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Package for highly viscous tacky materials.

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A packaging container for viscous material (such as polyisobutylene) is featured by a scored blank having substantially no adhesion for said material, folded into a seamless tray disposed in an external sleeve and a covered box-like outer container.

EP 0 070 721 A2

1 BACKGROUND OF THE INVENTION2 1. Field of the Invention

3 The present invention relates to improvements in
4 the construction and method of making a package for highly
5 viscous tacky materials. More particularly, it relates to
6 a container for such materials which utilizes a seamless
7 laminated tray with good release characteristics disposed
8 within a box.

9 2. Description of the Prior Art

10 Most highly viscous tacky polymers such as low
11 molecular weight polyisobutylene are mixed and packaged
12 "hot", e.g., greater than 125°C, so that the material will
13 flow to some extent or at least be pourable. Containers
14 for these types of materials must be able to withstand the
15 hot packaging temperatures of approximately 150°C to 235°C
16 and at the same time, permit the contents to be readily
17 removed for final use.

18 These materials are presently packaged in ex-
19 pensive metal containers which are of much lighter weight
20 than is desired for product protection and durability
21 since the container must be peeled from the product in
22 order to use the product. These containers are generally
23 coated with a release coat which must be manually applied
24 after the can is manufactured and is therefore generally
25 of poor quality.

26 One approach to packaging such materials is
27 shown in U.S. Patent 3,648,882 which teaches that low
28 molecular weight tacky polymers may be readily removed
29 from their containers by providing the container with a
30 removable release agent-coated inner liner having a
31 readily detachable bottom member.

32 Another approach to packaging these viscous
33 tacky polymers according to U.S. Patent 3,837,375 is by
34 hot filling an open-ended container having a liner com-
35 prising (1) heat stabilized nylon coated with a silicone
36 release agent; (2) an uncoated cellophane film; (3) a
37 mineral pigment coated kraft paper overcoated with a sili-

1 cone release agent; or (4) kraft paper coated with finely
2 divided mica. This liner provides for ready release of
3 the material from the container after warehouse storage
4 and/or shipment to the processor of said viscous tacky
5 material.

6 In these prior art structures that disclose the
7 use of cylindrical drums which have bag type inner liner
8 structures or cylindrical liner sleeves which are sup-
9 ported within the cylindrical drum, the liners have release
10 agents on their inner surfaces to permit the liners to be
11 peeled away from the viscous material after it has cooled.
12 With a bag type liner, it is not possible to peel the
13 liner away from the cooled tacky viscous material to place
14 the liner in a substantially flattened configuration to
15 leave the viscous material free standing on the liner;
16 rather, it is necessary to rip, tear or cut the liner in
17 order to peel it away from the cooled viscous material.
18 This can create problems in easily and completely freeing
19 the viscous material from the liner. In this regard, if
20 the bag structure were constructed from a substantially
21 flat sheet of material which had a release coating thereon,
22 it would be most difficult to seal the edges to provide a
23 substantially leak-proof container as a result of the
24 release coating on the surface of the sheet material. In
25 other words, seams would be necessary and there is diffi-
26 culty in adequate sealing of the seamed edges of a
27 material when a release coating has been placed thereon.
28 Furthermore, with cylindrical tube structures which have
29 been used as liners, a seam must be provided between the
30 tubular structure and a bottom which in turn can present
31 problems of leakage or flow of the tacky viscous material
32 when it is hot and poured into the liner. Furthermore, it
33 is difficult to place a release coating on bags which have
34 already been sealed, i.e., to coat the inside of a formed
35 bag or tube structure with a release agent. Thus, it will
36 be appreciated that with the prior art arrangements for
37 packaging structures either seams were provided which

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1 might present problems with leakage control, or alter-
2 natively, if the liner structures were adequately sealed,
3 there would be problems in adequately coating the inner
4 surface of the liner to provide a release coating for
5 facilitating removal of the liner after the viscous
6 material has cooled.

7 It is an object of this invention to improve the
8 packaging of highly viscous tacky materials which tend to
9 cold flow at room temperatures.

10 It is a further object of this invention to
11 provide a package for highly viscous tacky materials which
12 is leakproof and readily separated from the packaged
13 material.

14 BRIEF DESCRIPTION OF DRAWING

15 The various objectives and features of the in-
16 vention will be fully understood by reference to the ac-
17 companying drawings, which show a preferred embodiment
18 thereof.

19 Figure 1 is a perspective view of a scored and
20 unfolded blank;

21 Figure 2 is a perspective view of the scored
22 blank, folded into a seamless tray;

23 Figure 3 is an exploded view of a preferred
24 embodiment of the uncovered package of the invention show-
25 ing a folded seamless tray, a support sleeve and an outer
26 box;

27 Figure 4 is a partial cross-sectional representa-
28 tion taken along line 4-4 of Figure 5; and,

29 Figure 5 is a pictorial representation of the
30 container of the invention.

31 SUMMARY OF THE INVENTION

32 It has been discovered that a scored blank,
33 preferably a scored paper sheet (optimally kraft paper
34 laminated to a corrugated board or fiber board) which has
35 been surface treated with a release agent for tacky viscous
36 material can be folded into a seamless tray which provides
37 said release properties (Kiel release of less than 10

1 grams and preferably less than 5 grams), is suitable for
2 disposition into a tray supporting member, e.g., a box or
3 sleeve, is capable of leakproof retention of said material
4 and provides freedom from contamination of the viscous
5 material. One or more trays may be placed in the support-
6 ing member which has suitable stacking strength, crush
7 strength, and puncture resistance for storage and/or ship-
8 ment. Preferably, the supporting member comprises a
9 sleeve and a box with a cooperating cover, said sleeve
10 disposed contiguous with the outer surface of the tray and
11 the inner surface of the box.

12 Thus, the invention can be described as a
13 packaging container for viscous material which comprises a
14 scored blank folded into a seamless tray, the inner sur-
15 face of said tray having a Kiel release of less than 10
16 grams for the material to be packaged within said tray, a
17 tray supporting member disposed about said tray and a
18 cover for said tray whereby viscous material is contained
19 within said tray. The scored blank usefully is a composite
20 of a polymeric film adhered to a scored corrugated board.
21 Preferably, the tray supporting member comprises an open ended
22 member and an outer box, said open ended member adapted to be
23 positioned external and contiguous with the outer surface of said
24 tray and the inner surface of said box. To avoid contamination of
25 the packaged viscous material, it is preferred further that the
26 tray has shoulders adapted to cooperate with the tray supporting
27 member whereby said shoulders prevent any contained viscous material
28 from contact exposure to said tray supporting member.

29 As seen from the foregoing, the unique feature of the
30 packaging container derives from the use of a substantially flat
31 blank of material having a release coating on one side thereof.
32 The blank of material is folded to provide a tray member having an
33 integral bottom and upstanding sidewalls defining an open top end,
34 the nature of the folding of the blank being such that the
35 tray member is substantially free of seams through which
36 tacky viscous material could flow when the tray member
37 is filled. The folded tray member is adapted to be
38 placed within a suitable support structure, such as a
39 corrugated sleeve and/or an outer box structure for

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1 supporting the bottom and sidewalls of the tray member
2 so that it will maintain its integrity when filled with
3 tacky viscous material.

4 The use of such a substantially flat sheet
5 material which is folded into a tray member is advanta-
6 geous in a number of respects over prior art packaging
7 structures for tacky viscous material. For instance,
8 the outer peripheral margins of the flat sheet can be
9 folded upwardly in a manner to define the upstanding
10 sidewalls of the tray member so as not to provide any
11 seams through which the tacky viscous material may leak
12 or flow when poured into the tray member. Additionally,
13 since the tray member is constructed from a substantially
14 flat sheet, after the tacky viscous material has cooled
15 and the tray member is removed from its supporting struc-
16 ture, the upstanding sidewalls of the tray member may
17 simply be unfolded and placed in a substantially flat
18 configuration to easily facilitate removal of the viscous
19 material. That is, as the initial configuration of the
20 blank of material was substantially flat, and was simply
21 folded to define the tray member, when it is desired to
22 use the viscous material the sidewalls of the tray member
23 may simply be pulled away from the side of the viscous
24 material and placed in a substantially flattened configu-
25 ration with the cooled viscous material lying on top of
26 the flattened blank of material. This capability facilitates
27 easy removal of the viscous material when it is desired
28 to use same.

29 DETAILED DESCRIPTION OF THE INVENTION

30 The container of this invention is suitable
31 for use for such tacky polymers as polyisobutylene having
32 a Staudinger molecular weight of 8,000 to 12,000, polybutenes
33 having Staudinger molecular weights of about 3,000 to
34 6,000, low molecular weight butyl rubbers and halogenated
35 butyl rubbers, low softening point hydrocarbon resins,
36 adhesives, sealants and the like compounds which are
37 normally not pourable at room temperature, but exhibit
38 cold flow at room temperature and are sufficiently tacky
39 to be removed from conventional containers only with

1 difficulty.

2 The substantially flat blank should be capable
3 of withstanding hot packaging conditions without degrada-
4 tion or softening to the point of adhering to the polymer
5 being packaged. Various polymeric films have been found
6 to be useful for this purpose. Typical of the types of
7 the film which may be used are polyester films and heat
8 stabilized nylon. Preferable, the polymeric film has a
9 thickness of about 0.5 to about 5 mils; more preferably
10 about 1 to about 3 mils.

11 A particularly suitable polyester film is the
12 reaction product of ethylene glycol and terephthalic
13 acid which is known to the trade by the duPont trademark
14 "Mylar".

15 The term "nylon" as used herein in the specifi-
16 cation and claims is used in its generic sense to mean
17 long chain synthetic polyamides which have recurring
18 amine groups. Illustrative examples of nylons suitable
19 for use in the practice of this invention are Nylon 4
20 prepared from pyrrolidone; Nylon 66 prepared from conden-
21 sation of hexamethylenediamine with adipic acid; Nylon
22 610 obtained from the condensation of hexamethylenediamine
23 with sebacic acid; Nylon 6 obtained by polycondensation
24 of caprolactam; etc. Aromatic polyamides are particularly
25 well suited for use in the practice of this invention
26 due to their excellent thermal properties.

27 Though any nylon film may be used in conjunction
28 with the scored blanks, it is preferable that where
29 packaging is carried out at elevated temperatures, e.g.
30 150-235°C, the nylon be a heat stabilized nylon illustrat-
31 ed by Nylon 6 which has the following physical properties:
32 at 22°C, tensile strength of 12,000-15,000 psi, yield
33 strength of 5,000-8,000 psi, tear strength of 70-100
34 gms., elongation of 400-600 percent, negligible solubility
35 in water, crystalline melting point of 218°-220°C; at 150°C,
36 tensile strength of 5,000-7,000 psi, yield strength of 1,500 -
37 2,700 psi, and elongation of 400-500 percent.

38 In the practice of this invention, it is preferred,
39 due to economics, to use kraft paper, e.g. 50-100 pound

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1 grade which corresponds to a thickness of from 0.5 to 5
2 mils, as the scored blank; optimally heat laminated to a
3 corrugated backing (usefully a single wall construction)
4 with any suitable combination of flute design and liner
5 board construction. Alternately, and also preferable is
6 a construction wherein the tray is folded from a scored
7 blank consisting of a release liner laminated to fiber
8 board of suitable thickness (typically 0.033 inches) as
9 by gluing with a phenol-formaldehyde resin.

10 The scored blank is surface coated with a
11 release agent. Various release agents may be used in
12 the practice of this invention. Preferably, the release
13 agents are silicone fluids having a viscosity of about
14 10 to about 30,000 centistokes at 25°C, more preferably
15 about 50-1,000 centistokes, most preferably 100 to 500
16 centistokes. The materials are well known to the art
17 having carbon to silicon linkages such as disclosed
18 in U.S. Patent Nos. 2,448,756, 2,484,595 and 2,541,137
19 which are incorporated herein by reference.

20 The silicone fluid is cured after application
21 to a surface of the scored blank. Illustrative of a
22 suitable silicone for the scored kraft paper blank is
23 Akrosil NS-62-UBL-5-1 sold by Akrosil Corporation. The
24 silicone fluids useful for the polymeric films are illus-
25 trated by Union Carbide and Carbon's L-45 series fluids
26 and General Electric Co.'s SF 96 series fluids with both
27 being available in a wide range of viscosities up to
28 about 100,000 cs at 25°C, e.g., Union Carbide and
29 Carbon's L-31 is a silicone fluid having a viscosity
30 of about 35 cs. at 25°C.

31 It has been found that the thickness of the
32 release agent coating is not critical. However, it is
33 essential that the coating be continuous. For example,
34 a continuous coating whose thickness is in the Angstrom
35 range will suffice, whereas a discontinuous coating of
36 several mils will not release properly.

37 It is essential, however, that the release
38 coating provide a release value of 2 to 10, preferably
39 5, grams as measured by a Kiel release tester.

1 In the practice of this invention, a simple
2 flat sheet of kraft paper which has been surface treated
3 with a suitable release agent such as a cured silicone
4 is laminated to the surface of a scored corrugated board
5 or fiber board. The corrugated or fiber board has been
6 appropriately scored in such a way that as its ends are
7 folded, a tray is formed which has the unique nature of
8 containing no seams, joints, butts or other areas in
9 which the tacky viscous material can leak out. The
10 folded flaps may be held in place by means of a fastener
11 such as a staple or yet folded into the outer box or
12 support sleeve. This folded tray is then placed in a
13 suitable outer corrugated box of such a construction as
14 to impart the required stacking strength, crush strength,
15 puncture resistance, etc. The folded tray may also be
16 placed in a corrugated support sleeve both of which are
17 placed into a simple outer box. Once the package is
18 filled with said material, the outer box top is sealed
19 by conventional means. One or more trays may be placed
20 in an outer box as described below. Note that the tray
21 overlaps the outer corrugated sleeve to prevent fiber
22 contamination of the tray contents.

23 The outer box may be of any suitable design.
24 However, it is preferred that the box lid completely
25 extend over the entire box top so that paper fiber con-
26 tamination of the product be minimized.

27 The kraft paper release agent need not be
28 laminated to corrugated board. It itself may be
29 adequate as an inner liner supported by itself or laminated
30 to a fiber board. It may also simply comprise the
31 inner surface of a suitable outer box.

32 This box is not restricted to polyisobutylene
33 type resins for it is suitable as a package for hydrocar-
34 bon resins, atactic polypropylene, hot melt adhesives and
35 the like.

36 In a preferred embodiment of this invention as
37 shown in the drawings, the inner blank 10 of Figure 1
38 has a series of scored lines a-j, b-e, f-i, k-j-i-g, k-
39 n, p-o, b-j-o-q, q-t, e-i-v-t, v-u, n-o-v-w, and g-w,

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1 which are folded along the scorings as follows: first
2 fold along scored lines b-j-o-q and e-i-v-t; secondly,
3 fold along scored lines k-j-i-g and n-o-v-w; thirdly,
4 fold along scored lines a-j, f-i, u-v and o-p; fourthly,
5 fold along scored lines k-n and g-w; and finally, each
6 of the four folded sections defined by efgi, vtwu, abjk
7 and npoq are positioned in overlapping fashion against
8 each end of the seamless tray as indicated in Figure 2.

9 Looking further at Figure 2, the seamless tray
10 11 has opposing sides 12 and 13, ends 14 and 15 and
11 bottom 16. By appropriately folding the scored blank,
12 no seams exist at any of the corners of the tray.
13 Further, the blank is preferably cut to provide areas
14 defined by cdeb, klmn, qrst and ghxw so that shoulders
15 17, 18, 19, 20 are formed overlap the sleeve member and
16 thereby prevent contamination of the viscous material by
17 exposure to the end of the supporting sleeve 21 (as seen
18 in Figure 3). Shoulder 20 has been further folded to
19 provide the lip 22, which is the optimal configuration
20 for all shoulders, thus achieving maximum protection
21 from supporting sleeve contamination.

22 In Figure 3, the exploded representation of
23 the uncovered package or container of the invention
24 shows the seamless tray 11 with its lipped 22 shoulders
25 17 and 20 positioned above support sleeve 21 (usefully
26 of corrugated paper) and cooperating outer box 23 having
27 sides 24, 25, 26 and 27 with bottom 28.

28 Referring now to Figure 5, the cooperating
29 outer box 23 has a cover 24, which thereby fully contains
30 the viscous material. Although in use the seamless tray
31 is never filled fully with viscous material, it is desir-
32 able to coat the inner surface of the cover 24 with a
33 release coating to avoid any tendency of the viscous
34 material to adhere to said cover in the event that it is
35 exposed thereto.

36 Figure 4 shows in partial cross-section the
37 covered container of Figure 5 along dotted lines 4-4.

38 Cover 24, which extends over the side of box

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1 23, is seen to lie directly in contact with shoulder 20
2 of the seamless tray 11, more particularly, the shoulder
3 20 of end wall 15 of said tray 11. The sleeve member 21
4 is positioned at its upper end between the lip 22 of
5 shoulder 20 and tray portions 29 and 30 which are repre-
6 sented by those liner areas fig and fei of Figure 1,
7 respectively.

8 In view of the foregoing, the preferred structure
9 of the packaging container of this invention for viscous
10 materials comprises an outer support member having means
11 defining a closed bottom and upstanding sidewalls and an
12 open top end, and further including means for closing
13 the open top end thereof; and an inner tray member placed
14 within said outer support member to be supported thereby,
15 said inner tray member having a bottom wall and integral
16 upstanding sidewalls, and an open top end into which
17 viscous materials may be placed, said bottom and integral
18 sidewalls of said tray member having a release agent on
19 the interior walls thereof so as to be peelable away
20 from said viscous material after said viscous material
21 has been placed in said tray member, said bottom and
22 integral sidewalls of said tray member being folded from
23 a substantially flat blank of material in a manner so as
24 to be free of seams through which viscous material may
25 flow when placed therein, and folded so that said sidewalls
26 may be peeled away from said viscous material after said
27 tray member has been removed from said outer support
28 structure by unfolding said blank of material into a
29 substantially flattened configuration to facilitate easy
30 removal of said viscous material.

31 Thus the invention is practiced by a method of
32 packaging viscous materials which comprises the steps
33 of:

- 34 (a) providing a substantially flat blank of
35 material having a release coating on one side thereof;
36 (b) folding said substantially flat blank of
37 material into a tray member having a bottom and integral
38 upstanding sidewalls defining an open top end, said

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1 substantially flat blank being folded so as to be free
2 of seams through which viscous material may leak when
3 placed in said tray member, and so that said release
4 coating is on the interior surfaces of said tray member;

5 (c) placing said tray member in a supporting
6 structure to support said bottom and sidewalls of said
7 tray member; and

8 (d) filling said tray member through said
9 open end with viscous material at a hot packaging tem-
10 perature whereby said tray member may be removed from
11 said supporting structure after said viscous material
12 has cooled and said upstanding sidewalls of said tray
13 member may be peeled away from said cooled viscous
14 material by unfolding said tray member into a substantially
15 flat configuration to thereby facilitate easy removal of
16 said viscous material.

17 The package and the method recite the preferred
18 feature that the inner tray or liner member is constructed
19 from a substantially flat blank of material by folding
20 of same so as to be free of seams through which the
21 tacky material may leak and yet which may be peeled away
22 from the viscous material after cooling by unfolding the
23 sidewalls into a substantially flat configuration so
24 that the cooled viscous material will simply lie on the
25 substantially flattened blank and may then be easily
26 removed therefrom and used as desired. As no seams are
27 provided during the folding operation, the viscous material
28 will not leak from the tray member. At the same time,
29 when it is desired to remove the viscous material and
30 use same, it is only necessary to remove the tray member
31 from its supporting structure and then unfold the sidewalls
32 and place same in a substantially flat configuration.
33 This latter step of unpeeling is of a much simpler nature
34 than prior art methods which require ripping, tearing or
35 cutting of the liner.

36 A further advantage resulting from use of the
37 substantially flat sheet which is folded into a tray
38 member is the fact that it permits easy automation of
39 the equipment for constructing the packages for the

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1 viscous material and for filling of same. For instance,
2 in the preferred embodiment of the present invention in
3 which the release coating is applied to a corrugated
4 cardboard or fiberboard, the blank may be easily folded
5 in a manner to have an integral bottom and upstanding
6 sidewall and which has sufficient rigidity to maintain
7 its shape so that it may thereafter be easily placed
8 within a supporting structure having the same general
9 configuration as the folded constructed tray member.
10 Such folding operations of a blank of material having
11 the release coating thereon may be performed with conven-
12 tional automated equipment. Likewise, the placement of
13 the constructed tray member within a suitable supporting
14 structure may be performed with automated equipment
15 since the constructed tray member may simply slide or
16 drop into the supporting structure. Further, lip portions
17 on the upper end of the tray may be provided to overlies
18 the edges of the supporting structure to prevent con-
19 tamination. Likewise, the filling of the tray member
20 after placement within the supporting structure may be
21 accomplished with automated equipment as well as the
22 placement of a suitable cover thereover. With the prior
23 art arrangements, the construction of the bag or cylin-
24 drical liners and the placement of same within the cylin-
25 drical drum with the upper edge of the liner folded over
26 the upper edges of the cylindrical drum could not easily
27 be accomplished with automated equipment.

28 A still further advantage in accordance with
29 the present invention relates to the fact that kraft
30 paper having a release coating thereon may be utilized
31 for the liner structure which is less expensive than
32 conventionally used nylon liners which are release coated.
33 While kraft paper having a release coating thereon has
34 been utilized or proposed in the prior art, such prior
35 art structures, as noted above, are of a cylindrical
36 nature and thus present a problem of seaming of same so
37 as to prevent any leakage. While this undoubtedly could
38 be accomplished, it could only be accomplished at a
39 relatively substantial expense in comparison to simple

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1 folding of a substantially flat blank into a tray member
2 having a bottom and integral upstanding sidewalls. Thus,
3 the present invention allows for a reduction in cost.

4 The invention in its broader aspect is not
5 limited to the specific details shown and described and
6 departures may be made from such details without departing
7 from the principles of the invention and without sacrific-
8 ing its chief advantages.

CLAIMS

- 1 1. A packaging container for viscous tacky
2 polymers or other materials which have a tendency to
3 cold flow at ambient conditions, with or without added
4 pressure, comprising:
 - 5 (a) a seamless inner tray composed of a scored
6 liner which has been surface treated with a release
7 agent for tacky viscous material;
 - 8 (b) a single or multiwall corrugated support
9 sleeve into which the inner tray is inserted;
 - 10 (c) an outer box which serves as a container
11 for the tray and support sleeve.
- 12 2. The packaging container of claim 1 made
13 free of fiber contamination by the inner release tray
14 folding over the top edges of the support sleeve and
15 locking between the sleeve and the outer box.
- 16 3. The packaging container of claim 1 wherein
17 the scored liner is a sheet of paper, either laminated
18 to a corrugated board or to a fiber board and which has
19 been treated with a suitable release agent.
- 20 4. The packaging container of claim 1 wherein
21 one or more trays are placed in the outer box (c) which
22 has suitable strength, crush strength and puncture resis-
23 tance for storage and/or shipping.
- 24 5. The packaging container of claim 1 wherein
25 the laminate for the scored liner is a silicone treated
26 (and cured) kraft paper having a Kiel release of less
27 than 10 grams.
- 28 6. The packaging container of claim 1 wherein
29 the laminate for the scored liner is a polymeric film
30 such as a polyester or heat stabilized nylon, and the
31 polymer is treated with a suitable cured release agent
32 having a Kiel release of less than 10 grams.

1 7. The packaging container of claim 1 wherein
2 the cover for the outer box extends completely over the
3 entire outer box top to minimize paper fiber contamination
4 of the product contained therein.

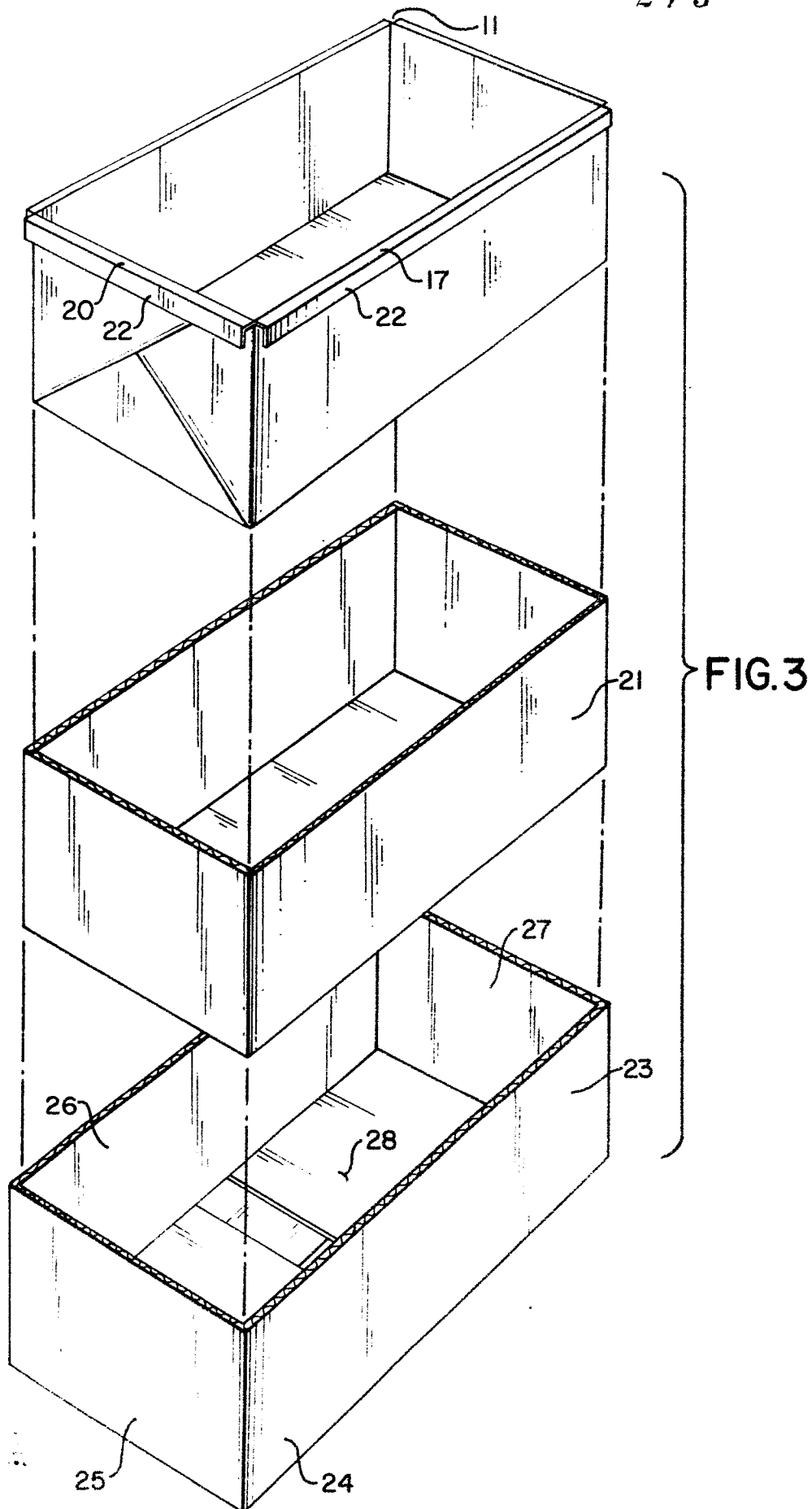


FIG. 4

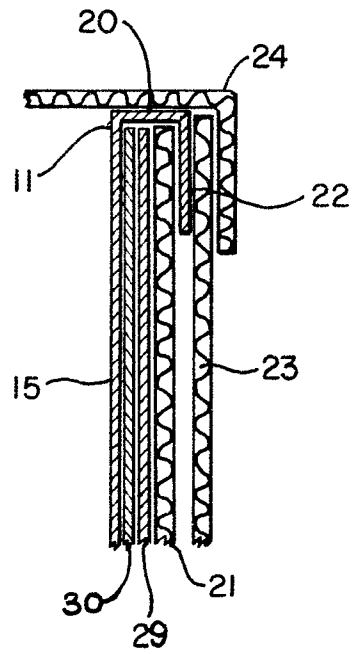


FIG. 5

