A compartment defining member for insertion into a rectangular shipping case is a single length blank of fibreboard or the like folded on parallel score lines with end panels fixed to intermediate panels, and the arrangement being such that the inherent tendency of the folded panels to return to the unfolded condition of the blank increases the stability and resistance to deformation of the inserted member in the case.

11 Claims, 8 Drawing Figures
INTERNAL PARTITIONING OF
COMPARTMENTED CASES

This invention relates to packaging and particularly to shipping cases having internal partitioning that is readily installed and reliably maintains a compartment defining condition.

The invention has special merit in that it substantially eliminates problems that have arisen in connection with automatic bottle and other container filling machines wherein empty containers, such as plastic bottles, are removed from a compartmented shipping case and routed through, the filling machine, and then the filled containers are inserted automatically into a previously emptied case that has been moved to the exit side of the filling machine. When the empty bottles are being removed, the case is usually upended and forcibly shaken or vibrated. As a result the compartment defining partitions in many cases have been found to be dislodged to changed positions, sometimes even being separated from the case, so that the filled container cannot be automatically reinserted properly. This cause delays and increases production expenses.

The present invention provides a novel compartment defining structure for shipping cases and the like wherein the compartment defining partitions are positively retained and properly positioned even though the case may be vigorously handled while being emptied, and this is the major object of the invention.

Another object of the invention is to provide a novel compartment defining member relatively easily inserted into a shipping case and of such construction and arrangement that it tends to retain its compartment defining condition and resist separation from the case.

A further object of the invention is to provide a novel one-piece compartment defining member for a shipping case, made by specially folding a single length of uniform width cardboard, fibreboard or the like, and having end portions that dynamically coat with the walls of the case to retain the member in the case while maintaining a defined non-distorted compartment arrangement even though the case may be vigorously handled.

BRIEF DESCRIPTION OF DRAWINGS

FIG. 1 is a top plan view illustrating a shipping case with its top flaps open to show an inserted compartment defining member according to a preferred embodiment of the invention;

FIG. 2 is an end view of the compartment defining member of FIG. 1 separate from the case;

FIG. 3 is a side elevation showing the compartment defining member of FIGS. 1 and 2 separate from the case and flattened for shipping;

FIG. 4 is an enlarged fragmentary view in section showing preferred wall construction of the compartment defining member;

FIG. 5 is a top plan view like FIG. 1 but showing a different structural embodiment of the compartment defining member;

FIG. 6 is a fragmentary view illustrating the compartment defining member of FIG. 5 in a different shipping case;

FIGS. 7 and 8 are top plan views like FIGS. 1 and 5 but showing further different embodiment of compartments defining members.

PREFERRED EMBODIMENT

Referring to FIGS. 1-3, a one-piece compartment defining member 11 is shown inserted into a standard size shipping case 12 having four top flaps 13-16 hinged to the upper edges of the respective sides.

The illustrated case is rectangular, with parallel end walls 17 and 18 and parallel side walls 19 and 21. Preferably it is of standard construction, being formed of one or more sheets of stiff paperboard or the like. An advantageous wall structure is shown in FIG. 4 wherein a corrugated inner layer 8 is disposed and bonded between layers 9 and 10. This is conventional in shipping case walls, since it provides good stiffness. The sheet structure of member 11 may also advantageously be that of the associated shipping case side walls.

The compartment defining member 11 is derived from a single length uniform width blank having transverse parallel score lines defining successive adjacent panels 22-30, permitting the member to be formed to the expanded operative condition shown in FIG. 1 and to be folded to the shipping condition shown in FIG. 3.

In the illustrated embodiment, the width of the blank is equal to the length of the shipping case so that each container compartment has the depth of the case.

In the member 11, one short end panel 22 of the blank is adhesively bonded at 31 to an intermediate, preferably central, area of the longest panel 27 which extends the length of the case. The other end panel 30 has its terminal area adhesively bonded at 32 in overlapping relation to the adjacent end of an intermediate panel 24, so that the combined effective straight rigid length of panels 24 and 30 equals the length of panel 27 to also extend the length of the case. These are thus only two adhesively bonded regions in the member 11. Internal panel 23 thus is oppositely hinged at its ends to panel 27 at fold line 33 and to the combined straight panel 24, 30 at fold line 34.

At one end of member 11, panels 25 and 26 at one end are similarly pivoted about fold lines 35 and 36 to adjacent ends of panels 24, 30 and 27 respectively and at the other end are pivoted about fold line 37 into overlapping relation so as to define a projecting double thickness arm indicated at 38. In the illustrated embodiment, arm 38 has been formed by clockwise pivoting of panels 25 and 26, and therefore arm 38 due to the resilient nature of the paperboard will as indicated by the adjacent arrow in FIG. 1 possess an inherent tendency to turn counterclockwise toward the original unfolded condition of the blank.

At the other end of member 11, panels 28 and 29 are similarly pivoted about fold lines 39 and 41 to adjacent ends of panels 27 and 24, 30 respectively, and at their other ends are pivoted about fold line 42 into overlapping relation so as to define a double thickness projecting arm indicated at 43. In the illustrated embodiment, arm 43 has been formed by clockwise pivoting of panels 28 and 29 and therefore arm 43 due to the inherent nature of the paperboard will tend to turn counterclockwise toward original unfolded condition oppositely to arm 38 in the case as indicated by the adjacent arrow in FIG. 1.

In an exemplary embodiment as illustrated, panels 25 and 28 may be of equal length, with each being one-half as long as end panels 26 and 29 which may be equal in length. The length of each panel 25 or 28 would thus be substantially one-third the interior width
of the case. The relative lengths of all of the panels may be varied as desired to select desired compartment row arrangements and sizes of compartments.

Thus, in the illustrated embodiment, when the formed and expanded member 11 is inserted into the case as shown in FIG. 1, end panels 26 and 29 will be flush and frictionally engaged with the case end wall inner surfaces, and parallel arms 38 and 43 will project along those inner surfaces into diagonally opposite corners of the case interior. Any tendency of the member 11 to displace in any direction linearly or rotatively is resisted by abutment of member 11 with the case walls, and the inherent resilient tendency of arms 38 and 43 to oppositely rock outwardly and thereby expand the inserted member lengthwise of the case increases the frictional grip of the member 11 with the case to dynamically resist accidental displacement. All compartment defining walls of the inserted member 11 remain parallel to the casing walls and retain their right angled intersections.

Referring to FIG. 5, the compartment defining member 46 is also formed from a single uniform width blank separated into panels by parallel score lines for folding. In this embodiment, a short end panel 47 is adhesively surface bonded at 48 to a middle area of long panel 49 which extends the length of the casing. A second effective panel extending the length of the casing parallel to panel 49 is provided by adhesively bonding at 50 the terminal area of the other end panel 51 to intermediate panel 52.

A short intermediate panel 53 is hinged at 54 and 55 respectively to one end of the full length panel 51, 52 and to a panel 56 that comprises one end of the inserted member and extends the full width of the case. Panel 56 is in turn hinged at 57 to one end of long panel 49. The other end of panel 49 is hinged at 58 to one end of panel 59 that is parallel to panel 56 and is hinged at its other end at 61 to panel 51. A panel 62 equal in length and parallel to panel 59 is hinged at opposite ends at 63 and 64 respectively to the full length panels 51, 52 and 49.

The coextensive portions of panels 53 and 56 form a double thickness arm 60, which since panels 53 and 56 have been bent counterclockwise about their hinges, resiliently tends to rock clockwise against the inner surface of case end wall 18.

When member 46 is inserted into the case, panel 49 lies in flush frictional engagement with one case side wall and panels 56 and 59 lie in flush frictional engagement with the opposite case end wall, while arm 60 acts dynamically to expand the member in length and bias the entire member against the case inner walls. As in the form shown in FIGS. 1-3, in this embodiment any tendency of the member 46 to displace linearly or rotatively is prevented.

Referring to FIG. 6, the case is of the form wherein, at the juncture of walls 17 and 21, an inturmed flap 65 comprising an integral extension of wall 21 is bonded internally of wall 17 and extends into the case interior sufficiently to form a stop ledge 66 abutting the inserted member 46 of FIG. 5. This aids in retaining member 46 immovable within the casing. Referring to FIG. 7, the compartment defining member 71 also comprises a single length uniform width blank having transverse parallel score lines separating it into adjacent panels for folding. Two adjacent intermediate panels 72 and 73 of the same length extending the full width of the casing are folded upon each other about hinge 74 at one end. At the other ends, panels 72 and 73 are hinged at 75 and 76 respectively to longitudinally aligned panels 77 and 78 that extend to opposite corners of the case at one side and in the case effectively provide continuous longitudinal long panel means extending the length of the case. The outer ends of the effective long panel 77, and 78 are hinged at 79 and 81 respectively to the ends of equal length parallel panels 82 and 83 that extend the full width of the case in frictional engagement with the case end walls.

Equal length panels 84 and 85 are hinged at 86 and 87 to the ends of panels 82 and 83 and are folded back part way along panels 82 and 83 to provide double thickness arms 88 and 89 respectively. Panels 91 and 92 are hinged at 93 and 94 to the inner ends of panels 84 and 85 respectively, and they are aligned to provide an effective long panel means extending the length of the case. Terminal panels 95 and 96 hinged to panels 91 and 92 at 97 and 98 respectively are full surface adhesively bonded to opposite sides of the full width double thickness panel provided at 72, 73.

When member 71 is inserted into the case, it is frictionally flush with both end walls and one entire side wall of the case, and the inherently resilient arms 88 and 89 act oppositely to bias the member to expand in length and into increased frictional grip with the case walls. Also the full width panel structure consisting of hinged panels 72 and 73 tends to resiliently expand about hinge 74 and thereby bias the opposite ends of member 71 against the case side walls.

Referring to FIG. 8, the compartment defining member 99 is in general the same as that of FIG. 7, except that arms 88 and 89 are not incorporated. Those panels that are common with member 71 are similarly identified. In member 99 the parallel end panels 101 and 102 of the member extend only part of the case width and are direct hinged at 103 and 104 to the outer ends of the effective long panel 91, 92.

When member 99 is inserted into the case it is frictionally flush with the end walls and one side wall of the case. As in FIG. 7 embodiment, panels 72, 73 inherently resiliently tend to oppositely turn about hinge 74 to tend to expand the member longitudinally of the case and bias opposite ends of the member against the case end walls.

In the FIG. 7 and 8 embodiments, as in all of the embodiments, there are two parallel full length effective panel means, one in FIGS. 7 and 8 comprising aligned panels 91 and 92 which are longitudinally rigid with each other, and the other long panels 77 and 78 that are also longitudinally rigid with each other. Both of these panel means in these embodiments are connected at opposite ends to parallel panels flush with the case end walls. In all embodiments the inherent resiliency of the formed compartment defining member provides a bias tending to expand the member in length to more tightly engage the opposite side walls of the case.

In the embodiments of FIGS. 5-8, as in the FIG. 1-3 embodiment, relative dimensions of the panels may be chosen to provide different compartment row arrangements and sizes of compartments.

In addition to the foregoing advantages of compartment member retention, it has been found in all embodiments that shipping cases with inserted compartment members according to the invention are markedly advantageous in resistance to vertical crushing as when
the cases are stacked one on the other. The inserted compartment defining member provides uniformly distributed and larger bearing areas due to an internal wall structure having an optimum number of corners and glued joints resulting in shorter span wall section lengths that extend the depth of the case. These internal wall sections combine to provide overall high resistance to bending when subjected to vertical loads such as case stacking, and this is particularly true where panels of member 11 lie along the interior walls of the case.

A further important feature of the invention is that the special compartment defining structure permits the shipping cases to be efficiently used in cut case display stacks wherein the merchandise in compartments is displayed by cutting away a case side wall section while the compartment defining member remains in place to support the vertical load.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiment is therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

What is claimed and desired to be secured by Letters Patent is:

1. In combination with a rectangular shipping case having parallel end walls and parallel side walls, an inserted piece compartment defining member formed from an elongated blank of substantially constant width and consisting essentially of a series of adjacent panels each having a transverse width substantially equal to the depth of the compartments to be formed hingedly connected by transverse parallel fold regions, said blank being folded at said regions to form said member and having its opposite terminals fixed to intermediate panels in the member and said member being capable of being collapsed to substantially flat condition, said member when in expanded condition inserted within the case having at opposite ends parallel panels in flush frictional engagement with the case end walls and having at least two longitudinally rigid laterally spaced parallel long panel means that extend the full distance between said parallel end panels, and said member having such inherent resiliency at the fold regions due to the tendency of the panels to return toward the unfolded condition of the blank as to bias said member against the case walls to effectively resist linear and rotative displacement of said member within the case as well as withdrawal of the member from said case.

2. In combination with a rectangular shipping case having parallel end walls and parallel side walls, an inserted piece compartment defining member formed from an elongated blank of substantially constant width and consisting essentially of a series of adjacent panels each having a transverse width substantially equal to the depth of the compartments to be formed connected by transverse parallel fold regions, each of the terminal panels of said blank being fixed to a different intermediate panel in the member and said member being capable of being collapsed to relatively flat condition, and said member when in expanded condition inserted into said case comprising at least two longitudinally rigid laterally spaced parallel long panel means that extend the full distance between the case end walls and parallel end panels having opposite ends flexibly connected to opposite ends of said long panel means, said end panels of the inserted member being in frictional flush engagement with the opposite end walls of the case.

3. A one-piece compartment defining member for insertion into a rectangular shipping case having parallel end walls and parallel side walls, said member consisting essentially of a series of adjacent panels connected by transverse fold regions with each of the terminal panels fixed to a different intermediate panel and being capable of being collapsed to relatively flat condition, and said member when in expanded condition for insertion into said case comprising at least two longitudinally rigid laterally spaced parallel long panel means that extend the full distance between the case end walls and parallel end panels having opposite ends flexibly connected to opposite ends of said long panel means, said end panels of the inserted member being in frictional flush engagement with the opposite end walls of the case and one of said end panels in the inserted member having a portion in flush folded relation to an adjacent panel to form a double thickness arm for extending into a corner of said case.

4. The compartment defining member recited in claim 3, wherein the other of the end panels in the inserted member has a portion in flush folded relation to an adjacent panel to form a double thickness arm for extending into another corner of said case.

5. The compartment defining member recited in claim 4, wherein said arms extend into diagonally opposite corners of the case.

6. The compartment defining member recited in claim 4, wherein said arms extend into corners at opposite ends of one side wall of the case.

7. The compartment defining member recited in claim 3, wherein said inserted member abuts a stop flange on the case wall at another corner.

8. A one-piece compartment defining member for insertion into a rectangular shipping case having parallel end walls and parallel side walls, said member consisting essentially of a series of adjacent panels connected by transverse fold regions with each of the terminal panels fixed to a different intermediate panel and being capable of being collapsed to relatively flat condition, and said member when in expanded condition for insertion into said case comprising at least two longitudinally rigid laterally spaced parallel long panel means that extend the full distance between the case end walls and parallel end panels having opposite ends flexibly connected to opposite ends of said long panel means, said end panels of the inserted member being in frictional flush engagement with the opposite end walls of the case, and said inserted member having two adjacent intermediate panels each extending the width of the case hinged together to form a double thickness arm parallel to the end panels.

9. A one-piece compartment defining member for insertion into a rectangular shipping case having parallel end walls and parallel side walls, said member consisting essentially of a series of adjacent panels connected by transverse fold regions with each of the terminal panels fixed to a different intermediate panel and being capable of being collapsed to relatively flat condition, and said member when in expanded condition for insertion into said case comprising at least two longitudi-
nally rigid laterally spaced parallel long panel means that extend the full distance between the case end walls and parallel end panels having opposite ends flexibly connected to opposite ends of said long panel means, said end panels of the inserted member being in frictional flush engagement with the opposite end walls of the case and one of said long panel means of the inserted member being flush with a side wall of said case.

10. A one-piece compartment defining member for insertion into a rectangular shipping case having parallel end walls and parallel side walls, said member consisting essentially of a series of adjacent panels connected by transverse fold regions with each of the terminal panels fixed to a different intermediate panel and being capable of being collapsed to relatively flat condition, and said member when in expanded condition for insertion into said case comprising at least two longitudinally rigid laterally spaced parallel long panel means that extend the full distance between the case end walls and parallel end panels having opposite ends flexibly connected to opposite ends of said long panel means, said end panels of the inserted member being in frictional flush engagement with the opposite end walls of the case and each panel in the inserted member extending substantially the entire depth of the case.

11. The compartment defining member recited in claim 8, wherein each of said long panel means in the member comprises two longitudinally aligned intermediate panels secured at their inner ends to said double thickness arm.