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Sweeney et al.

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[54] **LOAD STABILIZATION**

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Related U.S. Application Data

[63] Continuation of Ser. No. 637,522, May 10, 1967, abandoned.

[52] **U.S. Cl.** **53/26,** 53/30

[51] **Int. Cl.** **B65b 21/06,** B65b 53/02

[58] **Field of Search** ..... 53/3, 30, 184, 159, 26, 53/33; 214/6; 206/60 A, 65

[56] **References Cited**

UNITED STATES PATENTS

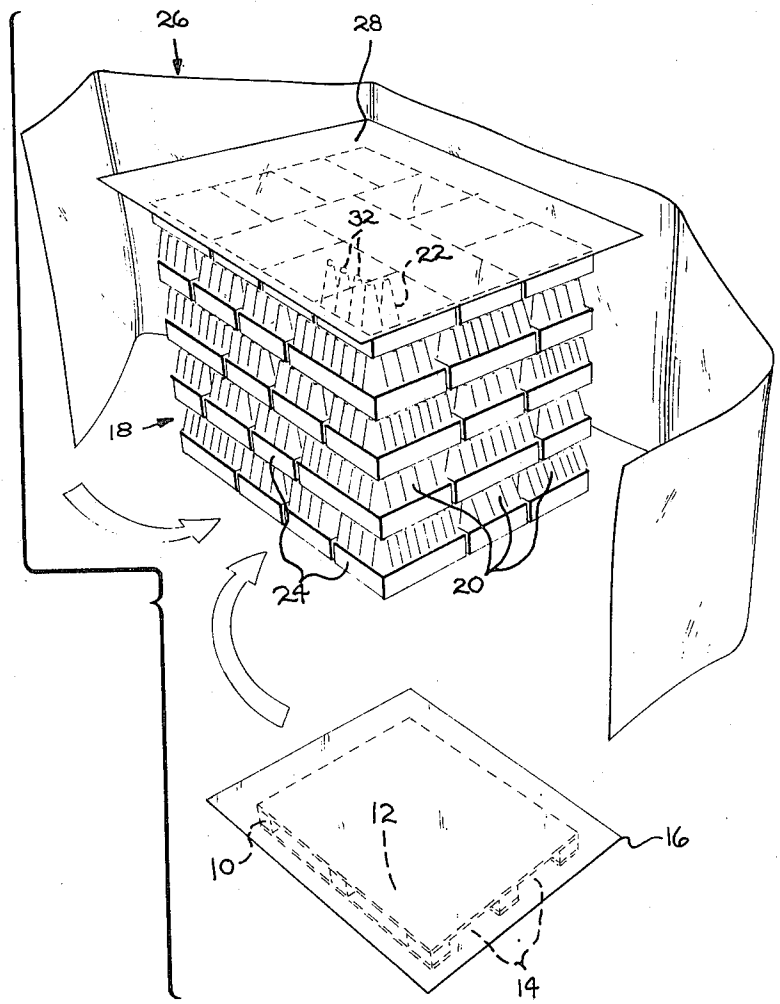
2,609,923	9/1952	Simonton	206/60 A
2,885,097	5/1959	Lyon	214/6
2,932,389	4/1960	Pearson	206/60 A
3,253,379	5/1966	Foradora	53/3
3,331,503	7/1967	Brown	53/30 X
3,337,036	8/1967	Peterson	206/60 A X
3,529,717	9/1970	McDougal	53/26 X

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[57] **ABSTRACT**

A storable and transportable load of multitudinous containers, comprising: a pallet of the type adapted for use with a forklift truck, a stacked array of sub-unitized containers positioned on the pallet and a heat-shrunk enveloping material grippingly holding the stacked array in a substantially rigid position as an integral unit load.

5 Claims, 3 Drawing Figures



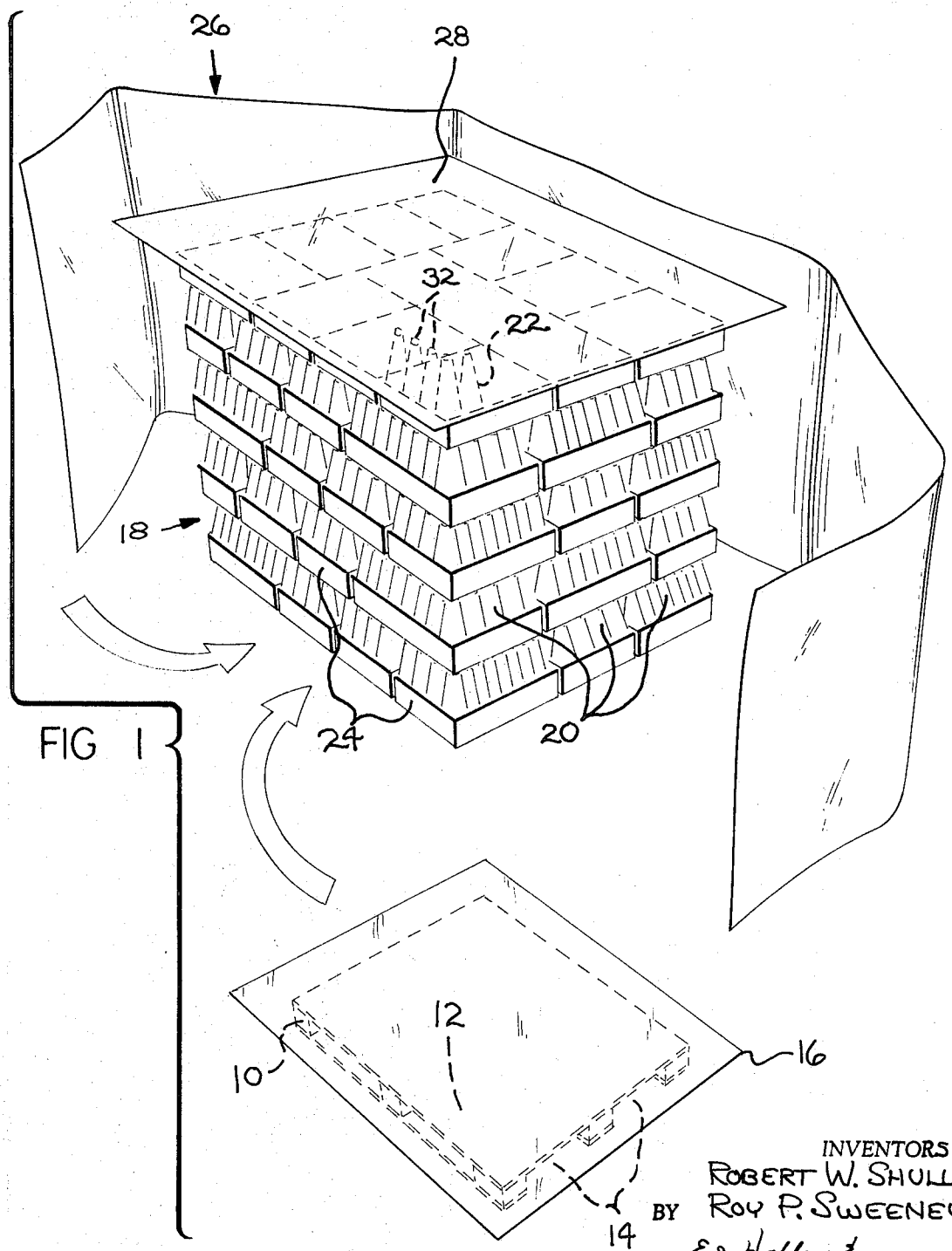


FIG 1

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FIG. 3

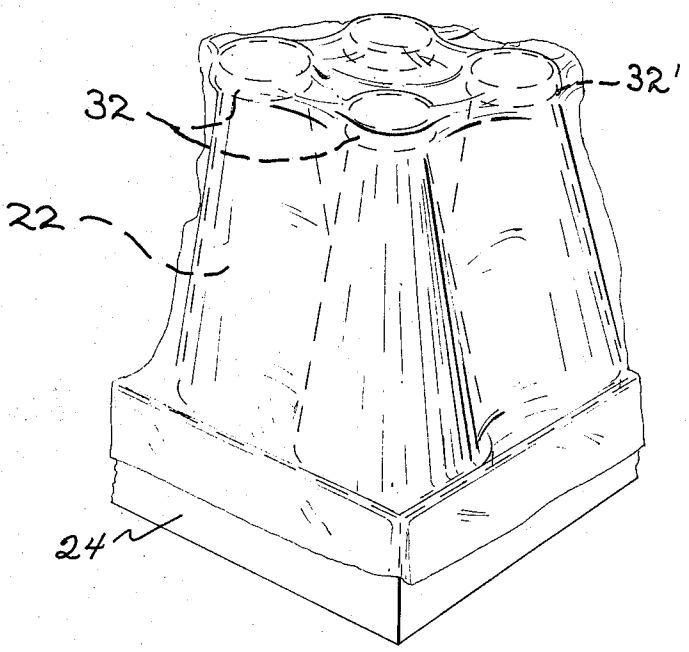
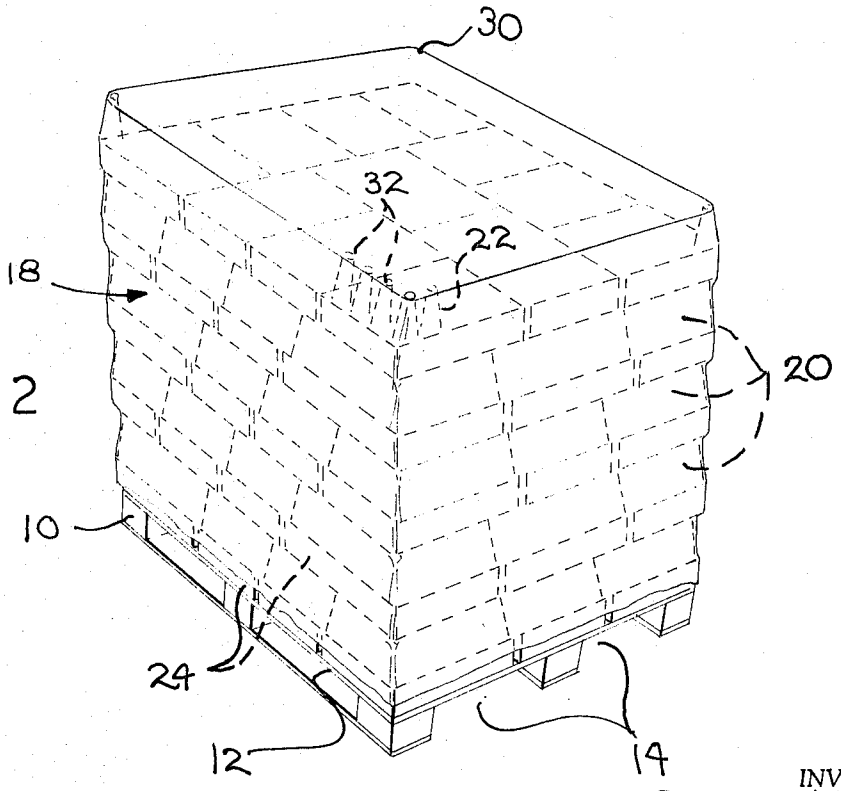


FIG. 2



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LOAD STABILIZATION

This application is a continuation of Ser. No. 637,522 filed May 10, 1967, now abandoned.

BACKGROUND OF INVENTION

This invention relates to the art of materials handling; more particularly, it relates to an improvement in means for unitizing and stabilizing pallet loads of a plurality of containers, thereby facilitating the shipping and storage of these loads.

Glass or similar type containers, because of their relatively small size and the high rates at which they are manufactured, must be handled in units of larger size if one is to minimize the inherent difficulty and expense resulting from the laborious task of individual container handling. For this purpose, numerous containers are generally packed into larger sub-assemblies such as, for example, open-topped cases, cartons and trays. In turn, a plurality of these larger, but still relatively small sub-assemblies are stacked upon a pallet and, by means of a forklift-truck, are lifted and moved to either storage areas or depots for subsequent transportation by truck or rail-car to the packer or bottler, and then to further distribution channels. As currently practiced, these pallet loads may contain up to 13 tiers of sub-assembled containers; each sub-assembly typically being comprised of a carton holding as many as two dozen containers and each tier including approximately 12 such sub-assemblies. Thus, it can be readily seen that each pallet load may consist of several thousand containers. Because of this multitude of similar individual containers arranged in stacked relation, these loads are inherently characterized by a lack of stability and rigidity.

Consequently, in order to permit conventional forklift handling, storage to normal heights and shipping in trucks or railroad cars, supplemental stabilization of unit loads is generally required. Currently, these stabilizing elements have included the use of twine, straps, corrugated sheets and cornerposts, the various elements either being used singularly or in various combinations.

In addition to not completely resolving the stability problem, these current practices generally render additional collateral desirabilities ineffective. Since the containers are typically sub-assembled in labeled cartons, it is preferable that the stabilizing elements also allow these labels to be readily discernible for purposes of easy load identification; furthermore, it is desirable that the stabilizing elements also protect the pallet load from dust, dirt and the like. It is readily apparent to those skilled in the art that, heretofore, no pallet load stabilizer has entirely resolved the prior considerations.

SUMMARY OF INVENTION

In accordance with this invention an improved unitizing, pallet load stabilizer is provided; said stabilizer allowing easy load identification and being capable of protecting the load from dust, dirt and other deleterious conditions.

More particularly, in accordance with this invention a multitude of sub-unitized containers are stacked in a suitable array upon a pallet, and a heat-shrinkable material is applied to such load to form a unitized pallet load sufficiently stable to permit conventional fork truck handling, shipment and storage.

BRIEF DESCRIPTION OF DRAWINGS

The foregoing and other advantageous features of this invention will become apparent by reference to the drawings, of which:

FIG. 1 is an exploded perspective view generally showing a method of producing a stabilized pallet load embodying the features of this invention;

FIG. 2 is a perspective view of a pallet load embodying the present invention;

FIG. 3 is an enlarged fragmentary perspective view showing the upper, corner margin of a pallet load embodying the present invention.

DESCRIPTION OF PREFERRED EMBODIMENT(S)

As used herein, the term "heat-shrinkable" refers to a property of a material which is characterized by its contraction in length and/or width upon being exposed to sufficient thermal energy. The contraction of these materials is thought to be attributable to a thermally stimulated, molecular reorientation, the molecules having been previously oriented by either a uniaxial or biaxial stretching. Similarly, "heat-shrunk" shall be used to designate the condition of a heat-shrinkable material subsequent to its contraction by thermal exposure.

Generally, the heat-shrinkable materials which may be used in the invention are thermoplastic films comprised of one or more synthetic organic polymers. Preferably, the films suitable for these purposes are polymers, or copolymers, of compounds having olefinic unsaturation such as, for example, ethylene, propylene, vinyl chloride, vinylidene chloride, styrene, vinyl acetate and vinyl alcohol. Additionally, it is preferred that these materials be of the transparent, non-pigmented type in order to allow easy load identification; however, when load identification is not desired, the materials may be colored by methods well known in the art.

While this invention generally relates to glass or metal containers, it has been found to be particularly effective with regard to glass containers having upper neck and mouth portions whose transverse sections are substantially smaller than the container body portion. Heretofore, these containers, especially when packed or sub-unitized in open-topped trays or cartons, which are subsequently stacked in tiers upon a pallet, have been extremely difficult to stabilize into a durable rigid unit-load because of the extensive sway inherent in such load where only the upper, smaller cross-sectional surface areas of the respective containers provide the support for the successively stacked tiers.

Referring to the drawings, FIG. 1 shows a transportable rigid base member, or pallet **10**, having an upper article supporting surface **12** and including passageways **14** formed beneath the supporting surface, whereby the pallet is adapted for handling by means of a forklift-truck. Positioned upon the pallet supporting surface **12** is a base sheet **16** of heat-shrinkable material, for example polyethylene, polypropylene or polyvinyl chloride film, the sheet **16** having sufficient longitudinal and transverse dimensions to extend coextensively and beyond the dimensions of the supporting surface **12.**

For purposes of simplification, the container load **18** to be unitized and stabilized is shown schematically in

a prestacked array displaced from the pallet **10.** It will, however, be apparent that the multitude of containers **20** comprising the load are first sub-unitized, and then stacked upon the pallet support surface **12.** As will be readily apparent upon reference to the drawings, load **18** is disposed in a horizontal and vertical array; that is, the load comprises a plurality of vertical tiers wherein each tier includes a plurality of horizontally juxtaposed sub-unitized container assemblies **24.** While any type container may be employed, the containers **20** illustrated are of the type having a neck portion **22** terminating in an upper annular lip or mouth portion **32.** Additionally, the containers are shown as having been sub-unitized by being packed in open-topped cartons **24,** it being understood that conventional cartons and trays are equally applicable, such cartons or trays normally being fabricated of corrugated paper and linerboard. The inherent strength of the individual containers **20** is used to form the stacked array, the cartons or trays serving to avoid surface-to-surface contact of the containers.

After the container load **18** is stacked on the pallet, a film of heat-shrinkable material **26** is circumferentially wrapped sidewise about the stacked load **18** with its longitudinal extremities being brought into overlapping relation. Sheet **26** is preferably imperforate and annularly surrounds the side surfaces of the unit-load. In passing, it should be mentioned that the magnitude of shrinkability of sheet material **26** is not critical, the only requirement being that the material, when applied, be sufficiently tight to enable it to snugly engage the load upon its being subsequently heat-shrunk. Following the sidewise load wrapping, a top sheet **28** of heat-shrinkable material is draped over the upper horizontal surface of the load **18** and the draped portion is brought into contact with the upper vertically-disposed side surfaces of sheet **26.** The overlapping portion of the base sheet **16** then also being brought into contact with the lower vertically-disposed side surfaces of sheet **26.**

Finally, in order to complete the stabilization, the enclosed load undergoes a heating cycle to effect the contraction of the heat-shrinkable sheet material. While the exact heating cycle is somewhat dependent upon the nature and thickness of film employed, successful shrinking has been accomplished by using a 15–60 second cycle at 300°–400°F or alternately a cycle of several minutes at 200°–300°F, time-temperature being complemental. Although the heating may generally be accomplished by positioning the load within any suitable heating chamber or adjacent to a heating source, because of the desirability of substantial uniformity of heating, a preferred source comprises an indirect-fired heat tunnel having recirculating air flowing therethrough. As a result of being subjected to such thermally-stimulated contraction, the film snugly engages the externally-disposed surfaces of the load contour to a considerable degree, thereby continuously exerting permanent and continuing compressive gripping forces which greatly stabilize and impart rigidity to the pallet load. Also, the load is protected against contaminants such as dirt, dust, water and other objectionable materials.

While the foregoing generally describes the encapsulation of a unitized container load within a heat-shrunk film, it will be obvious that certain modifications may be employed. For example, when exposure to dust or dirt is of no concern, such as in the case of capped containers, the base sheet **16** and top sheet **28** may be completely eliminated and only the circumferential side wrapping sheet **26** employed. Moreover, a plurality of side wrappings, such as a band type arrangement, may be desirable in certain instances. Another modification comprises the simple elimination of the base sheet **16** with the result that, the side wrapping sheet and top sheet, **26** and **28** respectively, upon contraction will produce a heat-shrunk hood or cover in contrast to a completely encapsulated load as described in FIG. **1.**

FIG. **2** discloses yet another embodiment in which, instead of using several sheets of material, a prefabricated, heat-shrinkable, unitary cover or hood is employed. Referring to this figure it will be apparent that the general method of producing the stabilized load is similar to that previously described. Generally, the sub-unitized container assemblies, comprised of open-topped cartons **24** each containing a plurality of containers **20,** are stacked on the supporting surface **12** of a pallet member **10** to form the container load **18.** Subsequently, a heat-shrinkable cover **30** is positioned over the load **18** and heat-shrunk, whereby the entire bag contracts and substantially conforms to the exterior surface contours of the load **18.**

The sheet contraction and its tendency to mate with the load contour is, as noted supra, particularly advantageous in the case of containers **20** having an upper annular lip **32.** When packed in open-topped cartons **24,** these containers lips define the upper surface of the load. Consequently, when using either the cover embodiment of FIG. **2,** or an embodiment which utilizes a top sheet as described in conjunction with FIG. **1,** the portion of the heat-shrinkable material disposed adjacent upwardly of the lips will, during heating shrink back under the lip of container (**32** in FIG. **3**) at least at the load periphery. Thus, the containers comprising the upper tier will be rigidly locked in position, thereby being substantially restrained from swaying and contacting each other while in transit.

While various and alternate embodiments of this invention have been described in detail above, it will be apparent to those skilled in the art that these embodiments may be modified. Accordingly, the foregoing is to be considered exemplary rather than limiting and the true scope of the invention is as described in the following claims.

We claim:

1. A method of providing a stable, unitized pallet load of multitudinous containers such as glass bottles, jars and the like, comprising the steps of:

positioning a pallet having a load supporting surface in a container loading location;

positioning a base sheet of heat shrinkable plastic material on said pallet, load supporting surface;

stacking a substantial plurality of container subassemblies in a suitable array upon said base sheet leaving a peripheral portion of said base sheet exposed;

wrapping a heat shrinkable plastic material about the sides of said stacked array;

draping a top-sheet of a heat shrinkable plastic material upon the upper surface of said stacked array, and bringing the draped portion of said top sheet and the peripheral portion of said base sheet into contact with said side wrapping sheet;

shrinking said material into intimate contact with the exterior surfaces of said stacked array, thereby forming a complete enclosure for the top and sides of the stacked array which exerts an inward restraining action thereupon.

2. The method of claim **1,** wherein said shrinkable material is a heat-shrinkable film comprised of a polymer, or copolymer of compounds having olefinic unsaturation.

3. The method of claim **2,** wherein said heat-shrinkable film is polyvinyl chloride or polypropylene.

4. The method of claim **3,** wherein said step of shrinking said material comprises the step of heating said heat-shrinkable film to a temperature of about 200° to 400° F.

5. The method set forth in claim **1** including the step of orienting at least each peripheral container subassembly in each layer above the lowermost layer on said pallet such that it is in a different orientation than the subassembly below it.

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