The embodiments of FIGS. 1 and 2 may additionally be covered by a black foil (not shown) as the package leaves the shrinking oven. This black foil prevents the wrapping from being deteriorated by exposure to ultraviolet light. Pressing the black foil on immediately after the package has passed through the Shrinking furnace, while the foil is still in a plastic state, bonds the foil to the wrapping.

In order that the wrapping 12 and the strip 14 of the embodiment of FIG. 1 and the bottom sheet 50, the hood 64 and the strips 52 and 58 of the embodiment of FIG. 2 will become heat-sealed to each other, respectively, they must be made of the same type of material, for example polyethylene.

The packaging material of the above embodiments has been described as being made of polyethylene but other suitable materials are polyvinyl chloride, polyvinylidene chloride, polypropylene, and polyester. While the non-shrinkable material of the embodiments of FIGS. 1 and 2 have been described as being composed essentially of certain plastic materials, they may also be made of fiber reinforced materials with a plastic coating. This coating makes it possible for the fiber reinforced members to be heat-sealed to the heat-shrinkable wrapping. In embodiments where the wrapping material is made of high density polyethylene or of some other shrinkable material, the fiber reinforced members are coated with the same material as the wrapping in non-shrinkable form.

For purposes of clarity, the thickness of the wrappings, non-shrunk strips and the bottom sheet have been exaggerated in the Figures. In actual use, the packaging materials are sufficiently thin that the goods resting on them lie substantially flat.

The terms and expressions which have been employed here are used as terms of description and not of limitation, and there is no intention in the use of such terms and expressions of excluding any equivalent of the features shown and described, or portions thereof, it being recognized that various modifications are possible within the scope of the invention claimed.

What is claimed is:

1. A package for goods stacked layers comprising a heat-shrunken wrapping extending over at least four sides of the stack of goods, the wrapping being in direct contact with a portion of the bottom side of the stack, and a strip of supporting material inserted into the interior of the stack at different levels in a supportive relationship with a portion of at least one layer of the goods.

2. A package as recited in claim 1 wherein portions of the supporting strip are heat-sealed to the wrapping and the wrapping and supporting strip in combination rigidify select lower portions of the stack such that the select portions thereby become capable of supporting the weight of the goods above them.

3. A package as recited in claim 1 further comprising a substantially opaque foil covering a portion of the top of the stack of goods, a portion of the foil being heat-sealed to the wrapping.

4. A package for goods stacked in layers comprising a heat-shrunken wrapping extending over at least four surfaces of the stack of goods, and a strip of supporting material inserted into the interior of the stack, a first portion of the strip being attached to the wrapping and a second, interior portion of the strip forming one side of a tunnel through the stack above the lowermost layer.

5. A package for goods stacked in layers comprising a heat-shrunken wrapping substantially covering at least the bottom and three other surfaces of the stack of goods, and a strip of supporting material having portions which are heat-sealed to the bottom of the wrapping, the strip covering a central portion of the bottom surface of the stack of goods and extending upwardly between adjacent goods in the stack on either side of the central portion of the stack up to a select intermediate layer of the goods, the ends of the upwardly extending portions of the strip being folded outwardly and horizontally over the select intermediate layer of the goods.

6. A package as recited in claim 5 wherein the strip of supporting material further defines at least one side of a horizontal tunnel through the stack of goods.

7. A package for goods stacked in layers comprising a heat-shrunken wrapping substantially covering at least the bottom and three other surfaces of the stack of goods, and a first and a second strip of supporting material, portions of each strip being heat-sealed to the wrapping, the first strip enveloping a first lower, outer portion of the stack and the second strip enveloping a second lower, outer portion of the stack, the strips and wrapping together rigidifying the first and second lower portions of the stack such that they become capable of bearing weight.

8. A package for goods stacked in layers comprising a heat-shrunken wrapping substantially covering at least four sides of the stack of goods, a sheet substantially covering the bottom of the stack of goods, portions of the bottom sheet being heat-sealed to the wrapping, and a first and a second strip of supporting material which each extend from the bottom sheet upwardly into the interior of the stack past at least two layers, portions of each of the strips being heat-sealed to the bottom sheet, the first strip enveloping a first lower, outer portion of the stack and the second strip enveloping a second lower, outer portion of the stack, the strips, bottom sheet, and wrapping together rigidifying select lower portions of the stack including the first and second lower portions.

9. A package as recited in claim 8 wherein the first and second strips partially define the sides of separate, parallel tunnels through the stack of goods.

10. A package as recited in claim 8 wherein the wrapping comprises an inverted, open ended bag substantially covering the four sides and top of the stack of goods.

11. A package as recited in claim 8 wherein the wrapping comprises a strip wrapped around the four sides of the stack with the strip ends being heat-sealed together.

12. A method of packaging goods comprising the steps of stacking the goods by layers in parallel rows, the rows of each layer being perpendicular to the rows of the next succeeding layer, the rows also being stacked on both sides of a strip of supporting material such that the strip is interwoven in a U-shape in the interior lower layers of the stack, enveloping the stack of goods and the interwoven strip in a heat-shrinkable
wrapping, heat-sealing portions of the wrapping to portions of the strip, and heat-shrinking the wrapping about the stack and interwoven strip.

13. A method of packaging goods as recited in claim 12 further comprising the steps of stacking the goods such that at least a first select pair of adjacent rows of a select layer are spaced apart from each other to form a first tunnel through the stack and at least a second select pair of adjacent rows of the select layer are spaced apart from each other to form a second tunnel through the stack.

14. A method of packaging goods comprising the steps of stacking the goods in layers on a nonheat-shrinkable bottom sheet with the goods at each layer in parallel rows which are perpendicular to the rows of the next succeeding layer, encircling the outer portions of rows of a select number of the bottom most layers with a first and second strip of nonheat-shrinkable material which each extends from the bottom sheet upwardly into the interior of the stack past at least two layers, enveloping the stack, the strips, and the bottom sheet with a heat-shrinkable wrapping, heat-sealing the first and second strip to the wrapping and the bottom sheet, and heat-shrinking the wrapping about the stack.

15. A method of packaging goods as recited in claim 14 further comprising the steps of stacking the portions of the rows of the select layers which are encircled by the first and second strips in a channel shape so as to partially define two parallel tunnels through the stack of goods.

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