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3,266,704

DUST-PROOF CONTAINER

Filed May 22, 1964

2 Sheets-Sheet 1

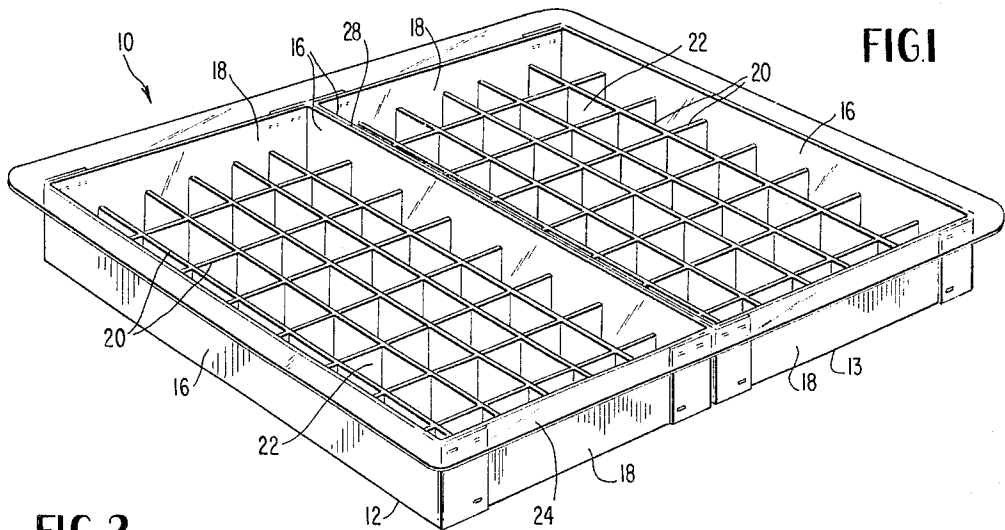


FIG. 1

FIG. 2

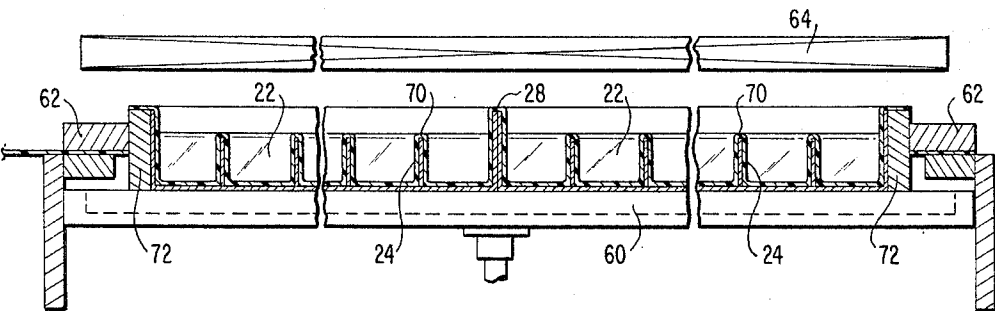
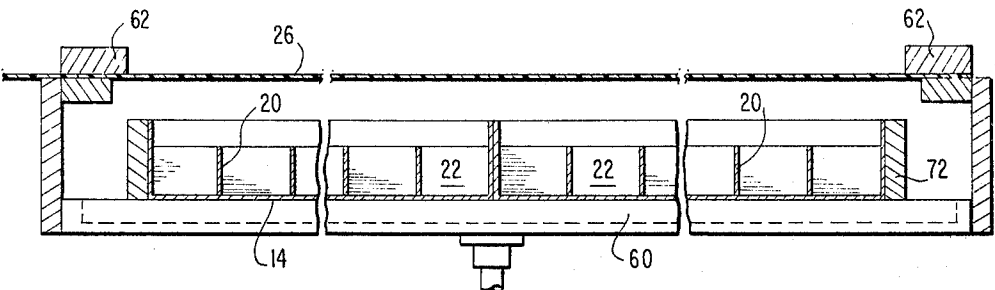


FIG. 3

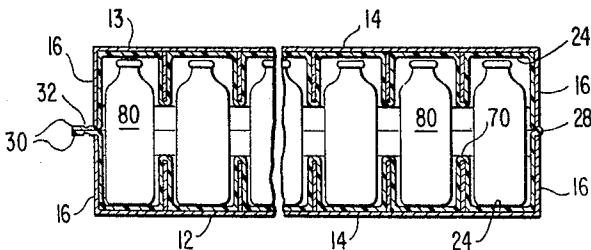


FIG. 4

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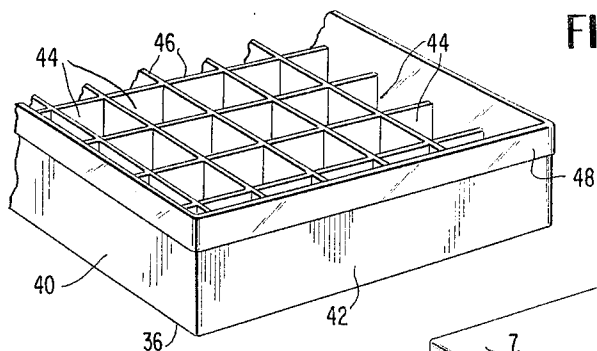


FIG. 5

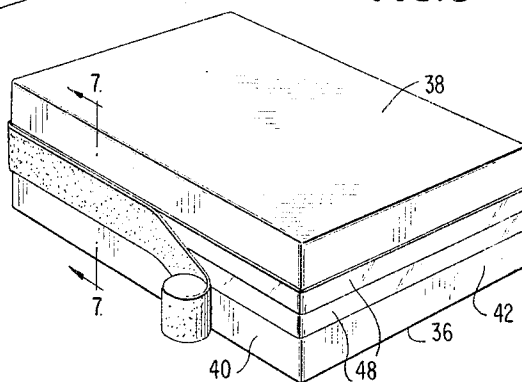


FIG. 6

FIG. 7

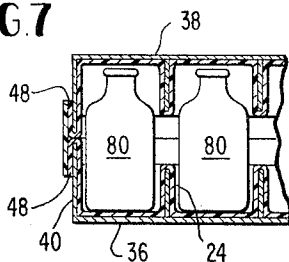


FIG. 8

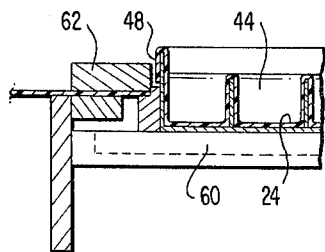
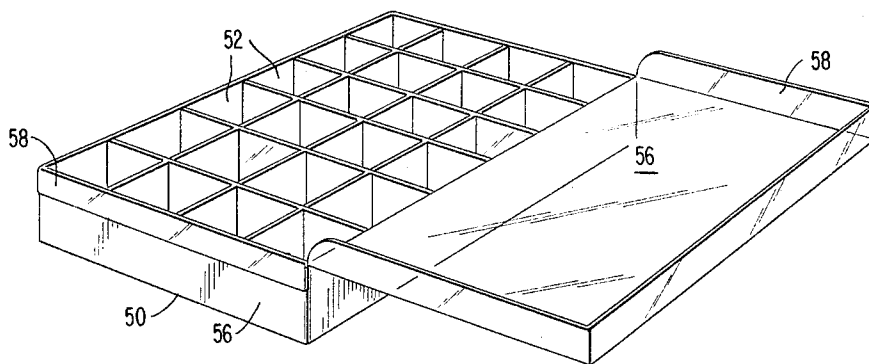


FIG. 9

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DUST-PROOF CONTAINER

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6 Claims. (Cl. 229-14)

This invention relates to dust-proof containers, and more particularly to containers having a dust-proof lining.

In the packaging industry it is frequently desirable to provide a container for packaging articles which will maintain the articles in an absolutely clean condition during handling, shipping, or storage. One such example is the packaging of ampules, serum bottles, or the like, used in the pharmaceutical industry. Such bottles must be absolutely clean before they may be used to package the pharmaceuticals and, since they are in such a clean condition immediately after the completion of their manufacture, it is very desirable to maintain them in this condition. However, in the past, when these bottles were packaged and shipped in containers formed of paperboard or the like, frequently very fine particles of paper, or dust would get into the packaged bottles. This dust was extremely difficult, if not impossible, to eliminate even by the best washing and sterilizing procedures and apparatus available.

Attempts have been made to eliminate the problem of dust in containers by applying a coating of material such as plastic to the surface of the material used to form the package. However, when the surface-treated material was cut to form the blank for the package, a raw or uncoated edge surface was left, thereby creating a prime source of dust. Also, when a package was compartmented for shipping a plurality of articles in a single package, the edge surfaces of the compartmenting strips, as well as friction between the strips and the package created another source of dust.

It is therefore an object of this invention to provide a container suitable for packaging articles of manufacture and which is effectively dust-proof when closed.

It is another object of this invention to provide such a container which is compartmented for packaging a plurality of articles.

Another object of this invention is to provide such a container having a dust-proof liner.

Another object of this invention is to provide such a container having a dust-proof liner in which the liner is employed to stay the corners of the container.

Another object is to provide a method of making a container having a liner and which is effectively dust-proof when closed.

In the attainment of the foregoing and other objects, a suitable container is formed from folded paperboard or the like and a plurality of dividers are inserted in the container to divide the interior of the container into a plurality of open topped compartments. A liner, formed from a sheet of thermoplastic material, is shaped to cover and closely conform to the interior surface of each of the container compartments, with the liners extending outwardly over the top edge of the container to cover the top edge of the side walls of the container.

The articles to be packaged may then be placed into the individual compartments of the container and a second container, similarly formed, is inverted over the first to form a top or lid. The two liners may be heat sealed or otherwise bonded to form a completely dust-proof joint between the top and bottom liners so that the interior of the container so formed will be and remain completely dust-proof.

If desired the bottom and top section of the container may be provided with a single liner, with the liner extending between and forming a hinge between the two sec-

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tions. Also, if desired, the liner may extend over the top edges of the container sections and be formed around a portion of the top outer periphery to stay the corners of the container.

Other and further objects of the invention will be apparent from the following detailed description taken in conjunction with the drawings in which:

FIG. 1 is a perspective view of a container in accordance with the present invention;

FIG. 2 is a sectional view showing a step in the production of the container shown in FIG. 1;

FIG. 3 is a view similar to FIG. 2 showing a further step in the production of a container;

FIG. 4 is a sectional view showing a plurality of articles packaged in the container shown in FIG. 1;

FIG. 5 is a fragmentary view similar to FIG. 1 showing a modified form of a container in accordance with the invention;

FIG. 6 is a perspective view of a closed container according to FIG. 5;

FIG. 7 is a fragmentary sectional view taken on line 7-7 of FIG. 6;

FIG. 8 is a perspective view of another embodiment of the invention; and

FIG. 9 is a fragmentary view similar to FIG. 3 showing a step in the production of an alternate embodiment of the invention.

Referring now to the drawings in detail, FIGURE 1 shows an open, unsealed carton 10 constructed according to the present invention, and including a pair of like trays 12, 13, each having a bottom panel 14, a pair of vertically extending side panels 16, and a pair of vertically extending end panels 18. The two trays 12 are positioned with one of the sides 16 on each tray in side-by-side abutting relation. A plurality of partitioning strips 20 divide the interior volume of each of the trays into a plurality of open topped compartments 22 in a manner well known in the art.

Carton 10 includes a continuous liner 24 formed from a single sheet 26 of thermoplastic material covering and closely conforming to the interior surface of each of the trays 12, 13 and of the individual compartments 22 formed therein. The liner 24 extends over the top edge of adjacent sides 16 of trays 12, 13, as best seen in FIGURE 3 to form a hinge joint 28 between the two trays, so that tray 13 may be pivoted about hinge joint 28 to form a lid or cover for tray 12 as shown in FIGURE 4.

Liner 24 extends outwardly over the top edge of side panels 16 and end 18 in a direction substantially parallel to bottom panel 14, forming a flange 30 to cover the top edges of panels 16, 18 of trays 12, 13. When the container is closed, as shown in FIGURE 4, the portion of flange 30 extending outwardly from tray 13 is positioned adjacent to and overlies the portion of the flange projecting from tray 12 and the overlying portions of the flange may be heat sealed as at 32 to form a completely air and dust tight seal for the container.

In an alternate embodiment of the invention, the trays may have separate liners formed therein with the flange 30 projecting outwardly over the top edge of all of the sides of the trays. To form a closed container according to this embodiment, one tray is merely inverted over the other and the flange of one is bonded to the flange of the other around the entire periphery of the closed container.

In the embodiment of the invention disclosed in FIGURES 5-7, a folded blank paperboard tray 36 having a bottom panel 38, side panels 40, and end panels 42, has its interior portion divided into a plurality of compartments 44 by partitioning strips 46. A liner 24 formed from a sheet 26 of thermoplastic material covers and

closely conforms to the interior surface of tray 36, including each of the compartments 44 therein. The liner extends outwardly over the top edge of side panels 40 and end panels 42, and extends downwardly around the outer periphery of the top portion of the tray to form a continuous band 48. It can be readily seen that this band will be effective to stay the side and end panels of the tray, thereby eliminating the necessity for stapling or interlocking locking tabs to set up the paperboard tray. To form closed container, a second tray having a similar liner formed therein is inverted over the top of a first tray and the two liners are joined by suitable means such as a continuous strip of adhesive tape as illustrated in FIGURE 6.

In still a further embodiment of the invention, illustrated in FIGURE 8, a container is formed from a single tray 50 and includes a liner formed from a single sheet of thermoplastic material. The sheet extends over the top edge of the side panels 54 and end panels 56 and may extend outwardly therefrom to form a flange as in the embodiment illustrated in FIGURE 1, or be drawn around the top outer periphery of the tray in a manner similar to that illustrated in FIGURES 5-7 of the drawings with the exception that the sheet extends beyond the top edge of one of the sides 54 a distance sufficient to form a cover 56. Cover 56 may be folded over the top of the container in the manner of a conventional integrally formed hinged closure flap with the peripheral edges being bonded, as by heat sealing to the band or flange 58 extending over the top edge of the remaining sides of the tray.

To form a dust proof container in accordance with this invention, a pair of paperboard trays 12, 13 are placed in the upright position in side-by-side abutting relation on a vacuum platen 60 (see FIGURES 2, 3, and 8) and a plurality of partitioning strips 20 are positioned within each of the trays to divide them into a plurality of similar individual open-topped compartments 22. A continuous sheet of thermoplastic material 26 is gripped around its outer periphery by a suitable clamping frame 62 and is positioned over the open tops of trays 12, 13 with the periphery of the sheet 26 extending outwardly beyond the top edges of the two trays. Sufficient heat is then applied to the plastic sheet 26 to render it in a plastic state so that it may be drawn into the interior of the trays. The heat may be applied by any suitable means, indicated generally by the numeral 64, such as a heated plate or a Calrod heating unit, brought into close proximity to the sheet.

When the plastic sheet 26 has been sufficiently heated, vacuum is applied to the platen 60 to withdraw the air from within the trays 12, 13, through the slightly porous bottom panels 14 of the paperboard trays, and thereby draw the thermoplastic sheet within the interior of the tray. By maintaining the vacuum on the plate sufficiently long to withdraw substantially all of the air from within the trays, the plastic sheet will be drawn into each of the individual compartments 22 and will very closely conform to the interior surfaces thereof as well as extend over the top edges of the individual partitioning members 20 as illustrated at 70. Also, it will be noted that the liner sheet extends over the top of the adjacent edges 16 to form a hinged joint 28.

Once the thermoplastic sheet has been drawn into the trays to form the continuous liner therefor, the clamping bracket 62 may be moved downwardly around a framing member 72 on the vacuum platen to shear sheet 26 along a peripheral line spaced outwardly from the top edges of the trays 12, 13 to form a continuous flange 30 around the top of the two trays. The two trays may then be removed, and the articles to be shipped, such as serum bottles 80, placed in the individual compartments of one of the trays. The other tray is then folded about the hinged joint 28 to be inverted over the first tray 12 to form a lid for the container. By sealing the overlapping portions of flange 30 around the three sides of the closed

container, a completely dust proof and air proof container is formed.

By reference to FIGURES 4 and 7 of the drawings, it will be noted that a container is provided in which the articles to be shipped are completely isolated from contact with any structural member of the container, and particularly from the dust or lint producing edges of the container and of the partitioning members. At the same time, a package is provided in which a plurality of articles may be packaged and maintained in separate isolated individual compartments to prevent damage due to handling or the like.

The band 58 of the embodiment illustrated in FIGURES 5-8 is formed in a manner similar to the flange 30, with the exception that the frame 72, shown in FIGURE 9, is of a lesser height than the trays, depending upon the width of band desired, and the shearing edge of the frame is formed in close proximity to the outer perimeter to the tray being lined so that, when the sheet 26 is drawn down around the outer periphery of the tray as illustrated in FIGURE 9, and then sheared in close proximity to the tray, a continuous band closely conforming to the outer periphery of the container will be formed.

If desired, the interior of the trays or the under side of the thermoplastic sheet, or both, may be pre-treated to effect a bond between the tray and the liner.

From the above, it can be seen that a compartmented container in accordance with this invention can be readily and inexpensively manufactured, without the necessity for elaborate equipment, and that such a container will be effective to completely isolate articles packaged within the sealed container from dust particles.

While I have disclosed and illustrated a preferred embodiment of my invention, I wish it understood that I do not intend to be restricted solely thereto, but that I do intend to cover all embodiments thereof which would be apparent to one skilled in the art and which come within the spirit and scope of my invention.

What is claimed is:

1. A folded blank container comprising a bottom, a plurality of integrally formed discrete side panels extending upwardly from the peripheral edges of said bottom, and a continuous liner formed from a sheet of thermoplastic material covering and closely conforming to the interior surface of the container, said liner extending outwardly over the top edges of said side panels and downwardly in contacting relation over a portion of the outer surface of said side panels forming a continuous band around the top peripheral surface of the container to retain said side panels in said upwardly extending position.

2. A container as defined in claim 1 including a cover extending over the top of said container, said cover being joined to said band to render said container effectively dust-proof.

3. A container as defined in claim 1 wherein the interior of said carton is divided into a plurality of open-topped compartments with said liner closely conforming to the interior surface of each of the compartments.

4. A container as defined in claim 3 including a cover member extending over the top of said container, said cover being joined to said band to render said container effectively dust-proof.

5. A container comprising a pair of folded blank trays each having a bottom panel and a plurality of integrally formed discrete side panels extending upwardly from the peripheral edges of the bottom panel, a continuous liner formed from a sheet of thermoplastic material covering and closely conforming to the interior surfaces of each of said trays, respectively, said liners extending outwardly over the top edge of said side panels and downwardly in contacting relation over a portion of the outer surface of said side panels forming a continuous band around the top periphery of each of said containers to retain said side panels in said upwardly extending position, said

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pair of trays being positioned in super-imposed relation with one of said trays inverted to form a cover for the other of said trays, and means joining the bands on said trays to form a dust-proof seal therebetween.

6. A container as defined in claim 5 wherein at least one of said trays is divided into a plurality of open-topped compartments with said liner extending into and closely conforming to the interior surface of each of said compartments.

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