Oct. 21, 1969 E. C. ZIMMERMAN 3,473,654

ASSEMBLAGE OF PACKAGING TRAYS AND PACKAGING TRAY THEREFOR

Filed Aug. 1, 1967 5 Sheets-Sheet 1

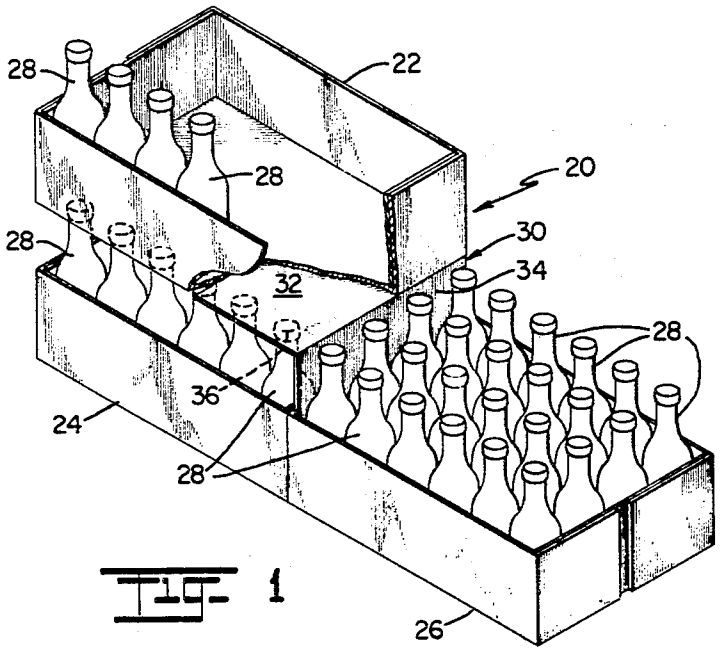


FIG. 1

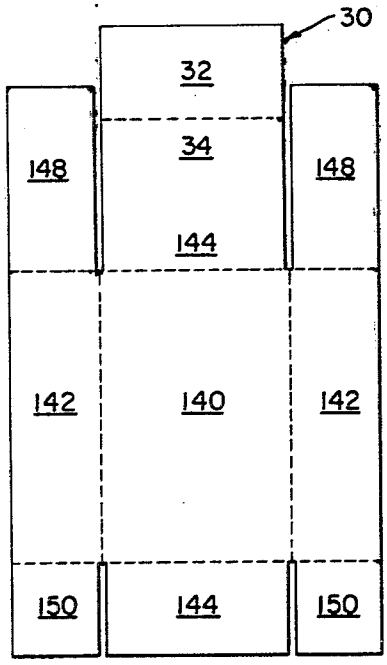


FIG. 3

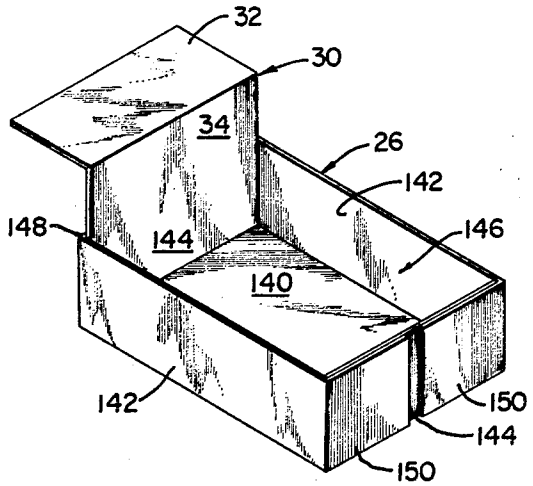


FIG. 2

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ASSEMBLAGE OF PACKAGING TRAYS AND PACKAGING TRAY THEREFOR

Filed Aug. 1, 1967 5 Sheets-Sheet 2

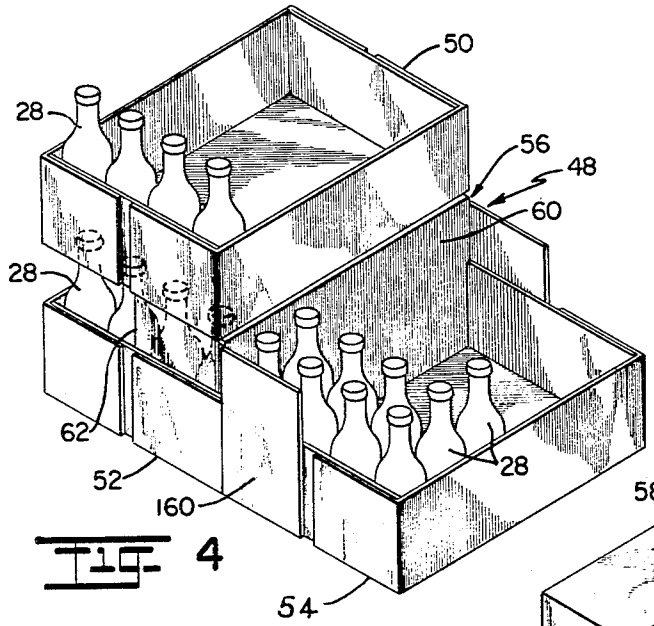


FIG 4

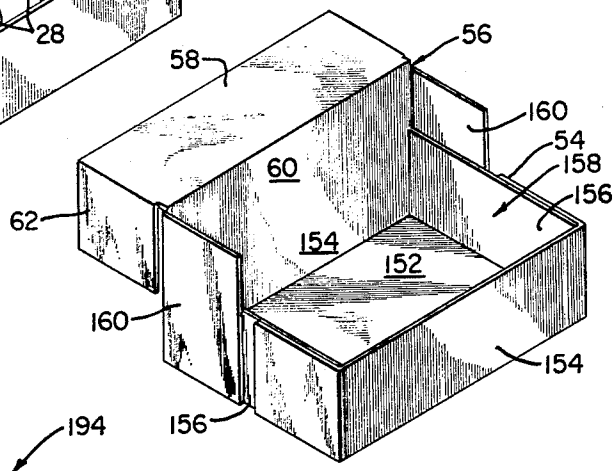


FIG 5

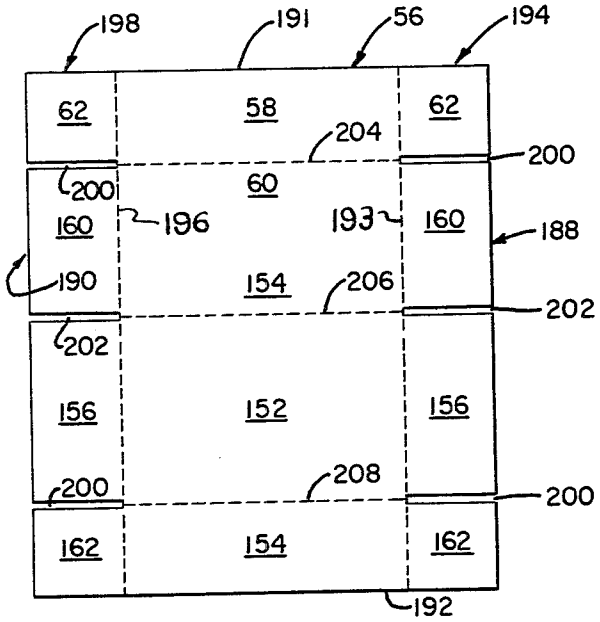


FIG 6

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ASSEMBLAGE OF PACKAGING TRAYS AND PACKAGING TRAY THEREFOR

Filed Aug. 1, 1967 5 Sheets-Sheet 3

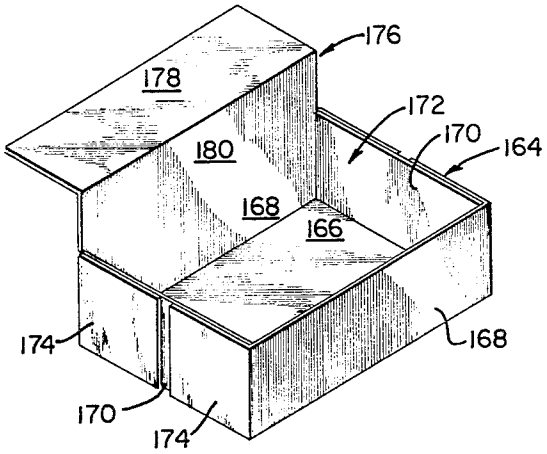


FIG. 7

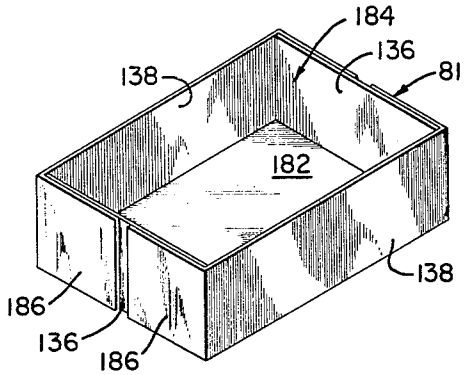


FIG. 18

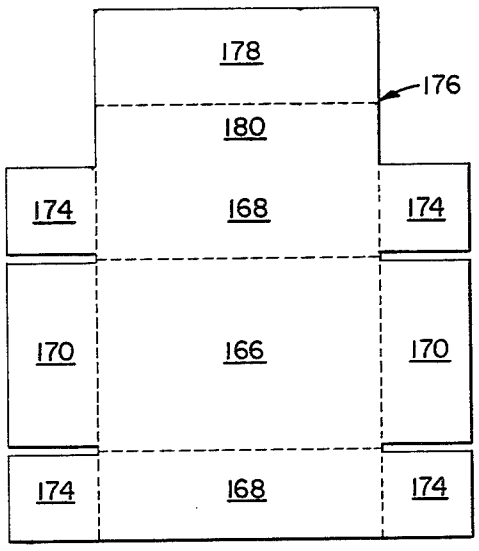


FIG. 8

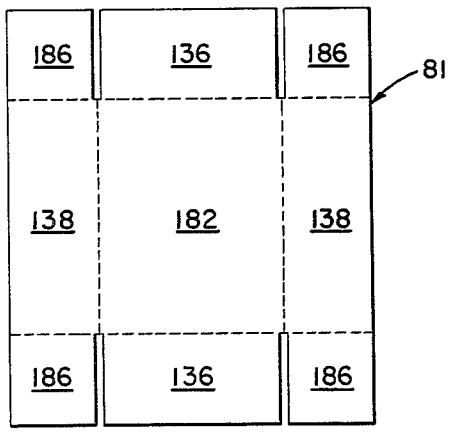


FIG. 19

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ASSEMBLAGE OF PACKAGING TRAYS AND PACKAGING TRAY THEREFOR

Filed Aug. 1, 1967 5 Sheets-Sheet 4

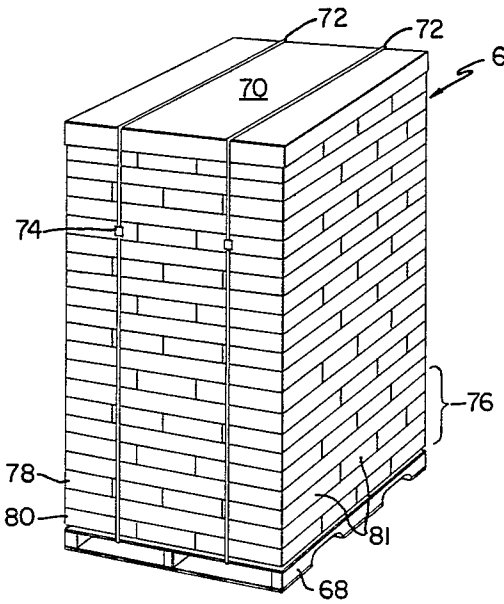


FIG. 9

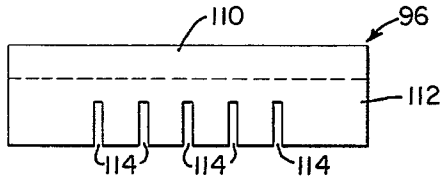


FIG. 11

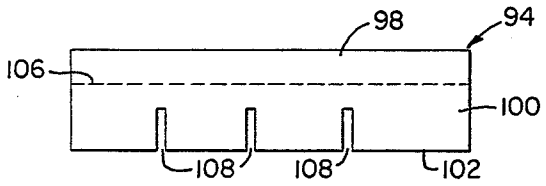


FIG. 12

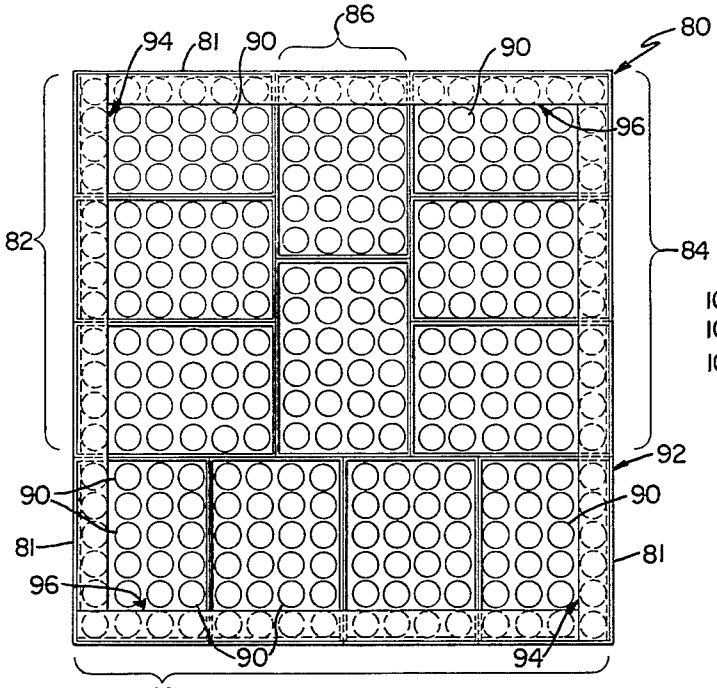


FIG. 10

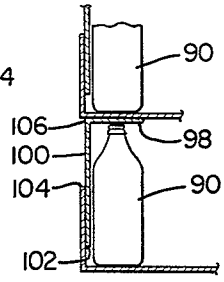


FIG. 13

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ASSEMBLAGE OF PACKAGING TRAYS AND PACKAGING TRAY THEREFOR

Filed Aug. 1, 1967 5 Sheets-Sheet 5

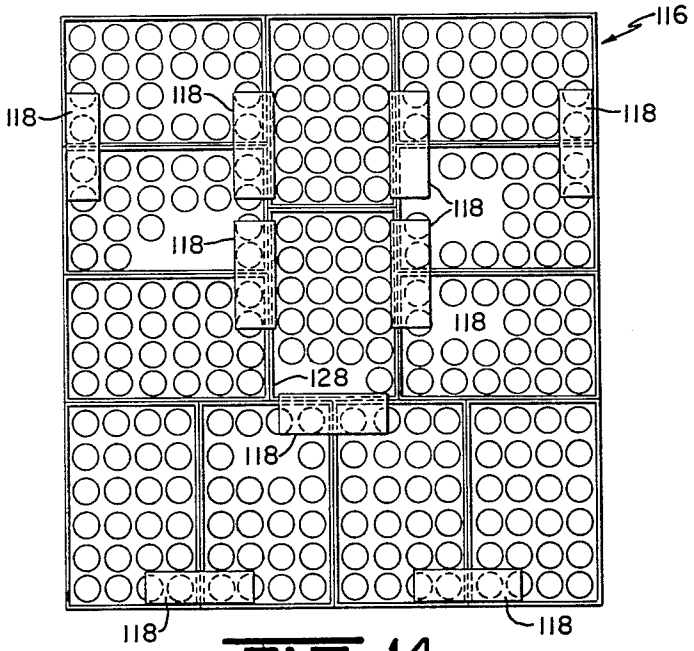


FIG. 14

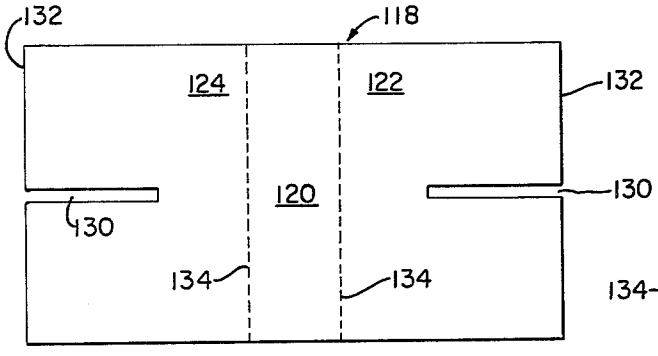


FIG. 15

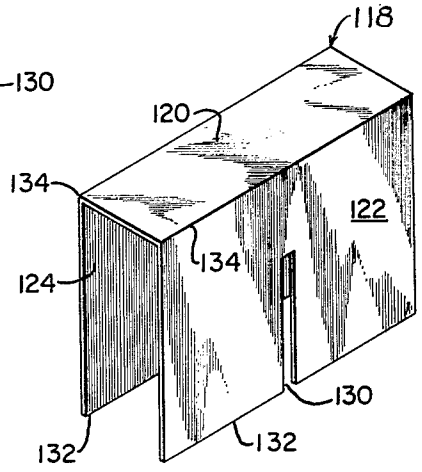


FIG. 16

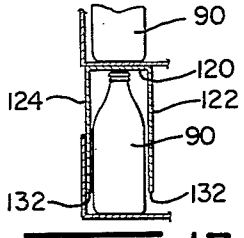


FIG. 17

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United States Patent Office

3,473,654

Patented Oct. 21, 1969

3,473,654

ASSEMBLAGE OF PACKAGING TRAYS AND PACKAGING TRAY THEREFOR

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Int. Cl. B65d 71/00, 5/26, 3/24

U.S. Cl. 206—65 22 Claims

ABSTRACT OF THE DISCLOSURE

Packaging trays, blanks for forming packaging trays, and an assemblage of packaging trays are disclosed. The assemblage of packaging trays has packages disposed therein with the assemblage including a plurality of stacked layers of horizontally adjacent trays, the trays in each upper layer being supported by packages in trays in the layer below. The assemblage includes means for interconnecting trays so that adjacent trays are prevented from inadvertent movement to thus stabilize the assemblage, the interconnecting means having at least a portion that is disposed between layers of trays to accomplish the desired end. The interconnecting means may be a part of a particular blank and thus an integral part of a formed packaging tray or individually formed from a blank and utilized with packaging trays, particularly those formed without interconnecting means.

BACKGROUND OF THE INVENTION

Heretofore, it has been the general practice to package containers such as glass bottles, jars and the like in package trays wherein the containers are completely enclosed within the trays. In an attempt to reduce the amount of sheet material required to make the package trays, such as cardboard, open-top package trays have been used wherein the upper portion of the containers or packages contained therein extends above the upper edges of the side walls of the package. This approach has resulted in a reduction of the amount of sheet material required to make the package trays; however, it has created additional problems where the package tray and its contents are palletized or stacked in vertical rows since there is insufficient frictional interface developed between the bottom of such a package tray and the upper surfaces of the packages contained in the underlying package tray to prevent relative movement between upper and lower packaging trays when the stack of packaging trays is moved from one location to another or subjected to normal forces and vibration encountered in warehouses and manufacturing areas.

It has been discovered, however, that the foregoing disadvantages may be quickly and easily overcome through the use of an assemblage of packaging trays having packages disposed therein and wherein said assemblage contains one or more sets of layers of trays, each layer set including an upper layer of trays and a lower layer of trays, each tray and each upper layer of trays disposed in contacting engagement on at least some of the packages contained within one or more trays disposed in said lower layer of trays, each lower layer of trays including a plurality of peripherally disposed trays, each of said peripherally disposed trays having a portion thereof forming a part of a periphery circumscribing said layer, and means for interconnecting each peripherally disposed tray within said lower layer within adjacent peripherally disposed tray within said lower layer and a tray disposed within said upper layer whereby said means maintains said trays within said layer set in a stabilized relationship thereby preventing inadvertent movement of one of said trays relative to the remaining trays in said layer set.

Further, the foregoing disadvantages may also be overcome through the use of an assemblage of packaging trays having packages disposed therein and wherein said assemblage contains one or more sets of trays, each set of trays including an upper tray and first and second lower trays, said upper tray being disposed in contacting engagement upon at least some of the packages contained within the first lower tray, and each set of trays including means for interconnecting said trays to prevent inadvertent movement of one of said trays relative to the remaining trays in said set, said interconnecting means including a first and second portion, said second portion interconnecting said second lower tray to said first portion, and said first portion being disposed between part of the bottom of said upper tray and the upper surfaces of some of the packages contained within the first lower tray.

Accordingly, one of the principal objects of this invention is to provide a new and improved assemblage of packaging trays.

Another object of this invention is to provide a new assemblage of packaging trays where at least some of the packaging trays are constructed from a reduced amount of sheet material and wherein the stabilization of said assemblage is greatly improved.

Another object of this invention is to provide an assemblage of packaging trays having packages disposed therein and wherein said assemblage contains one or more sets of layers of trays, each layer set including an upper layer of trays and a lower layers of trays, each lower layer of trays including a plurality of peripherally disposed trays, and means for interconnecting each peripherally disposed tray within said lower layer with an adjacent peripherally disposed tray within said lower layer and an overlying tray in said upper layer.

Another object of this invention is to provide an assemblage of packaging trays having packages disposed therein and wherein said assemblage contains one or more sets of layers of trays, each layer set including an upper layer of trays and a lower layer of trays, each tray in each upper layer of trays being disposed in contacting engagement on at least some of the packages contained within one or more trays disposed in said lower layer of trays, each lower layer of trays including a plurality of peripherally disposed trays, each of said peripherally disposed trays having a portion thereof forming a part of a periphery circumscribing said layer, and means for interconnecting each peripherally disposed tray within said lower layer with an adjacent peripherally disposed tray within said lower layer and a tray disposed within said upper layer whereby said means maintains said trays within said layer set in a stabilized relationship thereby preventing inadvertent movement of one of said trays relative to the remaining trays in said layer set.

Another object of this invention is to provide an assemblage of packaging trays having packages disposed therein in which said assemblage contains one or more sets of trays, each set of trays including an upper tray and first

and second lower trays and interconnecting means interconnecting each of said trays within each set to the remaining trays in a predetermined stabilized relationship.

Another object of this invention is to provide an assemblage of packaging trays having packages disposed therein wherein said assemblage contains one or more sets of trays, each set of trays including an upper tray and first and second lower trays and interconnecting means having a first and second portion, said second portion interconnecting said second lower tray to said first portion of said means, said first portion of said means being disposed intermediate part of the bottom of said upper tray and the upper surfaces of some of the packages contained within said first lower tray whereby said upper tray exerts through said first portion of said means an increased frictional interface between said upper and first lower trays thereby preventing inadvertent movement of said first portion of said means relative to said second lower tray and of said upper and first lower trays with respect to each other.

Another object of this invention is to provide a new and improved open-top package tray constructed for use in an assemblage of trays and including means for interconnecting said package tray to a pair of vertically disposed trays within such an assemblage.

Another object of this invention is to provide a new and improved package tray constructed for use in an assemblage of trays and including means for interconnecting said package tray relative to said assemblage of trays to provide an assembly of trays having greatly improved stabilized characteristics.

Another object of this invention is to provide an open-top packaging tray formed from a single blank of material and including means for interconnecting said packaging tray to a pair of vertically disposed trays, said means including a first portion extending generally outwardly from said packaging tray and constructed for disposition intermediate the vertically disposed trays, and a second portion interconnecting said first portion of said interconnecting means to one of the walls of said tray.

Another object of this invention is to provide a new and improved packaging tray as aforedescribed in which said interconnecting means includes a third portion depending from said first portion.

SUMMARY OF THE INVENTION

The present invention substantially overcomes or alleviates the problems mentioned above and has various other advantages which results in a greatly improved assemblage of packaging trays in which at least some of the package trays are formed of a reduced quantity of sheet material, and of a new and improved packaging tray for use in such an assemblage. Generally stated, in an assemblage of packaging trays having packages disposed therein and wherein said assemblage contains one or more sets of layers of trays, each layer set includes an upper layer of trays and a lower layer of trays, each tray in each upper layer of trays is disposed in contacting engagement on at least some of the packages contained within one or more trays disposed in said lower layers of trays, each lower layer of trays includes a plurality of peripherally disposed trays, and each of said peripherally disposed trays has a portion thereof forming a part of a periphery circumscribing said layer. Said assemblage includes a means for interconnecting each peripherally disposed tray within said lower layer with an adjacent peripherally disposed tray within said lower layer and a tray disposed within said upper layer whereby said means maintains said trays within said layer set in a stabilized relationship thereby preventing inadvertent movement of one of said trays relative to the remaining trays in said layer set. Said means includes a first portion and a second portion, said second portion interconnecting one of the said peripherally disposed trays within said lower layer of said first portion and said first portion and said first portion being disposed between part of the bottom of the tray disposed within the upper layer and the upper surfaces of some of the packages contained within one or both of the interconnected peripherally disposed trays in said lower layer whereby said tray in said upper layer exerts through said first portion of said means an increased frictional interface between said tray and said upper layer and a peripherally disposed tray disposed beneath said tray in said upper layer thereby preventing inadvertent movement of said first portion of said means relative to said interconnected peripherally disposed trays in said lower layer and said tray in said upper layer.

In another embodiment, the assemblage may include packing trays having packages disposed therein and wherein said assemblage contains one or more sets of trays, each set of trays including an upper tray and first and second lower trays with the upper tray being disposed in contacting engagement upon at least some of the packages contained within the first lower tray. Each set of trays also includes means for interconnecting said trays within said set whereby said means maintains said tray within said set in a stabilized relationship thereby preventing inadvertent movement of one of said trays relative to the remaining trays in said set. The interconnecting means includes a first portion and a second portion. The second portion of said means interconnects the second lower tray to the first portion of said means. The first portion of said means disposed between part of the bottom of the upper tray and the upper surface of some of the packages contained within the first lower tray whereby said upper tray exerts through said first portion of said means an increased frictional interface between the upper and first lower trays thereby preventing inadvertent movement of the first portion of said means relative to the second lower tray and of said upper and first lower trays with respect to each other.

The present invention also relates to a packaging tray formed from a single blank of material wherein said packaging tray comprises a bottom portion, wall portions extending vertically upwardly from said bottom portion to form a receptacle, means for securing adjacent wall portion to each other, and means for interconnecting said package trays to a pair of vertically disposed trays, said means including a first portion extending generally away from said receptacle and constructed for disposition intermediate the pair of vertically disposed trays, and a second portion interconnecting the said first portion of said interconnecting means to one of said walls of said tray. The upper part of said second portion of said interconnecting means is disposed a distance above said second portion greater than the distance of the upper end of at least one of said wall portions is disposed above said bottom portion. A packaging tray as aforedescribed may also be formed with the interconnecting means including a third portion depending from said first portion thereof with the lower edge of said third portion being constructed to extend below either one of the upper surfaces of the packages to be disposed within the lower one of the pair of vertically disposed trays or the upper surfaces of the adjacent side wall of the lower one of the pair of vertically disposed trays.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing objects and other advantages of the invention will become apparent from the following description and claims and the accompanying drawings, wherein:

FIGURE 1 is a perspective view of an assemblage of trays constructed in accordance with the subject invention;

FIGURE 2 is a perspective view of one of the lower trays contained within the assemblage of packaging trays shown in FIGURE 1;

FIGURE 3 is a plan view of a blank of sheet material from which the package tray as shown in FIGURE 2 is constructed;

FIGURE 4 is a perspective view of another embodiment of an assemblage of packaging trays constructed in accordance with the subject invention;

FIGURE 5 is a perspective view of one of the lower package trays shown in FIGURE 4;

FIGURE 6 is a plan view of a blank of sheet material from which the package tray as shown in FIGURE 5 is constructed;

FIGURE 7 is a perspective view of another embodiment of a package tray which can be used to form an assemblage of trays constructed in accordance with the subject invention;

FIGURE 8 is a plan view of a blank of sheet material from which the package tray shown in FIGURE 7 is constructed;

FIGURE 9 is a perspective view of an assemblage of packages constructed in accordance with the subject invention;

FIGURE 10 is a plan view of a lower layer of trays of a layer set constructed in accordance with the subject invention;

FIGURE 11 is a plan view of a blank of material used to form a means for interconnecting the peripherally disposed trays within the lower layer of a layer set of trays;

FIGURE 12 is a plan view of a blank used to form another embodiment of a means for interconnecting the peripherally disposed trays contained within a lower layer of a layer set of trays;

FIGURE 13 is an elevational schematic view, in cross-section, showing the positioning of an interconnecting means relative to the package tray and the packages contained therein;

FIGURE 14 is a plan view of another lower layer of a layer set constructed in accordance with the subject invention;

FIGURE 15 is a plan view of a blank used to form an interconnecting means shown in FIGURE 14;

FIGURE 16 is a perspective view of the interconnecting means shown in FIGURE 14;

FIGURE 17 is an elevational schematic view, in cross-section, showing the positioning of another embodiment of a connecting means relative to the package tray and the packages contained therein;

FIGURE 18 is a perspective view of one of the trays shown in FIGURE 9; and

FIGURE 9 is a plan view of a blank of sheet material from which the package tray shown in FIGURE 18 is constructed.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the drawings, in FIGURE 1 is shown one embodiment of an assemblage **20** of packaging trays as constructed in accordance with the subject invention. The assemblage **20** contains a set of trays comprising an upper tray **22** and first and second lower trays **24** and **26**. As shown, each of the trays has packages such as hollow glass containers **28** disposed therein. The upper tray **22** is disposed in contacting engagement upon at least some of the packages or containers **28** contained within the first lower tray **24**. The assemblage **20** of packaging trays also includes a means **30** for interconnecting each of the trays within said set whereby said means **30** maintains said trays within said set in a predetermined stabilized relationship. The means **30** includes a first portion **32** and a second portion **34**. The second portion **34** interconnects the second lower tray **26** to the first portion **32**. The first portion **32** is disposed between part of the bottom of the upper tray **22** and the upper surfaces **36** of some of the packages or containers **28** contained within the first lower tray **24**. Thus, the upper tray **22** exerts through said first portion **32** of said means **30** an increased frictional interface between the upper tray **22** and the first lower tray **24** thereby preventing inadvertent movement of the first portion **32** of said means **30** relative to the second lower tray **26** and of said upper tray **22** and first lower tray **24** with respect to each other.

Referring now to FIGURE 4, another embodiment of an assemblage **48** of packaging trays is shown constructed in accordance with the subject invention. The embodiment **48** of packaging trays includes one set of trays comprising an upper tray **50** and first and second lower trays **52** and **54**. As shown, upper tray **50** is disposed in contacting engagement upon at least some of the packages or containers **28** contained within the first lower tray **52**. The assemblage **48** of packaging trays also includes a means **56** for interconnecting each of the trays within the set to maintain said trays in a stabilized relationship and thereby preventing inadvertent movement of one of said tray relative to the remaining trays in said set. The means **56** includes first, second and third portions **58**, **60** and **62**. The second portion **60** interconnects the second lower tray **54** to the first portion **58** of said means **56**. The first portion **58** is disposed between part of the bottom of the upper tray **50** and the upper surfaces of some of the packages or containers **28** contained within the first lower tray **52**.

In FIGURE 5 is shown more clearly the second lower tray **54** shown in FIGURE 4. It will be noted that the third portion **62** of means **56** comprises a pair of panel members which depend from opposite ends of the first portion **58** of said means **56**. Each of the panel members extend downwardly a sufficient distance to extend below the upper surface of the adjacent side wall of the first lower tray **52**. Thus, the panels provide additional interlocking securement between the first lower tray **52** and the second lower tray **54**.

In FIGURE 9 is shown a perspective view of an assemblage **66** of packaging trays constructed in accordance with the subject invention. Said assemblage **66** includes a pallet **68**, a cap or cover **70** and strap means securing together the entire assemblage, said strap means including a pair of bands **72** formed from any suitable material such as polypropylene straps which are fastened with a metal seal **74**. Said assemblage **66** contains one or more sets **76** of layers of trays. Each layer set **76** includes an upper layer of trays **78** and a lower layer of trays **80**. Each tray **81** in each upper layer **78** is disposed in contacting engagement on at least some of the packages contained within one or more trays disposed in said lower layer **80** of trays.

Referring now to FIGURES 10–13, in FIGURE 10 is shown in plan view the lower layer **80** of a layer set **76** which is constructed in accordance with the subject invention. Lower layer **80** includes a first group **82** and a second group **84** of three trays each, a third group **86** of two trays, said third group **86** being disposed intermediate said first and second groups, and a fourth group **88** of four trays, said fourth group **88** being disposed along one side of said combined first, second and third groups with one of the end walls of the trays in said fourth group **88** being disposed in abutting contact with the adjacent side walls of the adjacent trays contained in said first and second groups. Each layer of trays is rotated approximately 180° with respect to each adjacent layer of trays whereby the fourth group of trays within each layer is vertically disposed with respect to some of the trays included within the combined first, second and third groups in each adjacent layer of trays.

Each tray **81** in the lower layer **80** has a plurality of packages **90** disposed therein as shown. Each lower layer of trays includes a plurality of peripherally disposed trays, each of said peripherally disposed trays having a portion thereof, such as a side wall or of an end wall or both, forming a part of a periphery **92** circumscribing said layer. The periphery **92** comprises a plurality of sides, each side of said periphery **92** being formed by a portion of each of some of the peripherally disposed trays.

Each peripherally disposed tray within said layer **80** is interconnected to an adjacent peripherally disposed tray within said layer **80** and a tray disposed within said upper layer of said layer set by a means **94** or **96** whereby said means maintains said trays within said layer set in a stabilized relationship thereby preventing inadvertent movement of one of said trays relative to the remaining trays in said layer set. Referring now to FIGURE 12, means **94** includes a first portion **98** and a second portion **100**. The second portion **100** of means **94** interconnects one of the peripherally disposed trays within said lower layer **80** to an adjacent peripherally disposed tray within said lower layer and through friction with a tray (not shown) disposed within the adjacent upper layer (not shown). As shown in FIGURE 13, the first portion **98** of means **94** is disposed between part of the bottom of a tray disposed within said upper layer and the upper surfaces of some of the packages **90** contained within one or both of said interconnected peripherally disposed trays in said lower layer whereby said tray in said upper layer exerts through said first portion **98** of said means **94** an increased frictional interface between said tray in said upper layer and the peripherally disposed trays disposed beneath said tray in said upper layer thereby preventing inadvertent movement of said first portion **98** of said means **94** relative to said interconnected peripherally disposed trays in said lower layer and said tray in said upper layer. The second portion **100** of means **94** has a lower edge **102** extending below the upper surface **104** of the adjacent side wall of the tray, see FIGURE 13. The second portion **100** of means **94** also includes an upper edge **106** and has one or more generally vertically disposed slots **108** extending from said lower edge **102** to a point intermediate said lower edge **102** and said upper edge **106**. When the means **94** is positioned as shown in FIGURE 10, portions of adjacent walls of adjacent peripherally disposed trays are disposed intermediate each of the side walls of vertically disposed slots **108** formed in said second portion **100** of said means **94**.

As will be noted from FIGURE 10, the means **94** is used to interconnect the peripherally disposed trays on the longer sides of the periphery while the means **96** are used to interconnect the peripherally disposed trays contained in the shorter sides of the periphery **92**. As shown in FIGURE 11, means **96** includes a first portion **110** and a second portion **112**. Except for the number of slots **114** formed in means **96** and the length thereof, means **96** is similar to means **94** and functions in the same general manner.

Referring again to FIGURE 10, as previously indicated, a pair of means **94** extends substantially along opposite sides of the periphery **92** while a pair of means **96** extends substantially along the two remaining sides of the periphery **92**. It will be readily appreciated that through the use of means **94** and **96** as shown in combination with the peripherally disposed trays of said layer of trays will produce a layer of trays wherein each tray is secured against inadvertent movement relative to the remaining trays within said layer. When an upper layer of trays is disposed upon the layer of trays shown in FIGURE 10 but rotated 180° with respect thereto it will be readily understood that each peripherally disposed tray within said lower layer is secured against inadvertent movement thereof relative to adjacent peripherally disposed trays and overlying trays thereto disposed in the upper layer.

Referring now to FIGURES 14–16, in FIGURE 14 is shown another lower layer **116** for use in a layer set constructed in accordance with the subject invention. Lower layer **116** is shown as including the same number of trays as lower layer **80** as shown in FIGURE 10, said trays being arranged also in the same manner as those trays shown in FIGURE 10. Each peripherally disposed tray within the lower layer **116** is interconnected to an adjacent peripherally disposed tray within said layer **116** and through friction with a tray (not shown) disposed within the adjacent upper layer (not shown). Said trays are interconnected by means **118**, see also FIGURES 15 and 16. Means **118** includes a first portion **120**, a second portion **122** and a third portion **124**. The second and third portions **122** and **124** depend from the first portion **120** and extend below the upper surface **126** of the side wall of the tray, see FIGURE 17. As shown in FIGURE 14, the non-peripherally disposed tray, designated with the number **128**, is interconnected by one or more means **118** to one or more peripherally disposed trays and one or more trays disposed thereover in the immediately adjacent upper layer. Although a total of nine separate means **118** is shown as being utilized in the layer **116** of FIGURE 14, it has been found that the quantity of material needed to form the means **118** for constructing layer **166** is approximately 20% less the amount of material needed to construct the means **94** and **96** for layer **80** as shown in FIGURE 10.

As shown in FIGURE 16, the means **118** includes a generally vertically slot **130** formed in each of the second and third portions. Each slot **130** extends upwardly from the lower edge **132** to a point intermediate said lower edge **132** and an upper edge **134**. The slots **130** formed within means **128** are positioned in much the same manner as the slots **108** and **114** formed within means **94** and **96**, respectively.

FIGURE 16 shows more clearly the type of tray used to form the assemblage **66** shown in FIGURE 9 as well as the lower layers depicted in FIGURES 10 and 14. In FIGURE 18, each of the side walls **136** and **138** are formed of reduced height as compared to the height of the packages or containers **90** to be disposed within the tray. Although the height of the side wall as compared to the overall height of the package to be disposed therein may vary over a considerable range, it has been found that good results have been obtained where the height of the side walls are less than the height of the packages contained therein and preferably where the height of the side walls equal approximately two-thirds the height of the packages or containers to be disposed within the packaging tray. With this height ratio it has been found that the strength of the side walls of the packaging tray is sufficient to resist bulging of the side walls during normal handling of the packaging trays filled with packages or containers.

FIGURE 19 shows a blank of sheet material from which the packaging tray shown in FIGURE 18 is constructed.

The subject invention also relates to an improved package tray for use in an assemblage of packaging trays as constructed in accordance with the subject invention. Referring to FIGURES 2 and 3, a packaging tray **26** is shown in FIGURE 2 formed from the single blank of material shown in FIGURE 3. The package tray **26** comprises a bottom portion **140**, wall portions **142** and **144** extending vertically upwardly from said bottom portion **140** to form a receptacle **146**, means **148** and **150** for securing adjacent wall portions to each other, and means **30** for interconnecting said package tray **26** to a pair of vertically disposed trays, such as package trays **22** and **24** shown in FIGURE 1. Interconnecting means **30** includes, a first portion **32** extending generally horizontally outwardly from said receptacle **146**. The first portion **32** is constructed for disposition intermediate the aforesaid vertically disposed trays. Interconnecting means **30** also includes a second portion **34** interconnecting said first portion **32** to one of said walls **144** of said tray. It is to be understood that an adhesive material may be disposed intermediate adjacent surfaces of the securing means **148** and **150** and their corresponding wall portions. Alternately, it will be understood that staples (not shown) may be used either in lieu of an adhesive material or in combination therewith. It will be noted that means **30** and its wall portion **144** are integrally connected.

Referring now to FIGURES 5 and 6, in FIGURE 5 is shown a package tray 54 which is made from the single blank of material shown in FIGURE 6. The package tray 54 comprises a bottom portion 152, wall portions 154 and 156 extending vertically upwardly from said bottom portion 152 to form a receptacle 158, means 160 and 162 for securing adjacent wall portions to each other, and means 56 for interconnecting said package tray 54 to a pair of vertically disposed trays such as package trays 50 and 52 as shown in FIGURE 4. Interconnecting means 56 includes a first portion 58 which extends generally horizontally outwardly away from said receptacle 158. The first portion 58 is constructed for disposition intermediate the vertically disposed trays. Interconnecting means 56 also includes a second portion 60 interconnecting said first portion 58 of said interconnecting means to one of said walls 100 of said tray 54, and a third portion 62 depending from said first portion 58. As previously indicated, the lower edge of said third portion 62 is constructed to extend below either one of the upper surfaces of the package for containers to be disposed within the lower one of the vertically disposed trays or the upper surface of the adjacent side wall of the lower one of the vertically disposed trays.

Referring now to FIGURES 7 and 8, in FIGURE 7 is shown a package tray 164 which may be substituted for either of the package trays 26 as shown in FIGURE 2 or package tray 54 as shown in FIGURE 5 for constructing an assemblage of packaging trays in accordance with the subject invention. Package tray 164 is formed from the blank of sheet material shown in FIGURE 8. Package tray 164 comprises a bottom portion 166, wall portions 168 and 170 extending vertically upwardly from said bottom portion 116 to form a receptacle 172, means 174 for securing adjacent wall portions to each other, and means 176 for interconnecting said package tray 164 to a pair of vertically disposed trays. Interconnecting means 176 includes a first portion 178 which extends generally away from said receptacle 172 and is constructed for disposition intermediate the vertically disposed trays. Interconnecting means 176 also includes a second portion 180 interconnecting said first portion 178 of said interconnecting means 176 to one of the walls 168 of said tray 164.

The packaging tray 81 used in layers 80 and 116 is shown in FIGURE 18 and is constructed from a single blank of material as shown in FIGURE 19. The packaging tray 81 shown in FIGURE 18 comprises a bottom portion 182, wall portions 136 and 138 extending vertically upwardly from said bottom portion 182 to form a receptacle 184, and means 186 for securing adjacent wall portions to each other.

It will be noted that the package tray 26 shown in FIGURE 2 and the package tray 164 shown in FIGURE 7 are generally similar in function when used within an assemblage of packaging trays constructed in accordance with the subject invention. The packaging tray 54 shown in FIGURE 5 is also similar in general function to the packaging trays 26 and 164; however, the packaging tray 54 differs from packaging trays 26 and 164 in a number of respects. For example, the depending third portion 62 of means 56 provides a greater resistance to separation between package tray 54 and the pair of vertically disposed packaging trays, such as packaging trays 50 and 52 as shown in FIGURE 4. This additional resistance results from the fact that each panel 62 must undergo a certain amount of crushing or tearing before the package tray 54 becomes separated from the pair of vertically disposed package trays 50 and 52. Another difference between package tray 54 and package trays 26 and 164 resides in the shape of securing means 160. The use of a panel member having the configuration of securing means 160 is beneficial since it provides additional rigidity and stability to the adjacent side wall 154 and the end walls 156.

Referring again to FIGURE 6, a foldable packaging material blank is shown which is foldable into a package tray 54 having a portion 58 thereof which may be engaged with a second package tray, such as package tray 50 shown in FIGURE 4. The blank is formed with a pair of longitudinally disposed edges 188 and 190 and a pair of laterally disposed edges 191 and 192. The blank has a first longitudinally fold line 193 formed therein and spaced inwardly from the first one 188 of said longitudinally disposed edges to form a first end flap 194 between said fold line 193 and said edge 188. The blank also has a second longitudinally fold line 196 formed therein and spaced inwardly from the second one 190 of said longitudinally disposed edges to form a second end flap 198 between said fold line 196 and said edge 190. The fold lines 193 and 196 extend the length of the blank and define therebetween a longitudinally extending panel portion comprising parts 58, 60, 152 and 154. The end flap portions 194 and 198 may be folded away from the panel portion therebetween. Each of said end flaps has a plurality of slots 200 and 202 formed therein including oppositely disposed end slots 200 spaced inwardly from each laterally disposed edge 191 and 192 and extending inwardly from each longitudinally disposed edge 188 and 190 of said blank to said first and second fold lines 193 and 196 and oppositely disposed intermediate slots 202 between said end slots 200 and extending inwardly from the longitudinally disposed edges 188 and 190 of said blank to said fold lines 193 and 196. The blank has a plurality of transversely disposed score lines 204, 206 and 208 formed therein across said panel portion including a pair of end score lines 204 and 208 each of which is spaced inwardly from the laterally disposed edges 191 and 192 of said blank and an intermediate score line 206 between said end score lines 204 and 208. The transverse score lines 204, 206 and 208 have the opposite ends thereof terminating adjacent the longitudinal score lines and the slots. The transverse score lines divide the panel portion of said blank into a pair of spaced side panel portions 154 having a bottom panel portion 152 therebetween and a first portion 58 of means 56 extending outwardly from a second portion 60 of said means 56, said second portion being integral with and extending outwardly from one of side panel portions, each of said end flaps 194 and 198 including an end panel 156 extending laterally outwardly from said bottom panel portion 152 and wall securing means 160 and 162 extending laterally outwardly from opposite ends of said side panel portions 154, said blank being foldable into tray form by folding said end panels 156 of said end flaps about the longitudinal score lines 193 and 196 to form upstanding end walls, folding the side panel portions 154 about the end transverse score line 208 and the transverse score line 206, folding the wall securing means 160 and 162 about the longitudinally extending fold lines 193 and 196 whereby each of the wall securing means 160 and 162 overlies a portion of an adjacent end wall and is in position to be secured thereto. The first portion 58 of said means 56 is foldable about the adjacent transverse score line 204 away from the second portion 60 so as to overlie a second package tray having upstanding side walls when positioned adjacent thereto. Each end flap 194 and 198 also includes portions 62 extending laterally outwardly from opposite ends of said first portion 58. The outwardly extending portions 62 of said end flaps are folded downwardly about longitudinal score lines 193 and 196 so as to depend from said first portion 58 of said means 56 and are positioned between the side walls of a second package tray thereby securing said package tray against inadvertent movement relative to said second package tray.

In view of the foregoing, it will now be readily appreciated that a new and improved assemblage of packaging trays and a new and improved packaging tray therefor has been described. An assemblage of packaging

trays constructed in accordance with the subject invention provides a substantial increase in stability due to the increase of frictional interface existing between adjacent vertically disposed packaging trays while at the same time permitting the use of package trays formed from a substantially reduced quantity of material. Further, the increase in stability of such an assemblage has substantially eliminated breakage of containers heretofore encountered in warehousing stacks and in transportation of the containers within such packages. Additionally, the use of an assemblage of packages as constructed in accordance with the subject invention has reduced the high cost of packaging heretofore required, both in labor and materials, to provide the necessary outside or shroud protection. Further, it has been found that assemblages of package trays may be easily and quickly made or removed with ordinary personnel and techniques without loss or danger of loss due to breakage of the packages or containers disposed within the packaging trays being used.

Although the assemblages of packages as described herein are useful in a large number of applications, it will be readily appreciated that such assemblages of packages have particular beneficial application where the upper surfaces of the packages or containers to be disposed within the packaging trays present a smooth, low coefficient of friction bearing area which area is sufficiently large in size that the upper surfaces of such packages or containers do not indent or become partially embedded within the sheet material from which the immediate upper tray is formed. This particular situation is encountered where hollow glass containers, with or without metal caps installed on the top thereof, are involved. When it is considered that literally millions of such containers are manufactured and handled each year, the significance of the herein invention will be all the more readily understood and appreciated.

What is claimed is:

1. In an assemblage of packaging trays having packages disposed therein and wherein said assemblage contains one or more sets of trays, each set of trays including an upper tray and first and second lower trays, said upper tray being disposed above and supported by at least some of the packages contained within said first lower tray; the improvement comprising means for interconnecting said trays within said set whereby said means maintains said trays within said set in a stabilized relationship thereby preventing inadvertent movement of one of said trays relative to the remaining trays in said set, said means including a first portion and a second portion, said second portion depending from said first portion and maintaining the position of said second lower tray substantially fixed relative to said first position, said first portion being disposed between part of the bottom of said upper tray and the upper surfaces of some of the packages contained within said first lower tray whereby said upper tray exerts through said first portion of said means an increased frictional interface between said upper and first lower trays thereby preventing inadvertent movement of said first portion of said means relative to said second lower tray and of said upper and first lower tray with respect to each other.

2. In an assemblage of packaging trays as described in claim 1 in which said first and second portions of said means are integrally formed from a single blank of readily flexible material.

3. In an assemblage of packaging trays as described in claim 1 in which said second portion of said means extends from said first portion at least below the upper surfaces of the packages contained within said second lower tray.

4. In an assemblage of packaging trays as described in claim 1 in which said means includes a third portion depending from said first portion, the lower edge of said third portion extending at least below the upper surfaces of packages contained within said first lower tray.

5. In an assemblage of packaging trays as described in claim 4 in which said third portion comprising panel portions depend from opposite ends of said first portion.

6. In an assemblage of open-top packaging trays containing a plurality of packages disposed therein, said packaging trays being disposed in rows and having one or more side walls of a height less than that of the packages to be contained therein, said packaging trays being arranged in side-to-side and top-to-bottom adjacent relationship wherein the tops of the packages in a given first tray support the bottom of a tray disposed thereabove, the improvement of a restraining member frictionally restraining said first tray and the tray disposed thereabove against movement relative to one another, said restraining member comprising a panel portion overlying some of the packages in said first tray and disposed between said packages and a part of the bottom of the tray disposed thereabove, said panel having a depending leg portion of a length greater than the distance between the top of the packages and the side wall formed of reduced height and engageable with packages in a second tray in portions thereof below side walls of said second tray whereby said second tray is restrained relative to said first tray and the first tray is restrained relative to said second tray and the tray disposed above said first tray by frictional contact with the panel member, said second tray being disposed adjacent to and horizontally with said first tray.

7. A foldable packaging material blank foldable into a package tray having a portion thereof engageable with a second package tray, said blank having a pair of longitudinally disposed edges and a pair of laterally disposed edges, said blank having a first longitudinal fold line formed therein and spaced inwardly from the first one of said longitudinally disposed edges to form a first end flap between said fold line and said edge, a second longitudinal fold line formed therein and spaced inwardly from the second one of said longitudinally disposed edges to form a second end flap between said fold line and said edge, said fold lines extending the length of the blank and defining therebetween a longitudinally extending panel portion whereby the end flaps may be folded away from the panel portion therebetween, each of said end flaps having a plurality of slots formed therein including oppositely disposed first and second end slots inwardly from each laterally disposed edge with said first end slot being disposed inwardly a distance substantially equal to the distance between said longitudinally disposed edges and said longitudinal fold line adjacent thereto, said end slots extending inwardly from each longitudinally disposed edge of said blank to said first and second fold lines, and oppositely disposed intermediate slots between said end slots and extending inwardly from the longitudinally disposed edges of said blank to said fold lines, the distance between said intermediate slot and said second end slot in the same end flap being greater than the distance between said oppositely disposed first end slots and said first laterally disposed edge, said blank having a plurality of transversely disposed score lines formed therein across said panel portion including a pair of end score lines each of which is spaced inwardly from said laterally disposed edges of said blank and an intermediate score line between said end score lines, said transverse score lines having the opposite ends thereof terminating adjacent the longitudinal score lines and said slots, said transverse score lines dividing the panel portion of said blank into a pair of spaced side panel portions of differing heights with a bottom panel portion therebetween and a means extending outwardly from the longer of said side panel portions, each of said end flaps including an end panel extending outwardly from said bottom panel portion and wall securing means extending outwardly from opposite ends of said side panel portions, said blank being foldable

into tray form by folding said end panels of said end flaps about the longitudinal score lines to form upstanding end walls, folding the side panel portions about one end and said intermediate transverse score lines, folding the wall securing means about the longitudinally extending score lines whereby each of the wall securing means overlies an adjacent end wall and is in position to be secured thereto, said means being foldable about the adjacent transverse end score line away from said longer side panel portion so as to overlie a second package tray having upstanding side walls when positioned adjacent thereto, said end flaps also including portions extending outwardly from said first portion, said outwardly extending portions of said end flaps being foldable downwardly about said longitudinal score lines so as to depend from said first portion of said means and positionable between side walls of a second package tray thereby securing said package tray against inadverent movement relative to a second package tray.

8. In an assemblage of packaging trays having packages disposed therein and wherein said assemblage contains one or more sets of layers of trays, each layer set including an upper layer of trays and a lower layer of trays, each tray in each upper layer of trays being disposed above and supported by at least some of the packages contained within one or more trays disposed in said lower layer of trays, each lower layer of trays including a plurality of peripherally disposed trays, each of said peripherally disposed trays having a portion thereof forming a part of a periphery circumscribing said layer; the improvement comprising, means for interconnecting each peripherally disposed tray within said lower layer with an adjacent peripherally disposed tray within said lower layer and a tray disposed within said upper layer whereby said means maintains said trays within said layer set in a stabilized relationship thereby preventing inadvertent movement of one of said trays relative to the remaining trays in said layer set, said means including a first portion and a second portion, said second portion interconnecting one of said peripherally disposed trays within said lower layer to said first portion, said first portion being disposed between part of the bottom of said tray disposed within said upper layer and the upper surfaces of some of the packages contained within one or both of said interconnected peripherally disposed trays in said lower layer whereby said tray in said upper layer exerts through said first portion of said means an increased frictional interface between said tray in said upper layer and the peripherally disposed trays disposed beneath said tray in said upper layer thereby preventing inadverent movement of said first portion of said means relative to said interconnected peripherally disposed trays in said lower layer and said tray in said upper layer.

9. In an assemblage of packaging trays as described in claim 8 in which said second portion of said means includes a lower edge and an upper edge and one or more generally vertically disposed slots extending from said lower edge to a point intermediate said lower and upper edges.

10. In an assemblage of packaging trays as described in claim 9 in which each of the trays included within each of the lower layers of each layer set is formed with an open top and each of said trays has side walls and end walls of a height approximately ⅔ or less than the height of packages contained therein.

11. In an assemblage of packaging trays as described in claim 9, a pallet disposed in supporting engagement beneath the lower layer of said lowermost layer set, a cap covering the upper layer of said uppermost layer set, and strap means securing together each layer set, said pallet and said cap.

12. In an assemblage of packaging trays as described in claim 8, said second portion having a lower edge extending from said first portion below at least the upper surfaces of the packages contained within the tray associated with said second portion.

13. In an assemblage of packaging trays as described in claim 8, in which said means also includes a third portion, said second and third portions depending downwardly from said first portion and interconnecting one of said peripherally disposed trays within said lower layer to said first portion.

14. In an assemblage of packaging trays as described in claim 8 in which said first portion of said means is generally perpendicular disposed with respect to said second portion of said means.

15. In an assemblage of packaging trays as described in claim 8 wherein said sets of layers of trays include non-peripherally disposed trays and wherein said assemblage includes means for interconnecting each of the non-peripherally disposed trays within each lower layer with one or more adjacent peripherally disposed trays within said lower layer and a tray disposed within said upper layer whereby said means maintains each non-peripherally disposed tray in a stabilized relationship thereby preventing inadverent movement of each said non-peripherally disposed trays relative to said upper tray and said interconnected adjacent peripheral trays, said means including a first portion and a second portion, said second portion depending from said first portion and maintaining the position of one of said lower trays substantially fixed relative to said first portion, said first portion being disposed between part of the bottom of said upper tray and the upper surfaces of some of the packages contained within the other of said lower trays whereby said upper tray exerts through said first portion of said means an increased frictional interface between said upper and the other of said lower trays thereby preventing inadvertent movement of said first portion of said means relative to said one lower tray and of said upper and lower tray with respect to each other.

16. In an assemblage of packaging trays having packages disposed therein and wherein said assemblage contains one or more sets of layers of trays, each layer set including an upper layer of trays and a lower layer of trays, each tray in each upper layer of trays being disposed above and supported by at least some of the packages contained within one or more trays disposed in said lower layer of trays, each lower layer of trays including a plurality of peripherally disposed trays, each of said peripherally disposed trays having a portion thereof forming a part of a periphery circumscribing said layer: the improvement comprising means for interconnecting each peripherally disposed tray within said lower layer with an adjacent peripherally disposed tray within said lower layer and a tray disposed within said upper layer whereby said means maintains said trays within said layer set in a stabilized relationship thereby preventing inadvertent movement of one of said trays relative to the remaining trays in said layer set, each tray having side walls and end walls and each layer including first and second groups of three trays each, a third group of two trays, said third group being disposed intermediate said first and second groups, the side walls of the trays in said third group being disposed in abutting contact with adjacent end walls of the trays in said first and second groups, and a fourth group of four trays, said fourth group being disposed along one side of said combined first, second and third groups with one of the end walls of the trays in said fourth group being disposed in abutting contact with the adjacent side walls of the adjacent trays contained in said first and second groups, and each layer of trays is rotated approximately 180° with respect to each adjacent layer of trays whereby the fourth group of trays within each layer is vertically disposed with respect to some of the trays included within the combined first, second and third groups.

17. In an assemblage of packaging trays having packages disposed therein and wherein said assemblage contains one or more sets of layers of trays, each set of

layers including an upper layer of trays and a lower layer of trays, each tray in each upper layer of trays being disposed in contacting engagement upon at least some of the packages contained within one or more trays disposed in said lower layer of trays, each lower layer of trays including a plurality of peripherally disposed trays, each of said peripherally disposed trays having a portion thereof forming a port of a periphery circumscribing said layer, said periphery comprising a plurality of sides, each side of said periphery being formed by a portion of each of some of the peripherally disposed trays: the improvement comprising a plurality of means for interconnecting the trays within each layer set whereby said trays within said layer set are maintained in a stabilized relationship thereby preventing inadvertent movement of one of said trays relative to the remaining trays in said layer set, each means extending generally along a corresponding side of said periphery, each means including a first portion and a second portion, said second portion interconnecting said first portion with each of the peripherally disposed trays which have a portion thereof disposed to form a corresponding one of the sides of said periphery, said first portion being disposed between the upper surfaces of some of the packages contained within the peripherally disposed trays which have a portion thereof forming said corresponding one of said sides of said periphery and the trays disposed within said upper layer and which overlie the peripherally disposed tray in said lower layer which are interconnected by said means, whereby said overlying trays in said upper layer exerts through said first portion of said means an increased frictional interface between said overlying trays in said upper layer and the trays within said lower layer which are interconnected by said means thereby preventing inadvertent movement of said first portion of said means relative to said interconnected trays and said overlying trays.

18. In an assemblage of packaging trays as described in claim **17**, in which each of said trays within each lower level of each layer set has side walls and end walls of a height less than the height of the packages contained therein.

19. In an assemblage of packaging trays as described in claim **18** in which said second portion of said means includes a lower edge and an upper edge and one or more generally vertically disposed slots extending from said lower edge to a point intermediate said lower and upper edges.

20. In an assemblage of packaging trays as described in claim **19** in which portions of adjacent walls of adjacent peripherally disposed trays are disposed intermediate the vertically disposed slot formed in the second portion of said means.

21. A foldable packaging material blank foldable into a package tray having a portion thereof engageable with a second package tray said blank having a pair of longitudinally disposed edges and a pair of laterally disposed edges, said blank having a first lateral fold line formed therein and spaced inwardly from the first one of said laterally disposed edges to form a first end flap between said fold line and said edge, a second lateral fold line formed therein and spaced inwardly from the second one of said laterally disposed edges to form a second end flap between said fold line and said edge, said fold lines extending the width of the blank and defining therebetween a laterally extending panel portion whereby the end flaps may be folded away from the panel portion therebetween, each of said end flaps having first and second pairs of oppositely disposed slots formed therein, each pair being disposed inwardly from each longitudinally disposed edge with said pairs of slots being disposed inwardly a distance substantially equal to the distance between said first laterally disposed edge and said first lateral fold line, said slots extending inwardly from each laterally disposed edge of said blank to said first and second lateral fold lines, the portion of said end flap between said slots extending from said second laterally disposed edge to said second lateral fold line extending parallel to said slots a distance greater than the distance between said first lateral fold line and said first laterally disposed edge and having a score line thereacross defining a means providing a portion engageable with a second package tray, said blank having a pair of longitudinal fold lines formed therein across said panel portion extending between said pairs of slots and terminating adjacent the lateral fold lines and said slots, said longitudinal fold lines dividing the panel portion of said blank into a pair of spaced side panel portions having a bottom panel portion therebetween, each of said end flaps including an end panel extending outwardly from said bottom panel portion and wall securing means extending outwardly from opposite ends of said side panel portions, said blank being foldable into tray form by folding said end panels of said ends flaps about the lateral fold lines to form upstanding end walls, folding the side panel portions about said longitudinal fold lines, folding the wall securing means about the laterally extending fold lines whereby each of the wall securing means overlies an adjacent end wall and is in position to be secured thereto, said means defining the portion engageable with a second tray being foldable about the score line across the longer end panel away from said package tray being formed so as to overlie a second package tray having upstanding side walls when positioned adjacent thereto.

22. A foldable packaging material blank foldable into a package tray having a portion thereof engageable with a second package tray, said blank having a pair of longitudinally disposed edges and a pair of laterally disposed edges, said blank having a first longitudinal straight fold line formed therein and spaced inwardly from the first one of said longitudinally disposed edges over the greater portion of said blank to form a first end flap between said fold line and said edge, a second longitudinal fold line formed therein and spaced inwardly from the second one of said longitudinally disposed edges over a portion equal to that portion between said first longitudinal fold line and said first longitudinally disposed edge to form a second end flap between said fold line and said edge, said fold lines and longitudinal edges extending straight therefrom defining therebetween a longitudinally extending panel portion whereby the end flaps may be folded away from the panel portion therebetween, each of said end flaps having first and second pairs of oppositely disposed slots formed therein, each pair of slots being disposed inwardly from the edge of said end flaps a distance substantially equal to the distance between said longitudinally disposed edges and said longitudinal fold line adjacent thereto, said end slots extending inwardly from said longitudinally disposed edge of said blank to said first and second longitudinal fold lines, said blank having a pair of transversely disposed parallel score lines formed therein across said panel portion extending between said pairs of slots and terminating adjacent the longitudinal score lines and said slots, said transverse score lines dividing the panel portion of said blank into first and second spaced side panel portions with a bottom panel portion therebetween, said second side panel being of greater length than said first panel and having a score line thereacross defining means providing a portion engageable with a second package tray, each of said end flaps including an end panel extending outwardly from said bottom panel portion and wall securing means extending outwardly from opposite ends of said side panel portions, said blank being foldable into tray form by folding said end panels of said end flaps about the longitudinal score lines to form upstanding end walls, folding the side panel portions about said transverse score lines, folding the wall securing means about the longitudinally extending score lines whereby each of the wall securing means overlies an adjacent end wall and is in position to be se-

cured thereto, said means defining the portion engageable with a second tray being foldable about the score line extending across said second panel away from said package tray being formed so as to overlie a second package tray having upstanding sidewalls when positioned adjacent thereto.

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