

[54] **METHOD OF PACKAGING LOAD UNITS IN WELDABLE PLASTIC FOIL**

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[58] Field of Search ..... 53/27, 32, 33, 170, 176,  
 53/198, 210, 229, 214

[56] **References Cited**

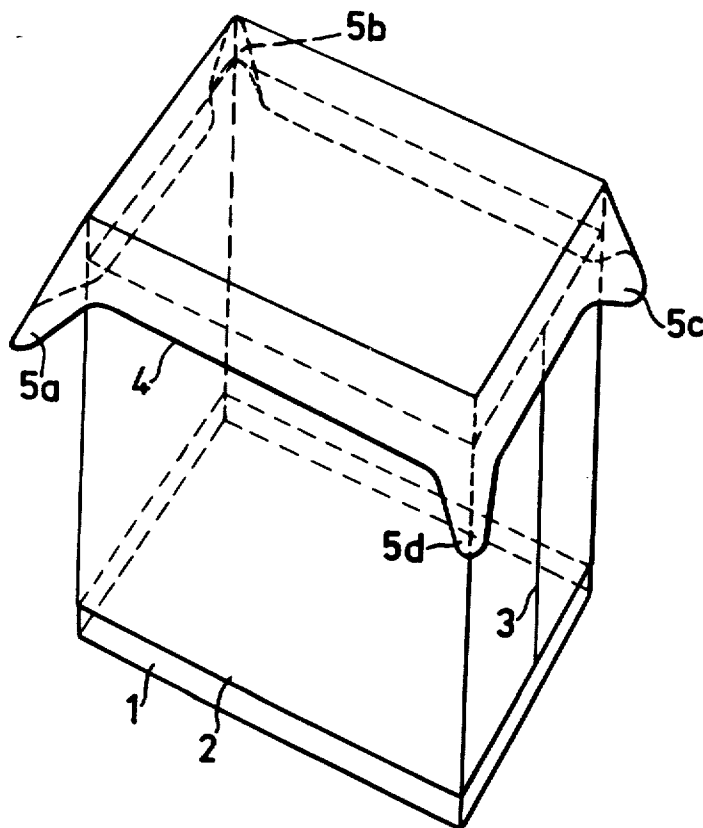
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[57] **ABSTRACT**

A load unit, such as a pallet load, is initially wrapped in a first, tensible, weldable, plastic foil web, which is applied in a substantially stretched condition in a closed path around substantially the whole circumferential area of the load unit, after which the two meeting portions of this web are united with each other. Then, one end surface of said load unit is covered with a second foil, which is made to overlap and cover part of said first foil web. Subsequently, a third, tensible and weldable plastic foil web, which is made to cover the major part of said first foil web and those portions of the second foil, which overlap the first foil web, is wrapped in a closed path around said load unit in the same way as said first foil web, while being substantially stretched during the wrapping operation, after which the two meeting portions of the third foil web are united with each other.

**1 Claim, 3 Drawing Figures**



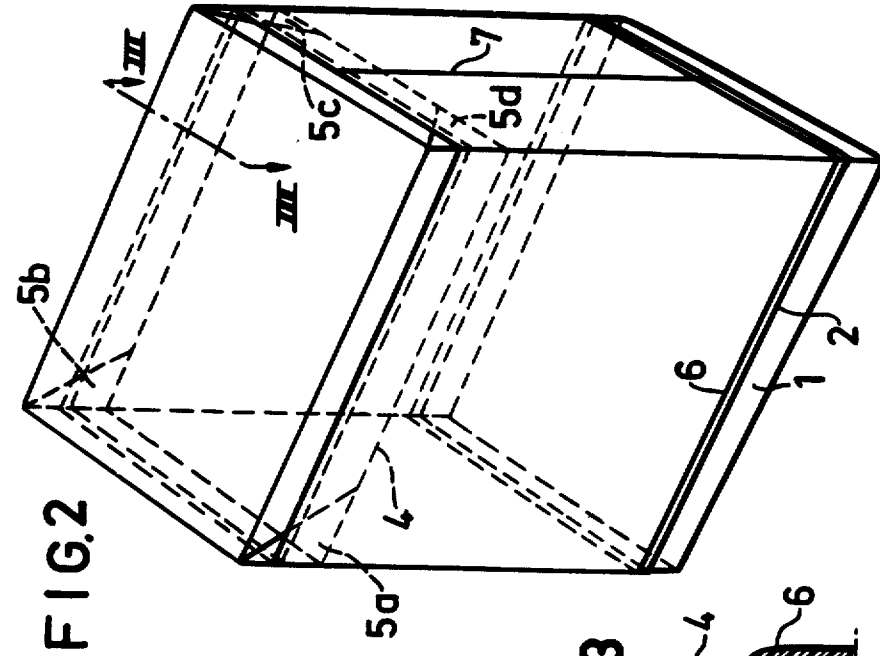


FIG. 1

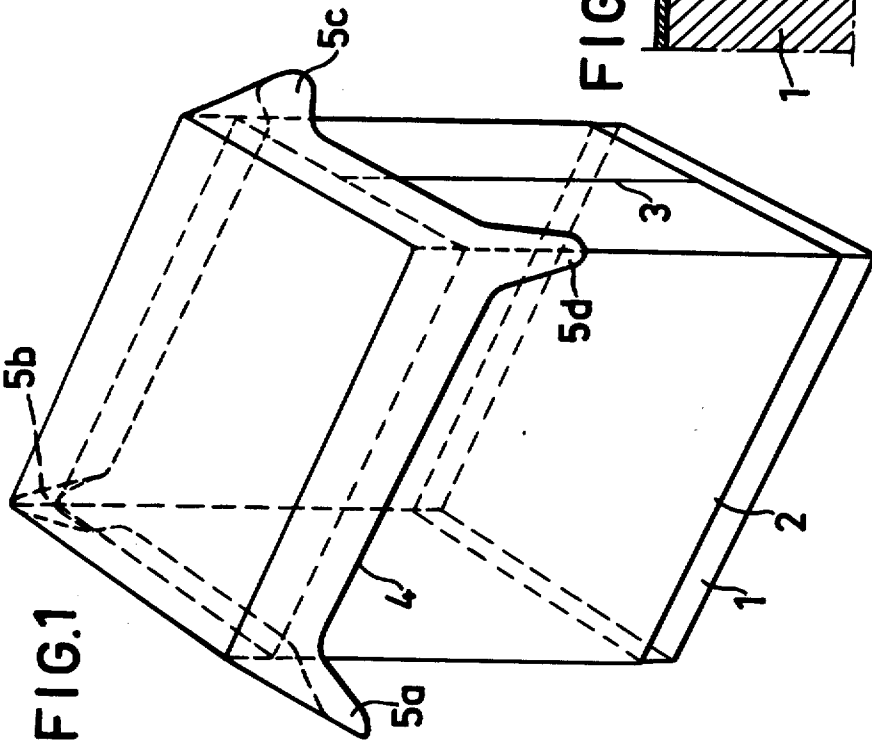


FIG. 2

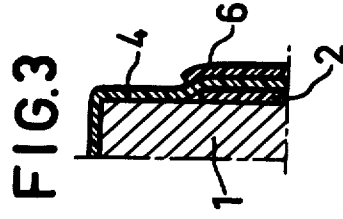


FIG. 3

## METHOD OF PACKAGING LOAD UNITS IN WELDABLE PLASTIC FOIL

This invention relates to a method of packaging load units in a weldable foil of plastic or the like. The word "load units" herein encompasses one single article as well as a group of articles, one of which generally is a load pallet, on which the other articles are stacked or deposited in another way.

One of the principle objects of packaging of the kind in question is to unite several loose articles to a coherent unit exhibiting substantial shape permanence. To attain this object it is often sufficient to wrap the unit in a foil extending around the unit in a closed path.

In other cases it is desired to protect the load units against dust and dirt and/or moist and possibly also theft. In these instances it is evidently necessary to cover also the top side of the unit by a foil, which may either be the same foil as covers the circumferential surfaces of the load units, or also a separate foil.

The method according to the invention relates to rainproof or at least dustproof packaging of load units, which in addition thereto prevents theft of individual articles comprised in the load units, provided that the packaging foil is left intact. This object is attained by the method according to the invention, which comprises the steps of initially wrapping a first, tensile, plastic foil web in a closed path around substantially the whole circumferential area of the load unit, uniting the two meeting web portions of said first foil web with each other, said first foil web being substantially stretched in connection with the wrapping operation; covering one end surface of said load unit with a second foil, which is made to overlap and cover one longitudinal edge of said first foil web, which extends around the load unit; subsequently, wrapping a third, tensile and weldable plastic foil web, which is made to cover the major part of said first foil web and those portions of the second foil, which overlap said one edge of the first foil web, in a closed path around substantially the whole circumferential area of said load unit in the same way as said first foil web, said third foil web also being substantially stretched in connection with the wrapping operation; and finally uniting the two meeting web portions of said third foil web with each other.

Foils, which are intended to be used in carrying out the method according to the invention and which are stretched considerably in connection with the packaging operation, are on the one hand so called shrink film, which is stretched by the load unit proper, after that the film has been sealed around the unit, in connection with the shrinkage of the film as a consequence of deliberate heating, and on the other hand so called stretch film, which is stretched elastically before the two end portions of the foil web, in which the unit is being wrapped, are welded together or united with each other in an equivalent way.

The invention will now be more particularly described in conjunction with the annexed diagrammatic drawing, in which:

FIG. 1 is a perspective view illustrating an intermediate stage in the wrapping operation;

FIG. 2 is a perspective view of a wrapped load unit after that the wrapping operation has been completed; and

FIG. 3 is a partial section on line III — III in FIG. 2, on a larger scale.

In the drawing 1 is a load unit, e.g. a load pallet and crates or boxes stacked thereupon, which is parallelepipedal in FIGS. 1 and 2, and 2 a first stretch film web, which in stretched or tensioned condition has been wrapped around the whole, substantially vertical circumferential surface of the load unit 1 and the end portions of which are welded together by means of a continuous weld or an equivalent joint 3. This wrapping operation is preferably carried out in a way and in a machine, which form the subject matter of the Swedish Pat. specification No. 347 485, to which is hereby referred, i.e. so that a foil web is unreeled substantially symmetrically from two supply rolls having substantially parallel rotational axes, between which the load unit is advanced, after which the two foil web portions, which are each unreeled from its individual reel, are welded together on the rear side of the load unit, as seen in the direction of advancement of the load unit.

According to the invention a second foil 4 is subsequently applied, manually or by machine, on top of the unit 1 in such a way that the foil 4 covers the top side of the unit 1 and depends over the upper portions of the first foil 2. At the upper corners of the load unit 1 the second foil 2 hereby forms dependent, double flaps 5a — 5d, which are substantially triangular in side view, as is shown in FIG. 1.

In a third step or operation a third foil 6 (FIG. 2), which is similar to the foil 2 and which may possibly come from the same foil web as the foil 2, is then wrapped around the unit 1 in the same way as the first foil 2. The welded joint of the foil 6 is designated 7 in FIG. 2. Thanks to the fact that two foil layers 2 and 6 are utilized, these may be thinner than if only one foil were utilized for the wrapping.

As is evident from FIG. 2, the flaps 5a and 5d are folded counterclockwise on substantially vertical axes at the wrapping of the unit 1 in the foil 6, so that these flaps each engage a substantially vertical side wall of the unit. In the same manner the flaps 5b and 5c of the foil 4 are turned and folded in opposite directions with respect to the flaps 5a and 5d, respectively, on substantially vertical axes at the wrapping in the foil 6, so that also each of the flaps 5b and 5c will engage an individual, substantially vertical side wall of the unit.

This method of wrapping gives a substantially waterproof (rainproof) enclosure, at least of the most essential portions of the unit, possibly excepting the lowermost portion of the load pallet. As is evident from FIG. 3, the layers 2, 4, 6 in fact form a kind of labyrinth seal in the upper portion of the unit.

Thanks to the invention the advantage is gained that the load unit becomes waterproofly enveloped without any provision of a top weld. Furthermore, the top side becomes entirely even, which is of importance, e.g. when pallet loads are to be stacked on top of each other. The invention also eliminates projecting flaps, which otherwise easily could get stuck and which flap when load units are transported, e.g. on lorry platforms, and on account hereof easily rupture. Another advantage resides therein, that it is possible to have different material, e.g. material of different thickness, in the layers 2, 4 and 6. The total amount of wrapping material, which is required for the wrapping in accordance with the invention, is smaller than that required in every other envelope, which is equal in respect of tightness.

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The embodiment described above and illustrated in the drawing is, of course, to be regarded merely as non-limiting example and may as to its details be modified in several ways within the scope of the following claims. E.g. it is possible to wrap other articles or units than parallelepipedal ones according to the invention. Furthermore, the layers 2 and 6 may be applied from different directions insted of being applied in the same direction. It is, however, often suitable to joint the foil layers 4 and 6, at least spotwise, in some manner, e.g. by means of adheasive tape. Alternatively, it is, of course, possible to use spot welding.

I claim:

1. Method of packaging load units in weldable plastic foil, comprising the steps of initially wrapping a first, tensible, plastic stretch foil web in a closed path around substantially the whole circumferential area of the load unit by unreeling two individual portions of said first stretch foil web substantially symmetrically from a respective one of two foil supply rolls having substantially parallel vertical rotational axes and having their free foil ends united with each other along a substantially vertical junction line, and advancing said load unit between said rotational axes; uniting said two unreeled web portions of said first foil web with each other along a substantially vertical junction line by welding together said unreeled portions of said first foiled web on the rear side of the load unit, as seen in the direction

of advancement of said load unit, said first foil webbing substantially stretched in connection with the wrapping operation and having its upper longitudinal edge located below the top end surface of said load unit; covering the top end surface of said load unit with a second tensible plastic stretch foil, which is made to overlap and cover said upper longitudinal edge of said first stretch foil web, which extends around the load unit; subsequently wrapping a third, tensible and weldable plastic stretch foil web, which is made to cover the major part of first stretch foil web and those portions of the second foil, which overlap said upper edge of said first stretch foil web, in a closed path around substantially the whole circumferential area of said load unit in the same way as said first stretch foil web, said third stretch foil web also being substantially stretched in connection with the wrapping operation, substantially double, dependent flaps formed with said second foil at each vertical edge of the load unit, being pairwise folded in mutually opposite directions during the wrapping of said load unit in said third stretch foil web; uniting the two unreeled web portions of said third foil web with each other along a second, substantially vertical junction line in the same way as the two unreeled portions of said first stretch foil web; and finally joining said second stretch foil spot-wise to said third stretch foil web.

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