United States Patent [19]

Cloyd

[11] **3,917,066**

[45] **Nov. 4, 1975**

[54] **PALLETIZED LOAD WITH COMPRESSION FRAME**

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[73] Assignee: **Nosco Plastics, Incorporated**, Erie, Pa.

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[52] **U.S. Cl.** **206/386;** 108/51; 220/23.4

[51] **Int. Cl.**..... **B65d 85/00;** B65d 71/00

[58] **Field of Search** 206/386; 220/23.4; 108/51, 108/58, 55, 56, 53

[56] **References Cited**

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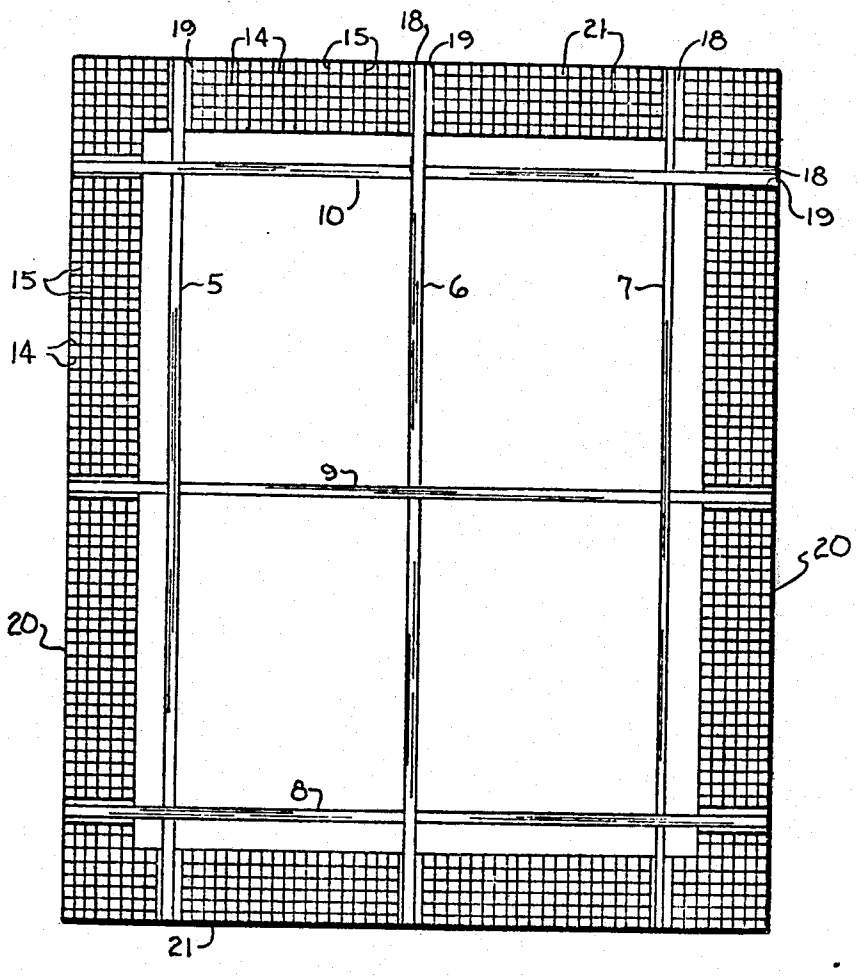
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Assistant Examiner—Joseph Man- Fu Moy
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[57] **ABSTRACT**

A rectangular palletized load having a hollow rectangular compression frame engaging the upper periphery of the load, the frame having vertically spaced planar surfaces parallel to each other, the lower surface for transmitting a vertical hold down force from strapping to the load and the upper surface for receiving a pallet stacked on top of the frame. The sides and ends of the frame each consist of a lattice of intersecting ribs united to each other at the intersections and with edges normal to said surfaces. In a preferred form the sides and ends of the frame are latched together at the corners of the frame so as to permit knock down shipping.

6 Claims, 8 Drawing Figures



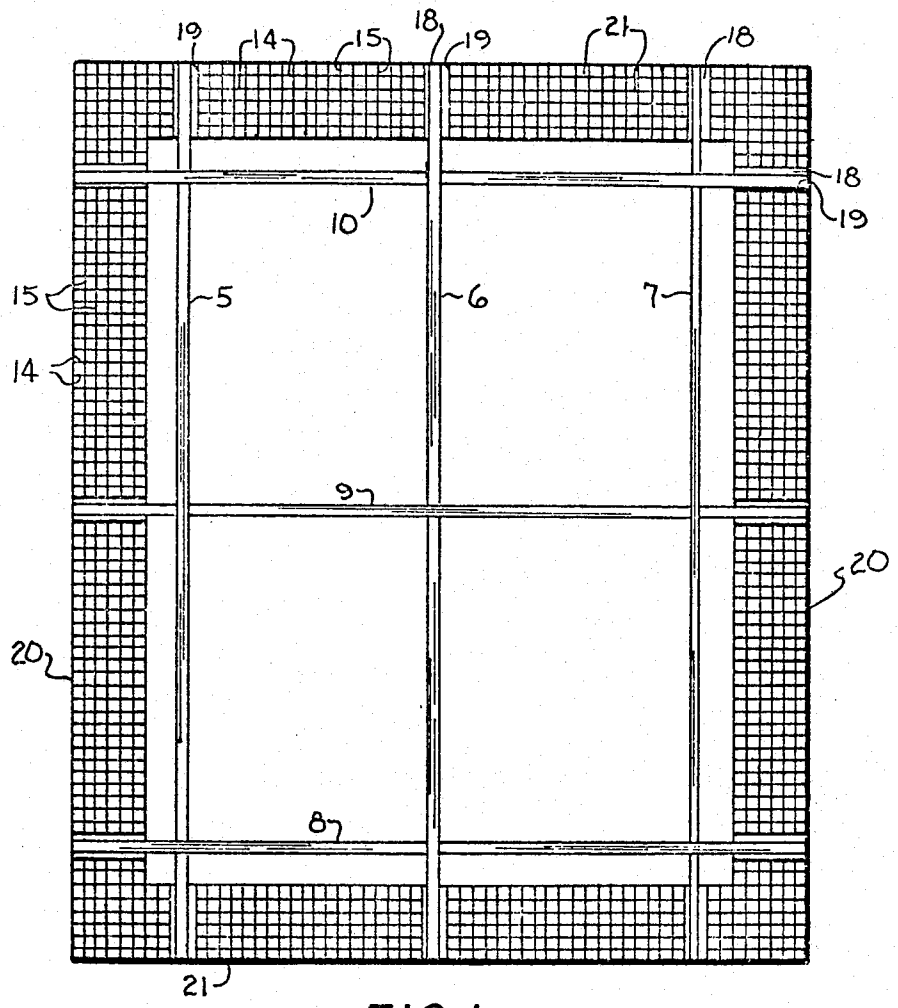

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FIG. 1

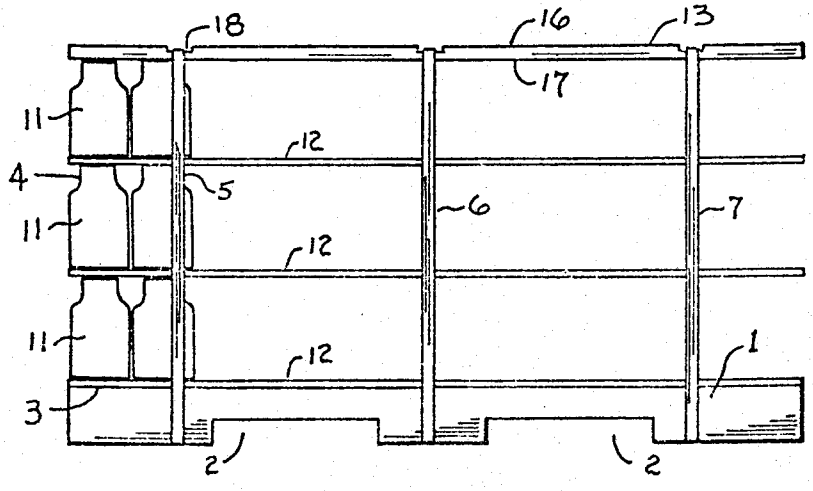

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FIG. 2

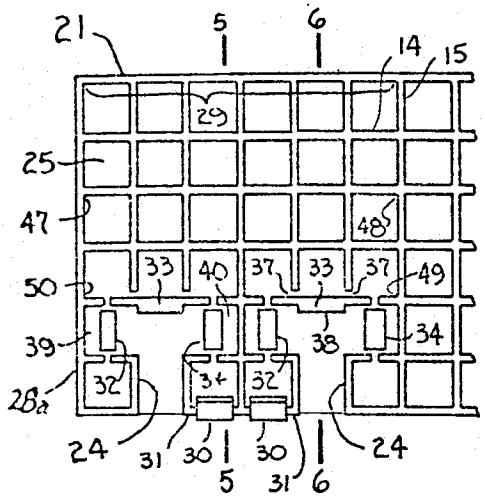


FIG. 3

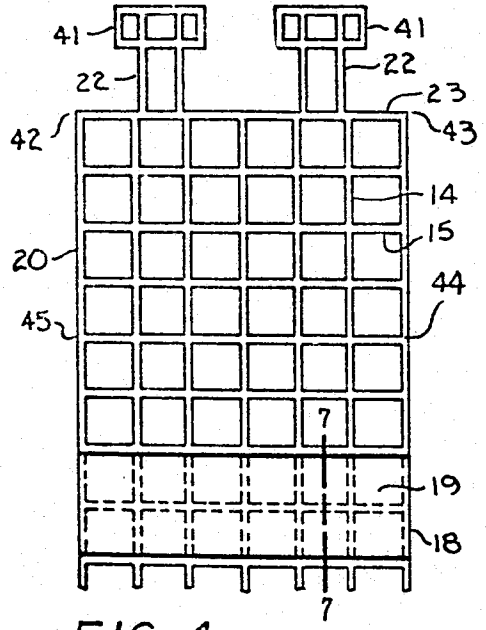


FIG. 4

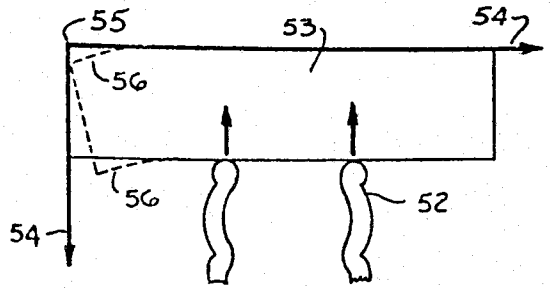


FIG. 8

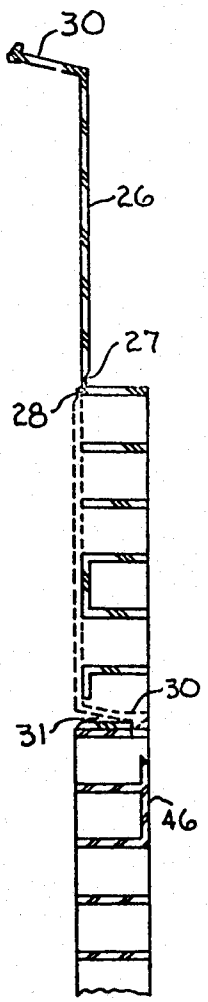


FIG. 5

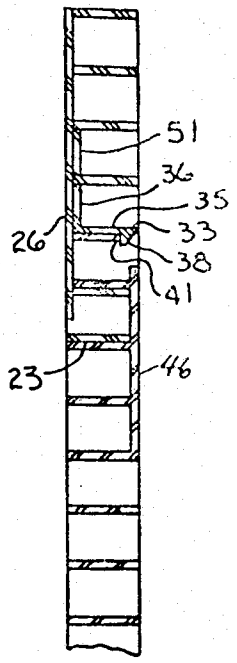


FIG. 6

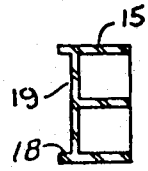


FIG. 7

PALLETIZED LOAD WITH COMPRESSION FRAME

In shipping palletized loads of bottles and the like, a hollow rectangular compression frame is required to transmit hold down forces from steel strapping to the top of the load and to receive the weight of one or more pallets stacked on top of the frame. The frame is of the same outside dimensions as the pallet (44" × 56") and the sides and ends of the frame are 1" thick and 4" wide. Heretofore the compression frames have been made of four pieces of wood class "C" species NWPMA grade "A" S2S with the grain extending lengthwise of each piece.

This invention is intended to decrease the weight and increase the life of compression frames by making the frames of plastic in the form of a grid of intersecting ribs edgewise to the load. This structure optimizes the structural properties of the plastic so that the cost is substantially equal to the wood frame but the weight is much less and the life as measured by the number of trips is much greater. In a preferred form in which the sides and ends of the frame are latched together at the corners of the frame, after each use the frame may be knocked down for the return shipment for reuse as long as the parts function.

In the drawing, FIG. **1** is a top plan view of a loaded pallet, FIG. **2** is an end view of FIG. **1**, FIG. **3** is a fragmentary top plan view of an end piece of the compression frame, FIG. **4** is a fragmentary top plan view of a side piece of the compression frame, FIG. **5** is a section on line **5-5** of FIG. **3**, FIG. **6** is a section on line **6—6** of FIG. **3**, FIG. **7** is a section on line **7—7** of FIG. **4**, and FIG. **8** is a diagrammatic view showing the moments and forces applied to the frame by the strapping when shipping small mouth bottles of large capacity.

In FIGS. **1** and **2** there is shown a pallet **1** with fork lift openings **2** on the upper surface **3** of which is mounted a load **4** held in place by lengthwise steel strapping **5, 6, 7** and crosswise steel strapping **8, 9, 10.** Similar fork lift openings are in the other sides of the pallet which are not shown. The load has the general shape of a rectangular parallelepiped or prism. The particular load shown consists of three tiers of empty bottles **11** (only a few of which are shown), each resting on a sheet **12** of particle board. This is a typical load for bulk shipment of empty bottles from the manufacturer. Other loads might consist of empty cans, etc.

All of the loads require a hollow rectangular compression frame **13** registering with the underlying pallet load for transmitting hold down forces to the top of the load from the steel strapping **5–10.** The forces transmitted by the frame are substantially entirely compression. When loaded pallets are stacked one on top of the other the compression frame of the lowermost pallet must in addition carry the gravity load of the upper pallets, which is also a compression force.

The sides and ends of the compression frame **13** comprise a lattice or grid of lengthwise and crosswise extending ribs **14, 15** arranged edgewise normal to the upper and lower planar surfaces **16, 17** of the frame and united to each other at the points of intersection. For the particular frame shown which was designed for 3,000 pound bulk loads of bottles on a standard 44" × 56" pallet, the outside dimensions of the frame were 44" × 56", the ribs **14, 15** were substantially 3/32" thick, 1" in height and arranged on ⅜" centers so seven ribs lengthwise of each of the side and end pieces

resulted in the same 1" × 4" cross section envelope of the prior art wood frame. These dimensions are by way of example and not of limitation. This produced an extremely rigid structure in the compression direction which, due to the open spaces between the ribs, was much lighter than the wood frame it replaced. The open spaces between the ribs are enough smaller than the smallest bottle top so the load can be transmitted from the frame directly to the bottle tops. For example, the bottle top for the standard crown cap always contacts two or more intersecting ribs. Rigid polyethylene, one of the plastics suitable for the frame, floats in water so that the open spaces between the intersecting ribs provide visual indication of the weight saving. Plastic has a further advantage that it does not splinter and, therefore, eliminates the wood splinter problem so troublesome to the food processing industry.

Another advantage of the plastic compression frame is the guideways **18** for the steel strapping. These guideways consist of walls **19** recessed below the upper surface **16** of the ribs **14, 15.** Three such guideways are present in each of the end and side pieces of the frame arranged adjacent the corners and at the mid sections of the side and end pieces. The guideways provide positive location of the strapping.

In FIGS. **1** and **2** the compression frame **13** is shown as a one piece construction in which the side and end pieces **20** and **21** are molded as a single unit. In FIGS. **3–6** there is shown an alternate construction in which each side and end piece is molded as a single unit and the pieces are then latched together to form the complete frame. This offers further savings in molding and shipping costs. Molding of the individual side and end pieces can be effected in a smaller press because more efficient use is made of the press platen area. The separate side and end pieces take up less space for shipping. The latch connection permits easy assembly and disassembly so that the frame may be easily assembled for use or disassembled for return for reuse.

FIGS. **3** and **5** show one end of an end piece **21.** The opposite end is of the same construction and the mid section is a lattice of longitudinal and cross ribs **14, 15** as shown in FIG. **1.** The end piece could be provided with the impact absorbing corner construction of U.S. Patent No. 3,750,598.

FIGS. **4** and **6** show one end of a side piece **20** and FIG. **6** further shows one of the latch connections between an end piece and a side piece. As was the case with the end pieces **21,** the side pieces are of identical construction and the end construction shown in FIG. **4** is duplicated at the opposite end.

In both the side and end pieces the main portion is made up of uniformly distributed lengthwise and crosswise extending ribs of the construction shown in FIGS. **1** and **2** so that the load carrying properties are unchanged. Corresponding parts are indicated by the same reference numerals.

The connection between side and end pieces **20, 21** is made by interlocking joint means such as two T-shaped projections **22** outstanding from cross rib **23** extending across the full width of the side piece **20** and two complementary T-slots **24** recessed into the adjoining end of the end piece **21.** The lower ends of the T-slots **24** as well as the lower ends of the grid openings **25** in the entire corner section of the end piece are closed by a stop plate **26** hinged by a hinge member **27** to the portion of edge **28** enclosed by bracket **29.** The stop plate **26** is molded in the position shown in full lines in FIG. **5** and

after molding is swung to the dotted line position where latch **30** is hooked over the upper edge of rib **31.** In the dotted line position, the stop plate **26** closes the lower ends of the T-slots **24.** The stop plate **26** could obviously be hinged to the adjoining edge **28a** of the corner since its function is to close the lower ends of the T-slots **24.**

In the head portion of each of the T-slots are three latches **32, 33, 34,** each of similar construction. As shown in FIG. **6,** latch **33** is integral with the upper edge of a vertical wall **35,** the lower edge of which is integral with a horizontal wall **36** bridging the space between the lower ends of longitudinal and crosswise extending ribs **14, 15.** The vertical wall **35** is separated from cross ribs **15** by grooves **37** and the outermost tip **38** of the latch extends into the T-slot **24.** The latches **32** and **34** are of similar construction, the latch **32** being integral with a vertical wall similar to **35** extending upwardly from a bottom wall **39** similar to **36** and the latch **34** being integral with a vertical wall similar to wall **35** extending upward from a bottom wall **40** similar to wall **36.** The latch members **32** and **34** likewise extend into the T-slots **24.**

The side section **20** is assembled to the adjoining end section **21** by moving the projecting T-sections **22** over the T-slots **24** and pushing downward when the T-sections register with the slots. As the T-sections are pushed downward, the heads **41** engage the latches **32, 33, 34** and cam the latches outward. When the T-sections **22** bottom against the stop plate **26,** the latches **32, 33, 34** snap over the upper edges of the heads **41** as shown in FIG. **6.**

When assembled, the upper and lower surfaces of the end and cross pieces lie in a common plane with no projections which could interfere with the operation. The interfitting T and T-slot connections provide the required corner rigidity to maintain the required rectangular outline. To further rigidify the corner sections of the frame, the upper ends of the openings between the grids in the area bounded by **42, 43, 44, 45** may be closed by a solid wall **46** and the lower ends of the grid openings in the area **47, 48, 49, 50** may likewise be closed by solid walls **51.** The walls **46, 51** further tie the ribs together and rigidify the corner sections.

To disassemble the corner sections, the latches **30** are merely pushed outward clear of the adjoining wall surface **31.** This permits the stop plate **26** to swing downward out of the way and the T-sections **22** may be easily pushed out the open ends of the T-slots **24.** The T-slot joint is an example of the class of interlocking or dovetail joints which may be used.

The latches merely hold the parts together and do not take any of the strapping or compression loads. Latch **30** merely holds stop plate **26** in position. Latches **32, 33, 34** hold the T-sections **22** in the T-slots **24.**

FIG. **8** illustrates the forces and moments present when the load consists of quart size beverage bottles. The bottle top **52** is spaced substantially inward of the outer edge of the compression frame member **53** so the forces from strap **54** which ordinarily range from **300** to **350** lbs. are applied to the outer corner **55** and tend to bend the frame member as indicated by dotted lines **56.** These forces tend to split the members of the prior art wood frame due to the lengthwise grain of the wood. In the frame of this application, the ribs are much better adapted to withstand these forces and the plastic has no tendency to split. The life of the frame as measured by the number of trips is greatly increased.

What is claimed is:

1. A pallet having a rectangular load carrying surface and fork lift openings below said surface, a load in the form of a rectangular parallelepiped on said surface, said load comprising a plurality of tiers of bottles and the like with the bottle tops uppermost, a hollow rectangular compression frame engaging the tops of the bottles in the upper periphery of the load, strapping for holding the load on the pallet, said strapping extending from the pallet up one side of the load over the top of the frame and down the opposite side of the load to the pallet and also extending from the pallet up one end of the load over the top of the frame and down the opposite end of the load to the pallet, said compression frame comprising two side pieces and two end pieces forming a hollow rectangle registering with an underlying load carrying surface of the pallet said pieces being united at the corners and having lower planar surfaces engaging the bottle tops of the top tier of the upper periphery of said load and upper planar surfaces for receiving an upper pallet stacked on top of said frame so the load received by said frame from said upper pallet is transmitted from the frame directly to the bottle tops of the top tier of the upper periphery of said load, said side and end pieces each comprising a lattice of intersecting ribs united to each other at the intersections, said ribs extending edgewise between and being normal to said surfaces with the upper edges of said ribs comprising said upper planar surface and the lower edges of said ribs comprising said lower planar surface.

2. The pallet of claim **1** in which said end and side pieces have abutting ribs and one piece has a socket, with an opening through its rib and the other piece has a projection interlocking with said socket and said opening, said socket having one end open, and means for closing the other end of the socket.

3. The pallet of claim **2** in which said projection is slidable through said socket and opening in a direction normal to said surfaces.

4. The pallet of claim **3** in which said one piece has a releasable latch for said stop plate.

5. The pallet of claim **3** in which said socket has latch means blocking movement of said projection out of said socket in a direction away from said stop plate.

6. A pallet having a rectangular load carrying surface and fork lift openings below said surface, a load in the form of a rectangular parallelepiped on said surface, a compression frame engaging the upper periphery of the load, strapping for holding the load on the pallet, said strapping extending from the pallet up one side of the load over the top of the frame and down the opposite side of the load to the pallet and also extending from the pallet up one end of the load over the top of the frame and down the opposite end of the load to the pallet, said compression frame comprising two side pieces and two end pieces forming a hollow rectangle registering with an underlying load carrying surface of the pallet, said pieces being united at the corners and having lower planar surfaces for engaging the upper periphery of said load and upper planar surfaces for receiving a pallet stacked on top of the frame, said side and end pieces each comprising a lattice of intersecting ribs united to each other at the intersections, said ribs extending edgewise between and being normal to said surfaces with the upper edges of said ribs comprising said upper planar surface and the lower edges of said ribs comprising said lower planar surface, said end and side pieces having abutting ribs, one piece having a

socket with an opening through its rib and the other piece having a projection interelocking with said socket and said opening, said projection being slidable through said socket and in a direction normal to said surfaces, and said one piece having a releasable stop plate blocking said sliding of said projection.

* * * * *