

Feb. 17, 1970

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3,495,375

STABILIZING UNIT LOADS USING TENSIONED FILM

Filed April 20, 1967

3 Sheets-Sheet 1

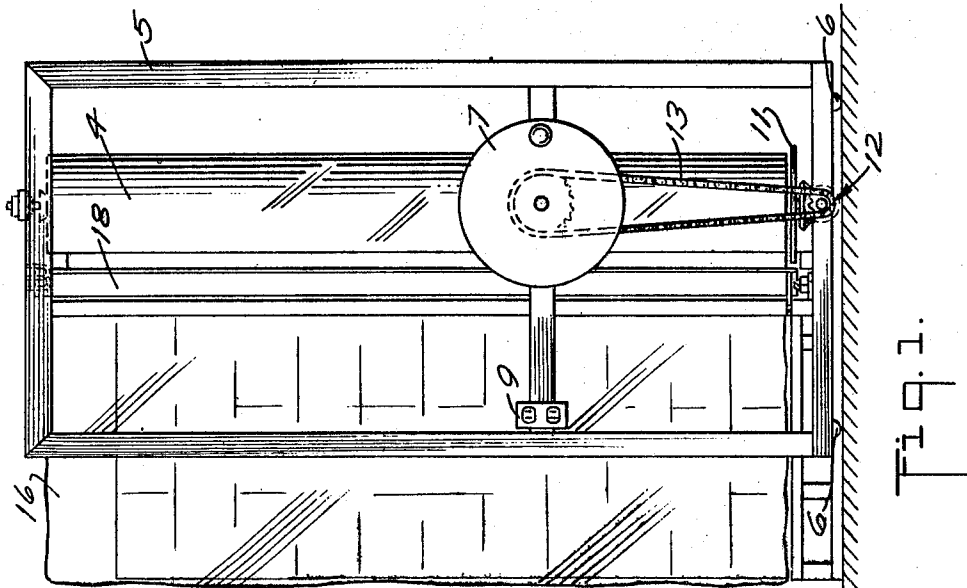


Fig. 1.

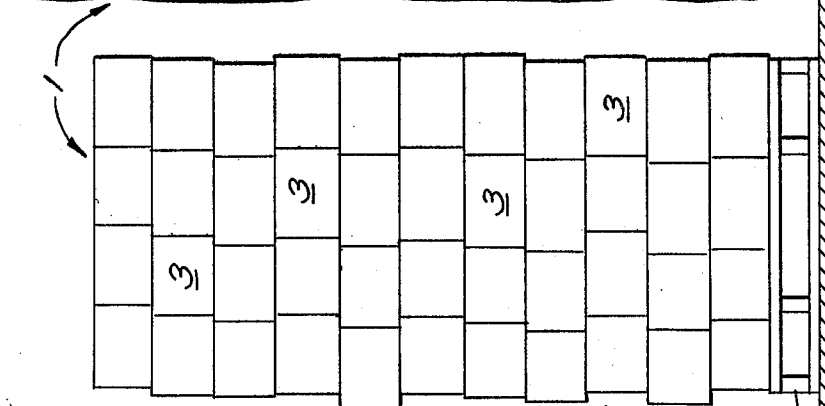


Fig. 2.

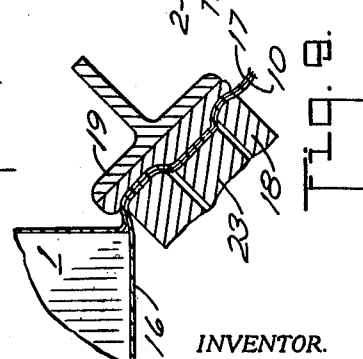
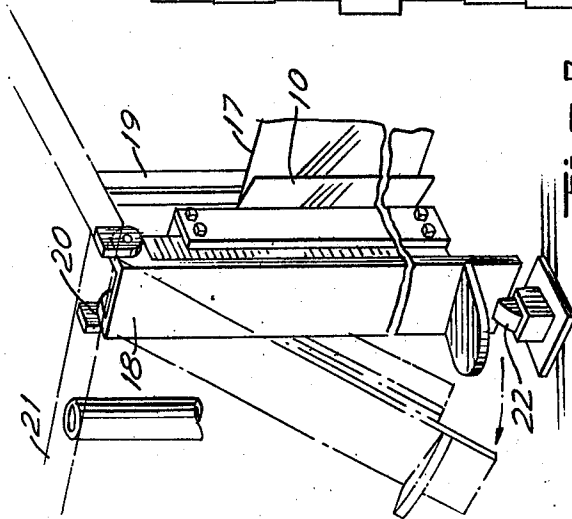


Fig. 3.

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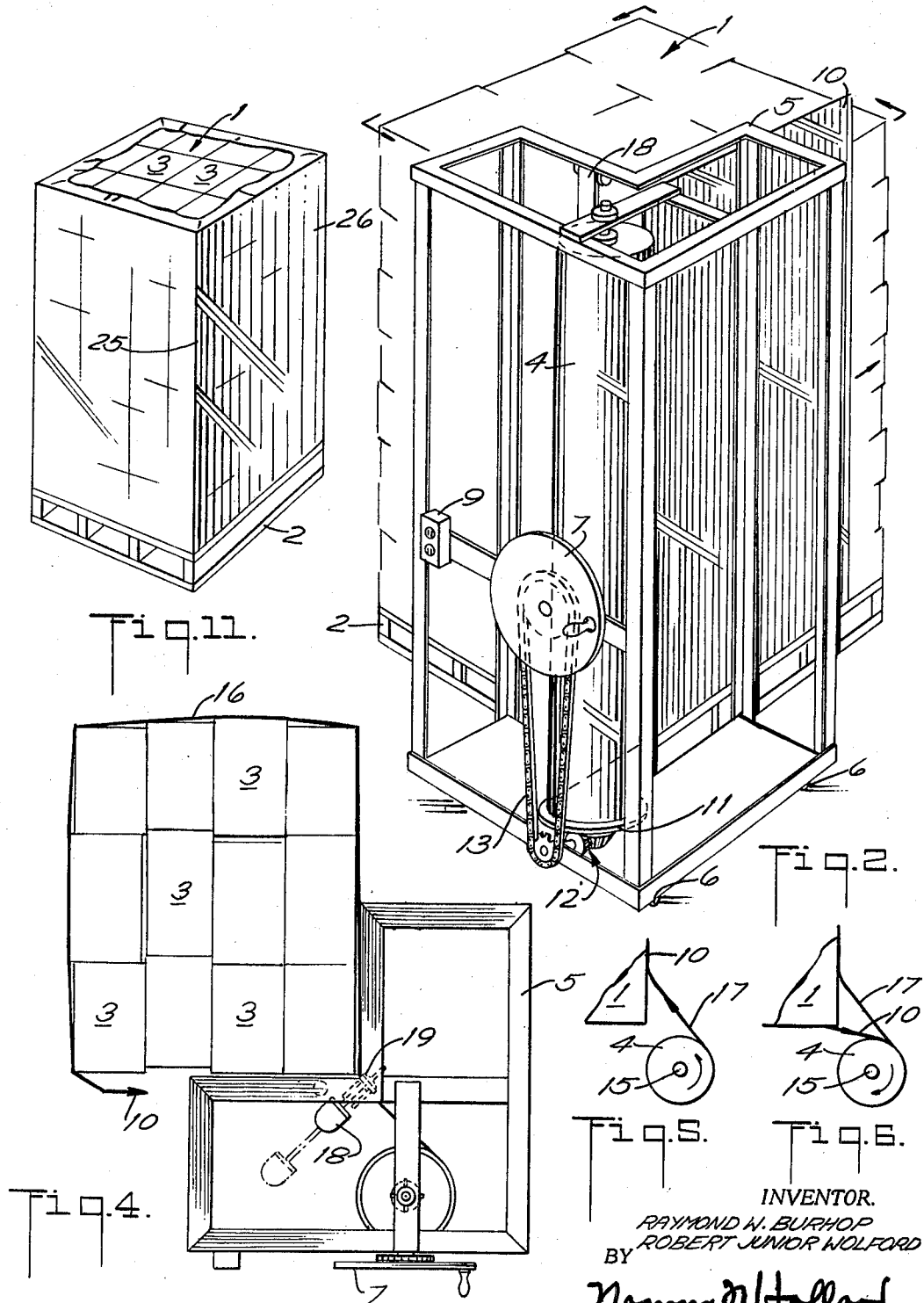
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3 Sheets-Sheet 2



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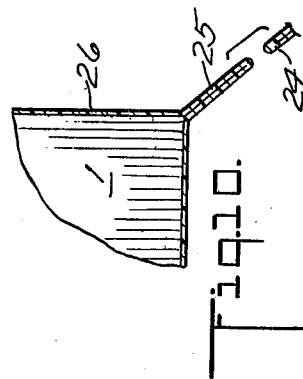
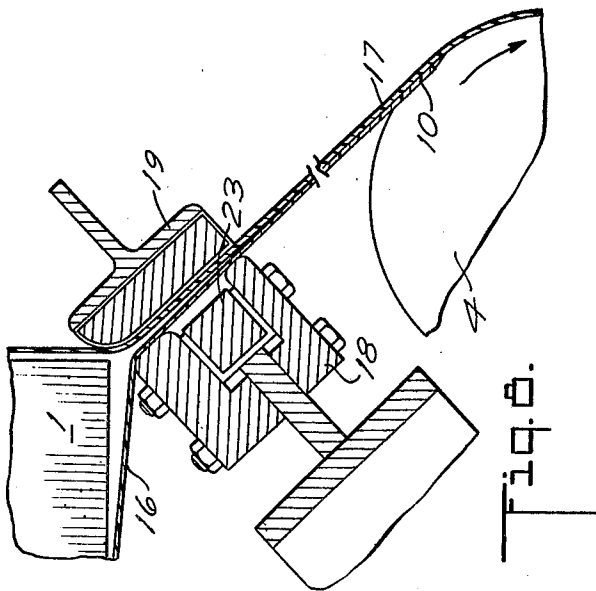
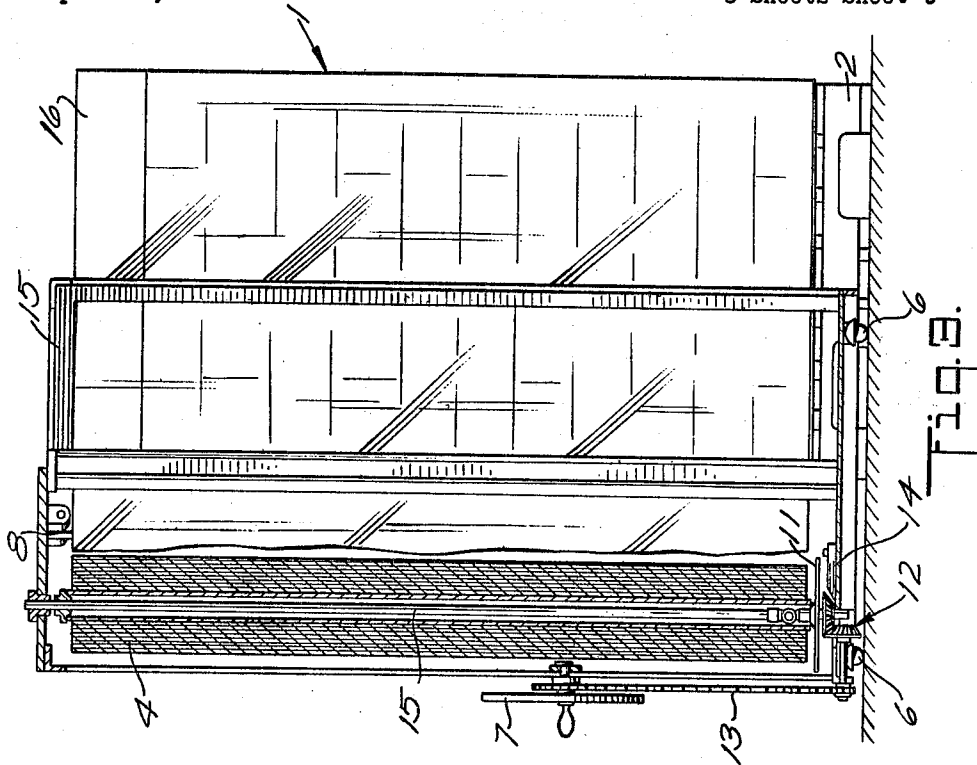
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STABILIZING UNIT LOADS USING TENSIONED FILM

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3 Sheets-Sheet 3



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3,495,375 STABILIZING UNIT LOADS USING TENSIONED FILM

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Filed Apr. 20, 1967, Ser. No. 632,372
Int. Cl. B65b 11/02, 51/26, 67/68
U.S. Cl. 53—33 4 Claims

ABSTRACT OF THE DISCLOSURE

A method of making an improved package containing a number of stacked articles such as cases of bottles supported on a pallet or other type of unit load wherein a sheet of plastic film is wrapped around the stacked load, tensioned, and sealed along a seam while maintaining the tension on the wrapper, whereby a unitized load is produced with the individual articles held against shifting relative to each other and the support.

BRIEF DESCRIPTION OF THE DISCLOSURE

The present invention relates to a method of making an improved package and more particularly a method of packaging a number of articles stacked on a pallet or other type unit load so as to prevent their shifting with respect to each other and thereby creating a unitized load.

It has long been a problem in handling loads comprising a number of articles stacked upon one another, side by side on a pallet to prevent relative shifting between the individual articles which may result in the collapse of the load. It is therefore desirable when dealing with these types of loads to create a unitized package wherein the individual articles are securely held against each other. This unitizing prevents random shifting of the center of gravity of the entire load, caused by the shifting and colliding of some of the articles with others during movement of the load. With such a unitized package the center of gravity will be acted upon only by the more easily controlled forces which act upon the entire load.

In the past in dealing with this unitizing problem many diverse solutions have been used and proposed. A common method of securing such loads is the tying of chains, straps and other lines over and around the load and the use of side bars and other members on the support pallet. Where there has been a tendency for the individual articles to skid or slide upon each other, various adhesive and non-skid surfaces have been applied to the articles and certain other antifriction means have been used.

When dealing with loads wherein relative shifting occurs between the carton and the items contained therein such as cases containing glassware and the like, the problem has been particularly troublesome. In this situation, the cases are stacked with the bottoms of the cartons placed upon the tops of the glassware in the lower cartons. The shifting of the bottles with respect to the cartons in which they are contained causes additional shifting of the cartons resting upon them which makes for an extremely unstable load.

The present invention is directed toward solving this problem of unitizing stacked palletized loads and particularly where the loads are of the type containing cases of bottles or related glassware. This solution takes advantage of the light weight and flexibility and the extraordinary tensile strength of thin plastic sheet materials such as polyethylene in creating a neat, compact, and stable load.

It has been found that sheets of thin flexible plastic material when wrapped around palletized loads such as stacked cartons of beverage bottles will when secured and

tensioned thereabout provide extremely satisfactory structural strength and create an essentially unitized package which overcomes the problems inherent in loosely stacked loads. The film may be drawn from a roll of such material and wrapped about the load or formed beforehand into a wrapper and then placed about the load. When in place the film is gripped and stretched into a stressed condition and secured in this condition maintaining a sufficient compressional force on the articles in the stack to prevent their movement relative to each other.

The prior art methods required a great deal of equipment or expensive processes as well as time consuming labor and handling. This invention provides a relatively simple method of securing large loads with a minimum of labor and materials and each load may be readily disassembled at the point of arrival after shipment without concern for dismantled paraphernalia and special tools.

The package formed by the method of the present invention is comparatively stable, more readily handled during shipment, keeps the contents comparatively contamination free and is more efficient in its structure than any of the prior art devices.

It is therefore an object of the present invention to provide an improved method of packaging a palletized load of stacked articles.

It is another object of the present invention to provide an improved package which is comparatively contamination free and having improved capabilities for handling and shipment.

It is another object of the present invention to provide an improved package which is readily assembled with a minimum of labor and material and having superior unitized qualities.

It is another object of the present invention to provide a method of making a unitized package using thin flexible plastic material and utilizing the extraordinary tensile strength thereof.

It is a further object of the present invention to simplify the handling of large palletized loads of glassware in cartons in preparation for and during shipment as well as dismantling upon arrival at its destination.

Other and further objects of the invention will be obvious upon an understanding of the illustrative embodiments about to be described or will be indicated in the appended claims and various advantages not referred to herein will occur to one skilled in the art upon employment of the invention in practice.

BRIEF DESCRIPTION OF THE DRAWINGS

A preferred embodiment of the invention has been chosen for purposes of illustration and description and is shown in the accompanying drawings forming a part of the specification wherein:

FIG. 1 is a view in elevation of two palletized loads of stack articles, one of which is being wrapped in the manner of the present invention with film supplied from a roll mounted on a preferred support device;

FIG. 2 is a perspective view of the preferred support device in position adjacent a palletized load showing the film being drawn from the roll;

FIG. 3 is a side view of the support device and the palletized load shown in FIG. 2 at a further stage of wrapping;

FIG. 4 is a top view of the support and palletized load as shown in FIG. 2, and showing the film being led around the perimeter of the load;

FIG. 5 is a partial diagrammatic top view showing the positions of the roll and the corner of the load with the film being drawn from the roll;

FIG. 6 is a view as in FIG. 5 showing the end of the film after passing about the load being tucked under

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the sheet coming from the roll and the rewinding of the roll for tensioning the film about the load;

FIG. 7 is a showing of the mounting for the heat sealing means on the support frame;

FIG. 8 is a partial top view partly in section showing a preferred embodiment of the heat sealing means used in connection with the present invention;

FIG. 9 is a view of the heat sealing means of FIG. 8 in operation;

FIG. 10 is a partial view in section showing the seam formed by the operation of FIG. 8; and

FIG. 11 is a perspective view of a palletized load after the completion of the unitizing method of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

The method of the present invention deals with palletized loads of stacked articles such as those shown in FIG. 1. These loads 1 comprise a pallet 2 upon which a number of the articles 3, generally of a uniform size, are stacked side by side running the length and width of the pallet. The articles 3 may be closed cartons as shown or may consist of cases of glassware such as beverage bottles whose tops extend beyond the upper edge of the cartons. In this latter situation, the bottoms of the upper cases are placed upon the tops of the bottles in the cases beneath. As the bottles have some freedom of movement within the cases, it will be seen that the entire load is rendered somewhat unstable since a great deal of relative movement between individual articles in the stack is thus permitted. The upper cases, particularly, in this random movement may collide against each other and introduce further dynamic effects within the load. It is therefore desirable to secure the individual cases within the load against relative movement. This is accomplished by wrapping a support member such as the polyethylene film of the present invention about the load.

In our preferred embodiment the film is supplied from a large roll 4 of the polyethylene film which is rotatably mounted on a shaft 15 on the portable support frame 5. The frame 5 is provided with rollers 6 so that it may be rolled about from load to load thus avoiding the need for any extra handling or movement of the palletized loads in order to perform the unitizing operation. The frame 5 is also provided with a hand wheel or crank means 7 which may be used to rewind the film supply and with a clamping and heat sealing means 8 which is also used in the method of the present invention as will be more fully discussed hereinafter. An electrical receptacle 9 is mounted on the frame to accept a plug for connecting a source of electrical power to the heat sealing member 8.

As best seen in FIG. 3 the film roll 4 is mounted on a plate 11 which is connected to a gear system 12. The gear arrangement 12 is in turn connected by means of a chain 13 to the crank device 7. A ratchet 14 permits the film 16 to be drawn freely from the roll 4 without any resistance from the gear arrangement 12 while engaging the gears when it is desired to rewind the roll 4 by means of the crank 7.

The first step of the method of the present invention is shown in FIG. 2 where the support frame 5 is positioned adjacent the palletized load 1 to be wrapped or unitized; one corner of the load 1 being disposed in the bay of the L-shaped frame 5.

Next, the end 10 of the film 16 is drawn from the roll 4 and led about the perimeter of the load 1 (FIG. 5). The end 10 is passed completely around the perimeter of the load and returned to the point where it is coming off the roll 4. This end 10 is then tucked along its length between the roll 4 and the portion 17 of the sheet coming off the roll (FIG. 6).

Tensioning of the film 16 about the load 1 is then accomplished by turning the crank 7 which rotates the roll 4 in the opposite direction from its rotation when the film 16 is being drawn off. The end 10 of the film 16 will be gripped between the surface of the roll 4 and the portion

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17 of the sheet coming off the roll 4 and be rewound with the roll 4. The crank 7 is turned until the film is sufficiently tensioned to hold the cartons 3 tightly against one another preventing any of the cartons in the load from moving relative to each other. A tight wrapper is thus formed about the load which acts as an exceptional structural support.

In order to secure the wrapper about the load a clamping and heat sealing means 8 is provided at the inner elbow of the L-shaped frame 5. As shown in FIGS. 7 through 9 it is in the form of two bars, one of which 19 extends the height of the frame 5 and is fixed to the top and bottom members of the frame. The other bar 18 comprises a clamping and heating unit which cooperates with this stationary member 19. The bar 18 is mounted by means of the pivots 20 to the top rung 21 of the frame 5. It may be pivoted upwardly to permit passage of the end 10 of the sheet of film 16 after the sheet has been wound about the load 1 so that the end 10 may be tucked under the roll for the tensioning operation. After the film 16 has been tensioned by reverse winding the roll 4 by means of the crank 7, the clamping and heating bar 18 is pivoted into place and locked (FIG. 7) by the snap arrangement 22 on the base of the platform 5. This clamping action (FIG. 8) further tensions the film 16 about the load 1 and maintains the tension during the welding or heat sealing operation.

The heat sealing is accomplished by means of a welding iron 23 extending the length of the clamping member 18 and mounted in a cutout portion in its center. When the pivotable clamping member 18 is in position, the outer surface of the welding iron presses against the film held between the clamps (FIG. 9). The iron 23 is then heated and the two sheets of film 17 and 10 are welded together along the line of the welding iron 23. This welding operation, while sealing the two sheets together along a seam at the welding line, will also cause separation of the film 16 along this line due to the tension of the film. This method thus results in two welded ends (FIG. 10), the loose end 24 remaining on the roll 4 and the welded seam end 25 forming the corner of a sleeve 26 tensioned about the load 1. Consequently, there is no resulting waste of poly film in this operation.

After the seam 25 is formed, the clamp device 18 is unlocked, allowing the finished palletized load to be removed (FIG. 11). The resulting load is a firmly-held unitized package which may be readily moved and handled without fear of relative shifting of the cartons or collapse of the load.

If, in lieu of the roll of film, a preformed wrapper is used it is quite apparent that the loosely-fitted wrapper may be similarly tensioned by heat sealing along a seam formed by drawing a portion of the wrapper between the clamping and heat sealing means and closing and operating them.

When it is desired to dismantle the load, a sharp cutting tool may be used to sever the poly film wrapper giving ready access to the individual cartons in the load. No complicated dismantling tools are required and no other paraphernalia is left at the point of destination.

It will thus be seen that a method has been provided for securing the individual articles in a stacked palletized load so as to provide a unitized package which is capable of ready handling and shipment without the danger of the individual articles shifting with respect to each other. This is accomplished without the need of expensive or complicated paraphernalia which must accompany the load and permits easy trouble-free dismantling upon arrival of the load at the destination. In addition a package is provided with a contamination preventing casing about the entire load that offers continuous structural support superior to means previously in use for this purpose.

As various changes may be made in the method disclosed or in the form, construction, and arrangement of the parts herein without departing from the spirit and scope of the invention and without sacrificing any of its

advantages, it is to be understood that all matter herein is to be interpreted as illustrative and not in a limiting sense.

Having thus described our invention, we claim:

1. A method of securing a palletized load of stacked articles against shifting comprising the steps of providing a relatively thin flexible sheet of plastic material that is drawn from a roll of the material and is formed into a wrapper and placed about the stacked load by leading the sheet end about the perimeter of the load, gripping the wrapper by tucking the said end between the roll and the sheet coming off the roll, tensioning the wrapper by reverse winding of the roll, and maintaining the tensioned condition whereby a tensioned wrapper is formed about the load whereby the stacked articles are tightly held against shifting relative to each other.

2. The method as claimed in claim 1 wherein the tensioned condition is maintained by heat sealing the wrapper along a substantially vertical seam.

3. The method as claimed in claim 1 wherein the plastic material is polyethylene.

4. A method of securing a palletized load of stacked articles against shifting comprising the steps of providing a relatively thin flexible sheet of thermoplastic material that is drawn from a roll of the material and is formed into a wrapper and placed about the stacked load by leading the sheet end about the perimeter of the load,

gripping the wrapper by tucking the said end between the roll and the sheet coming off the roll, tensioning the wrapper by reverse winding of the roll, and maintaining the tensioned condition whereby a tensioned wrapper is formed about the load with a two layer portion adjacent the roll, gripping and heating the wrapper on a transverse zone of the two layer portion of the wrapper whereby the gripped portions are heat-sealed together and whereby the tension being applied by the roll tears the film intermediate the transverse heated zone and the roller.

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U.S. Cl. X.R.

53—3; 206—65