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54 **Container and base.**

57 A one-piece formed base (1) for a container which is preferably formed by means of vacuum forming or spin-or blow-moulding is provided, an upper face of which provides a platform forming the base of a container, the lower end of the side wall(s) (11,13) of which is/are located in a continuous peripheral groove (5) in the upper face of the platform (1). On its underside the base is provided with pairs of parallel intersecting channels (7) providing multi-way entry for the forks of a forklift truck. The container can be made of heavy duty fibreboard and be provided with a traditional lid, and is normally fitted with an internal liner bag so that it can be used for powders, granular material and the like. The platform may be dished (30) so that its centre can rest on a support surface and the container may be square, rectangular or of any other shape, such as octagonal.

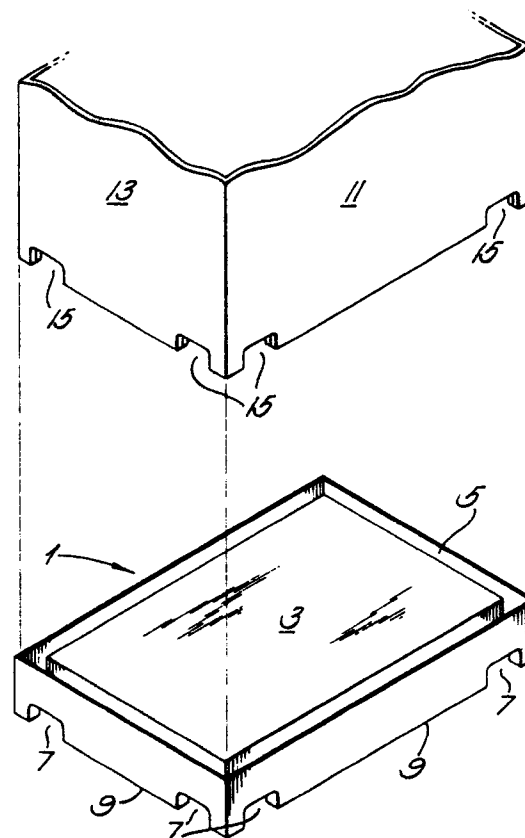


FIG. 1.

CONTAINER AND BASE

This invention relates to a container and a base therefor and more specifically to a base for a container for carrying large quantities of chemicals, powders, granules, semi-liquids, liquids, or similar products. It will be appreciated, however, that the container could be used for many other different purposes.

In the recent past, especially with the advent of containerisation, it has been normal to transport bulk chemicals, and for that matter many other granular, powdered and even liquid materials, in what are known as Intermediate Bulk Containers - (IBCs). IBCs normally comprise some form of box which may be made of multi-layer corrugated fibrous material of largely traditional construction which is supported on a traditional pallet base. Normally a liner is provided within the box. While such IBCs have been commercially acceptable they do suffer from certain disadvantages, one being that traditional pallets are normally of slatted construction and hence are not waterproof. This means that under certain conditions the base at least of the fibrous box on the pallet can easily get wet and lead to failure of the container. To some extent this problem can be reduced by incorporating a waterproof laminate in the corrugated material of the box or by treating the box in some way so as to make it at least water resistant.

Other disadvantages associated with traditional IBCs are that the pallets are relatively heavy, have a limited life, are bulky and have to be provided with various means for locating the box on them. Furthermore, the box itself has to be provided with a traditional base even though the pallet on which the box will rest is normally sufficiently strong to support the contents of the box. This base can be formed either from a separate lower end cap or from the traditional end flaps foldably connected to the lower edges of the side walls of the box.

The disadvantages of wooden pallets for use in conjunction with corrugated fibrous boxes are known, and it has been proposed in US-A-4550830 to use a plastics pallet having a groove around its periphery which receives the bottom edge of a sleeve of corrugated fibrous material. The plastics base is vacuum formed from two sheets of polymeric material, and apertures are provided in each layer through which tabs on the sleeve may be passed, and then folded over, to attach the sleeve to the pallet. In this construction, it is suggested that the problem of transferring compressive forces from the sides of the container resulting from the weight of other containers stacked on top, to the pallet without it deforming, is solved. To achieve this, the compressive forces are said to be trans-

ferred substantially directly to the supporting surface, e.g. a warehouse floor, thereby minimising deformation of peripheral portions of the pallet. In fact, this problem is not solved satisfactorily with this prior art proposal, because of the way the pallet is formed. The groove is formed in the upper layer of the pallet only, and because the pallet is vacuum formed from two sheets, there is a small clearance between the under or inner side of the top sheet and the upper or inner side of the bottom sheet, which means that the groove is not supported on the supporting surface until the top sheet has deformed very slightly.

There is a further major problem with this prior art container, in that the corrugated fibrous sleeves, when the containers are stacked in the open air, at least of those containers on the ground, easily get wet and thus the sleeves totally lose their stacking strength. This is because the pallets are not waterproof from beneath, because of the apertures therein for the locking tabs. This means that if put down by a fork lift truck into a shallow puddle, there is a real risk of the container and its contents getting damaged. Furthermore, even upper containers in a stack can get wet, since water can collect in the groove of a top of a container on which another container is stacked, and this water can then penetrate through the apertures of the base of this other container.

We have now developed an improved container and pallet base which does overcome the stacking problem, and which does not suffer from the disadvantages mentioned above.

According to the broadest concept of the present invention, we provide a base for a container comprising a platform having on its upper face a groove extending around or adjacent the periphery of the platform to receive the lower edge of the or each side wall of the container, the underside of the platform being suitably shaped to enable a loaded base to be handled with a forklift truck or the like, wherein the platform is formed in one piece, and in which the groove is continuous and devoid of apertures therein, so that the base provides a completely waterproof barrier to prevent water and moisture from penetrating the base from its underside and reaching the lower edges(s) of a sleeve when one is located in said groove.

It is preferred that portions of the base in which the groove is formed provide support areas for the base so that they will bear directly on a flat support surface for the base.

Also according to the present invention, we provide a container comprising a base as described above, at least one side wall extending upwardly from the base, the lower edge of the or each side wall being located within and constrained by the groove in the upper face of the platform and a lid for the container which may be formed by means of integral flaps or a separate top.

Preferably, a liner is located within the container and is confined by the or each side wall.

Preferably, the base is formed from a synthetic resinous material, e.g. by means of a vacuum forming, rotational (or spin) moulding, or blow-moulding process, and is shaped on its underside so as to provide a four-way entry for the forks of a forklift truck.

That portion of the upper face of the platform located within the groove is preferably flat, but alternatively it could be dishd so that its centre is at the same level as the periphery on the underside so that it can assist in supporting the contents of the container. This also has the advantage of lowering the centre of gravity of a filled container. Furthermore, the platform may be shaped at each corner to support internal or external supports to provide extra strength for when similar containers are stacked one upon another and/or to enable the strength of the side walls which would normally be made of corrugated fibreboard to be reduced.

If desired, a central area of the platform may be formed with one or more lines of weakness to enable a central panel to be removed from the platform to allow central discharge of the contents of the container.

The base may incorporate ribs therein to increase its strength or alternatively to allow it to be formed from thinner material.

It is also envisaged that the container may be provided with a formed one-piece lid of similar material to the base and it is also envisaged that the lid could be connected to the base by means of a synthetic resinous sleeve bonded between the base and lid, suitable side walls subsequently being located within the groove in the base to form the container.

Normally, the base would be square in plan but it could be of different rectangular shape or in certain instances round or multi-sided, for example, octagonal or hexagonal. Normally, the stacking strength of a container is increased in relation to the number of vertically extending folds in its side wall.

Several embodiments of the invention are now described by way of example with reference to the accompanying drawings, in which:-

FIGURE 1 is a perspective schematic view of one embodiment of moulded container base showing the lower portion of the side walls of the container about to be fitted to the base;

FIGURE 2 is a plan view of an alternative construction of container base;

FIGURE 3 is a half sectional elevation on the line X-X of the base shown in Figure 2;

FIGURES 4 and 5 show respectively perspective schematic views of two further alternative embodiments of container and base therefor, and

FIGURE 6 is a view similar to Figure 1 showing a yet further alternative construction of base and side walls for assembly therewith.

In the drawings, like parts in the various different views are identified with the same reference numerals.

Referring now to Figure 1, there is shown a moulded synthetic resinous base 1 having on its upper face a platform 3 around the periphery of which is formed a continuous upward facing groove 5. The base is provided on its lower face with intersecting channels 7 extending between opposite side edges of the base of sufficient size and of the required spacing to allow four-way entry of the forks of a forklift truck for handling purposes, the base otherwise having a lower peripheral edge portion 9 for resting on a suitable support surface. The base is formed in one piece, for example by a vacuum forming or blow-or spin-moulding technique, and is formed of a material which is sufficiently strong to support loads of at least 500kg without excessive buckling and it should also be hardwearing and able to withstand extremes of temperature. Suitable materials for the base are, e.g. high impact A.B.S. and high impact polyethylene and certain similar recycled material.

The base is designed to form the bottom of a container such as an Intermediate Bulk Container, two of the side walls of which are shown at 11 and 13. Although it is envisaged that these side walls could be made of many different materials, it is preferred for cost purposes that they are made of multi-wall corrugated fibreboard which may incorporate a barrier laminate or be treated in some other way so as to be water-resistant. Figure 1 shows a rectangular container but other shapes are of course possible. The container shown in Figure 1 therefore has two pairs of opposite side walls which are formed into a rectangular sleeve in known manner. The groove 5 in the base 1 extends the full depth of the base, save for the thickness of the material of the base at its bottom edge 9, and is of a width sufficient snugly to receive and confine the lower edges of the side walls 11 and 13 (and those not illustrated). These lower edges are therefore provided with cut-outs 15 to accommodate the material defining the channels 7 in the base. Of

course, if the four side walls of the container are held in their sleeve formation with the aid of a glue or stapling flap, provision for accommodating this should be made in the groove 5. Alternatively, the extra thickness of board material may be omitted where the bottom edge of the sleeve locates in the groove 5.

The construction shown in Figures 2 and 3 differs from that of Figure 1 in that instead of having a flat central platform 3, a dished platform 30 is provided within the continuous peripheral groove 5. Accordingly, the platform has a first inwardly and downwardly inclined portion 31 closely adjacent each edge of the base merging with a flat region 33 which forms the upper surface of that portion of the wall of the base which defines the top of the intersecting channels 7. The flat portions 33 merge with further downwardly and inwardly inclined portions 35, the inner edges of which are connected to a rectangular central portion 37, the lower face of which is at the same level as the lower edge 9 of the side walls of the base. In this construction, therefore, a load on the base is supported centrally by the rectangular portion 37 as well as peripherally by the edges 9. It will be appreciated that rectangular portion 37 could be of a different shape, and that the relative sizes and shapes and inclinations of the various portions making up the platform may be different from those illustrated.

In the construction shown in Figure 4, an assembled container is illustrated in which the top edges of the side walls are provided with inwardly turned flaps 17. The base 1 differs from that shown in Figure 1 in that it is specially formed with projecting portions 41 to receive external corner supports 43 extending upwardly to the same height as the side walls 11 and 13 of the container. These supports may be formed in any traditional manner, e.g. from strips of timber nailed together so as to have a fixed together, right-angled section which can be used to embrace the four corners of the container, thus providing protection for the container. Their main purpose, however, is to provide stacking strength and while their lower ends are of course confined by the portions 41 of the base, their upper ends are held in contact with the container side walls by means of one or more straps 45.

In the construction shown in Figure 5, a container and base 1 provided with internal stacking supports 47 is shown. The lower ends of the supports 47 are accommodated in suitable sockets - (not shown) formed in the upper face of the base 1 and the supports 47 are otherwise maintained in their upright positions in the corners of the container by straps of corrugated fibreboard 49 formed out of the material of the side walls of the container in known manner.

Figure 6 shows an octagonal container and base therefor. In other respects the container and base incorporate some of the features of the construction shown in Figure 1 and some of the features of the construction shown in Figures 2 and 3 but in this case eight intersecting channels 70 are provided in the base and there are of course eight side walls upstanding from the continuous octagonal groove 5 in the base 1. The additional number of fold lines separating adjacent side wall panels from each other gives added stacking strength to the container.

The above described containers can of course be of any size but they are particularly designed for use as Intermediate Bulk Containers capable of carrying at least 500kg of powdered, granular or liquid material. Normally, the containers are provided with an internal liner bag which will rest upon the platform of the base and when filled can simply be tied off or sealed in some other manner at the top. The container can then be closed in known manner either by folding in integral top closure flaps or by fitting a cap on top. The filled container would then normally be connected to the base 1 using straps or the like.

In order to reduce ingress of dust, dirt, water and the like into the groove 5 when the container is in use, it is preferred that a wide strip of self-adhesive tape be applied to the joint between the side wall(s) and the base so as completely to seal the joint. This means that any material hitting a side wall of the container will not fall down into the groove 5 but instead will slide down the side edge of the base onto the ground.

From the foregoing it will be appreciated that the present invention provides a new construction of base for a container and container with base and the one piece formed plastics base is wholly waterproof from its underside and thus even if a filled container is dropped into a pool of water, any water splashing upwardly cannot seriously damage the container. Furthermore, because the base is solid and forms the bottom of the container and also confines the bottom of the side walls of the container, it is not necessary to provide bottom closure panels on the side walls of the container. Furthermore, because of their construction, the bases are just as strong as wooden pallets but need not be so heavy and although individual bases are of the same order of size as individual wooden pallets, the bases of the present invention will almost completely nest one within another and hence when not in use can be stacked very compactly. Also, the side walls of the container with which the bases are to be used can be folded flat until required. The side walls can be formed from triple fluted corrugated board and are therefore very strong. Furthermore, because their bottom edges are formed

to fit within the groove 5, portions of the bottom edge between the cut out 15 rest in portions of the groove 5 which themselves rest on a support surface for the platform, e.g. directly on the ground. This provides a 'pallet-box' with substantial stacking strength.

Furthermore, since the bases are formed by a moulding or forming operation it is possible specifically to design them to accommodate internal or external stacking supports to increase stacking strength even more. With a traditional wooden pallet, complicated measures have to be taken to locate stacking supports, e.g. the provision of special metal attachments or the like.

A further advantage with the bases of the present invention is that for heavy materials they can be provided with a dished platform, the centre of which can be at the same level as the periphery of the base, thereby providing additional support for the contents of the base and its container and at the same time lowering the centre of gravity of a filled container. It is almost impossible to do this with a traditional pallet. Furthermore, such dished bases can be specially formed with lines of weakness to assist with central discharge should this be desired, e.g. for free-flowing dry goods, liquids or semi-liquids.

It is also envisaged that the bases of the present invention could be used in conjunction with pre-formed or moulded tops which could be connected to the bases with plastics sleeves which would be bonded at their ends to the base and top respectively, thereby providing a waterproof or powder-proof container. The bases with their connected tops, when empty, could be stacked relatively compactly and when they are required for use, side walls could be fitted, thereby effectively acting to confine the plastics sleeve and providing spacers to space the tops, which would have a removable lid, from the bases.

A further advantage of the present invention is that the bases would have a longer life than timber pallets, would be economical to re-use in that they can be nested together and returned to the original supplier who would fit new side walls, and they can be kept much cleaner and will therefore be more hygienic than wooden pallets.

It is envisaged that strength of the base could be maintained by reducing the thickness of the material of the base and building ribs into the material; alternatively, the ribs could be used to increase the strength of the base. Furthermore, it is preferred that mid-way along each edge of the base and at the corners, enlarged recesses 80,81 - (see Figure 2) are provided which merge with the

groove 5. These make the base easier to mould, and easier to stack when empty. They can also assist with locating a filler liner within the sleeve on the base.

It will of course be understood that the present invention has been described above purely by way of example, and modifications of detail can be made within the scope of the invention.

For example, the underside of the platform 3 could be level with the top of the channels 7. This would mean the top of the platform 3 would be located below the upper peripheral edge of the base 1.

Furthermore, the construction shown in Figure 6 may have only two pairs of channels 70 intersecting at right angles to provide traditional four-way entry for a forklift truck's forks.

Claims

1. A base for a container, said base comprising a platform (1) having on its upper face (3) a groove (5) extending around or adjacent the periphery of the platform to receive the lower edge of the or each side wall (11,13) of the container, the underside of the platform being suitably shaped (at 7) to enable a loaded base to be handled with a forklift truck or the like, characterised in that the platform - (1) is formed in one piece, and that the groove (5) is continuous and devoid of apertures therein, so that the base provides a completely waterproof barrier to prevent water and moisture from penetrating the base from its underside and reaching the lower edge(s) of a sleeve (11,13) when one is located in said groove (5).

2. A base according to claim 1 characterised in that portions of the base (1) in which the groove (5) is formed provide support areas for the base so that they will bear directly on a flat support surface for the base (1).

3. A container comprising a base (1) as claimed in claim 1, at least one side wall (11,13) extending upwardly from the base, the lower edge of the or each side wall (11,13) being located within and constrained by the groove (5) in the upper face (3) of the platform (1) and a lid (not shown) for the container.

4. The invention as claimed in claim 1, 2 or 3 characterised in that the base is formed from a synthetic resinous material and is shaped on its underside (at 7 or 70) so as to provide four-way entry for the forks of a forklift truck.

5. The invention as claimed in any one of claims 1-4 characterised in that that portion of the upper face of the platform (3) located within the groove (5) is flat (Figure 1).

6. The invention as claimed in any one of claims 1-4 characterised in that portions of the upper face of the platform (3) located within the groove (5) is dished (30, Figures 2,3) so that its centre is at the same level as the periphery on the underside of the base so that it can assist in supporting the contents of the container.

7. The invention as claimed in any one of claims 1-6 characterised in that the platform (3) is shaped at each corner (41) to support internal (47) or external (43) supports to enable similar containers to be stacked one upon another and/or to enable the strength of the side walls (11,13) which would normally be made of corrugated fibreboard to be reduced.

8. The invention as claimed in any one of claims 1-7 characterised in that a central area (37) of the platform (3) is formed with one or more lines

of weakness to enable a central panel to be removed from the platform to allow central discharge of the contents of the container.

5 9. The invention as claimed in any one of the preceding claims characterised in that ribs (not shown) are incorporated in the base to increase its strength or alternatively to allow it to be formed from thinner material.

10 10. The invention as claimed in any one of the preceding claims characterised in that the container is provided with a formed one-piece lid of similar material to the base and the lid is connected to the base by means of a synthetic resinous sleeve bonded between the base and lid -
15 (not shown).

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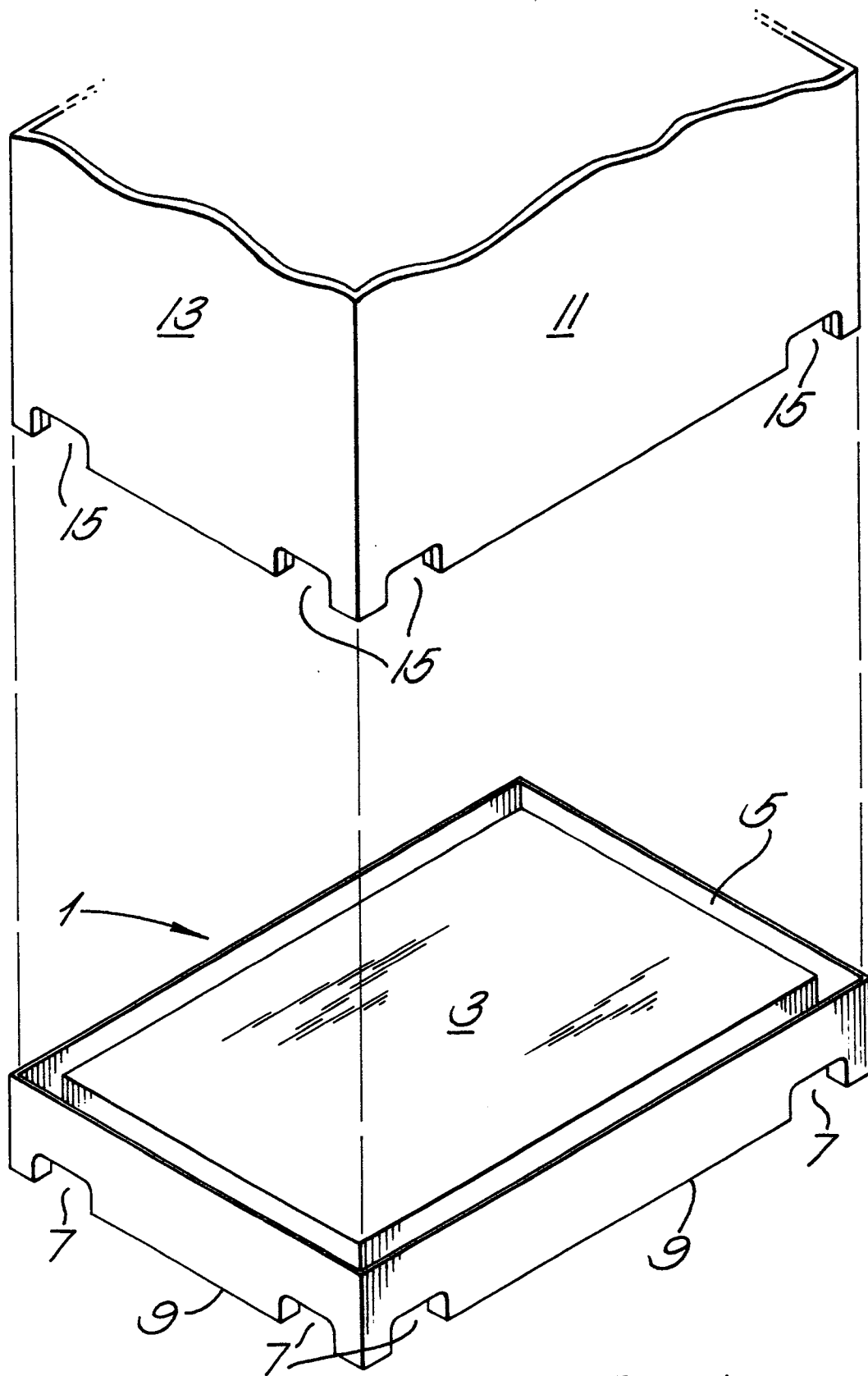
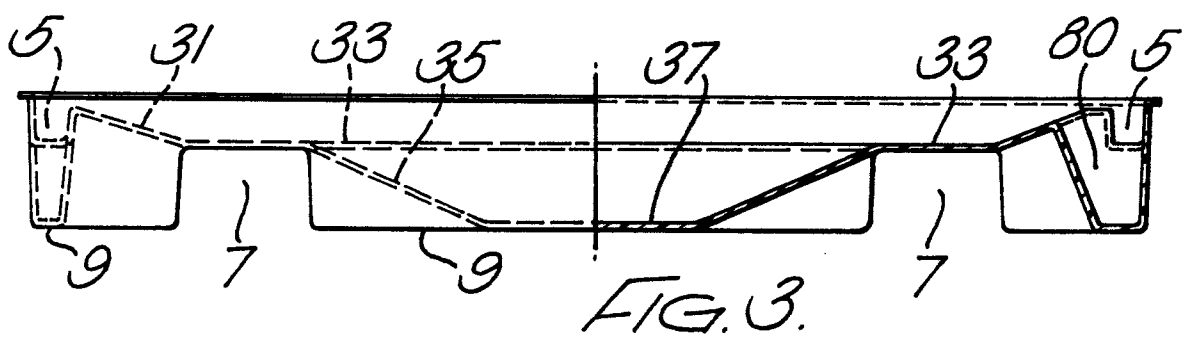
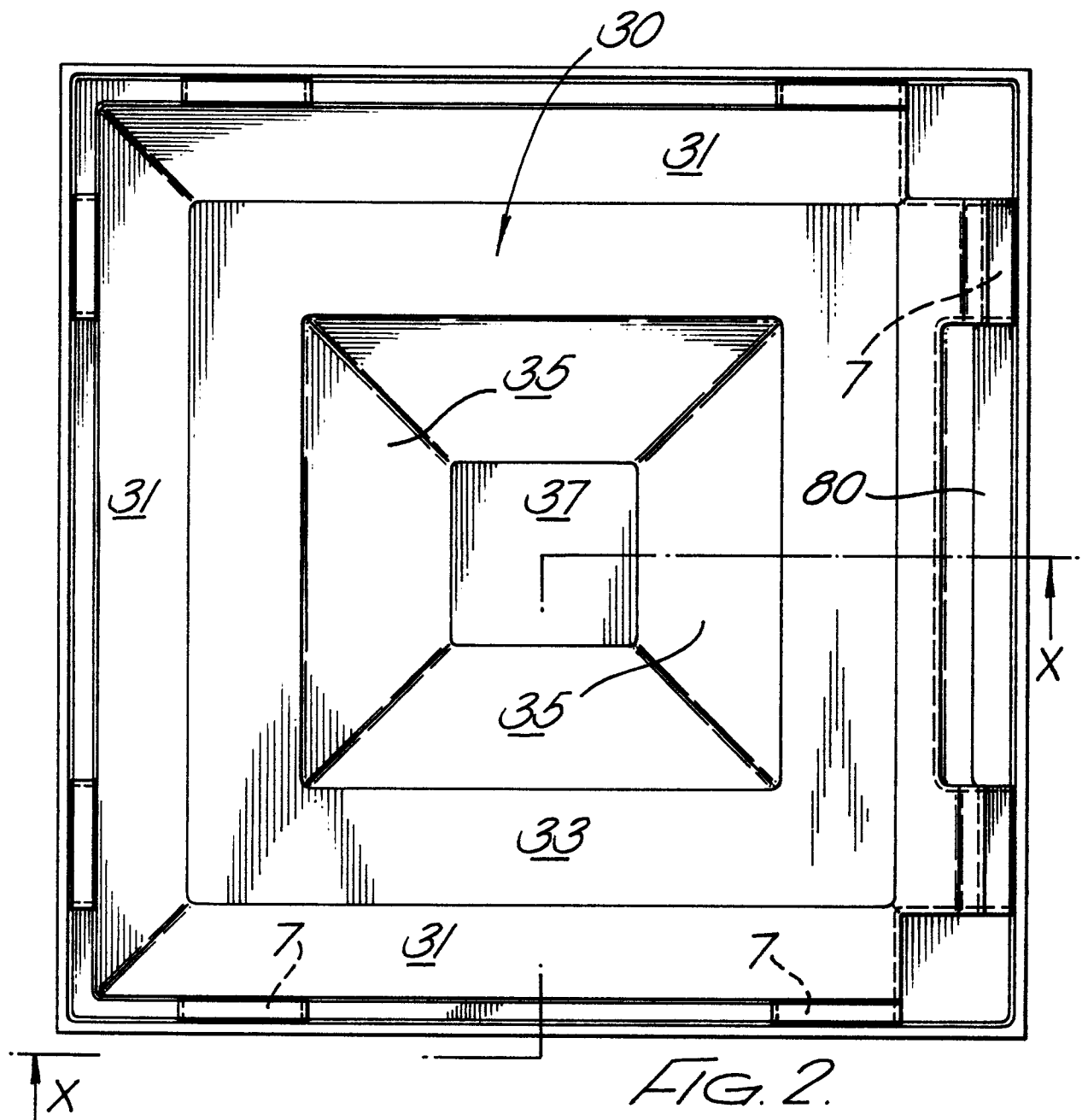
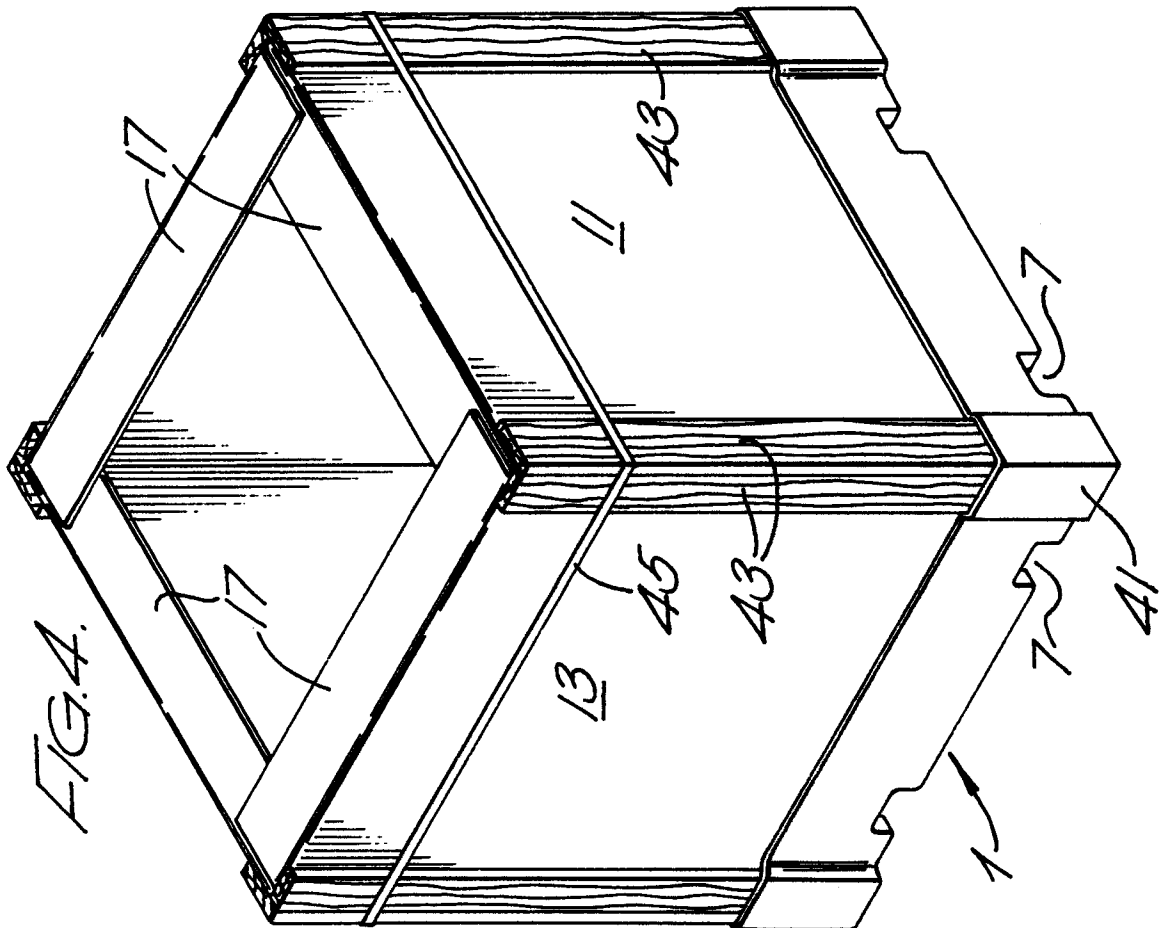
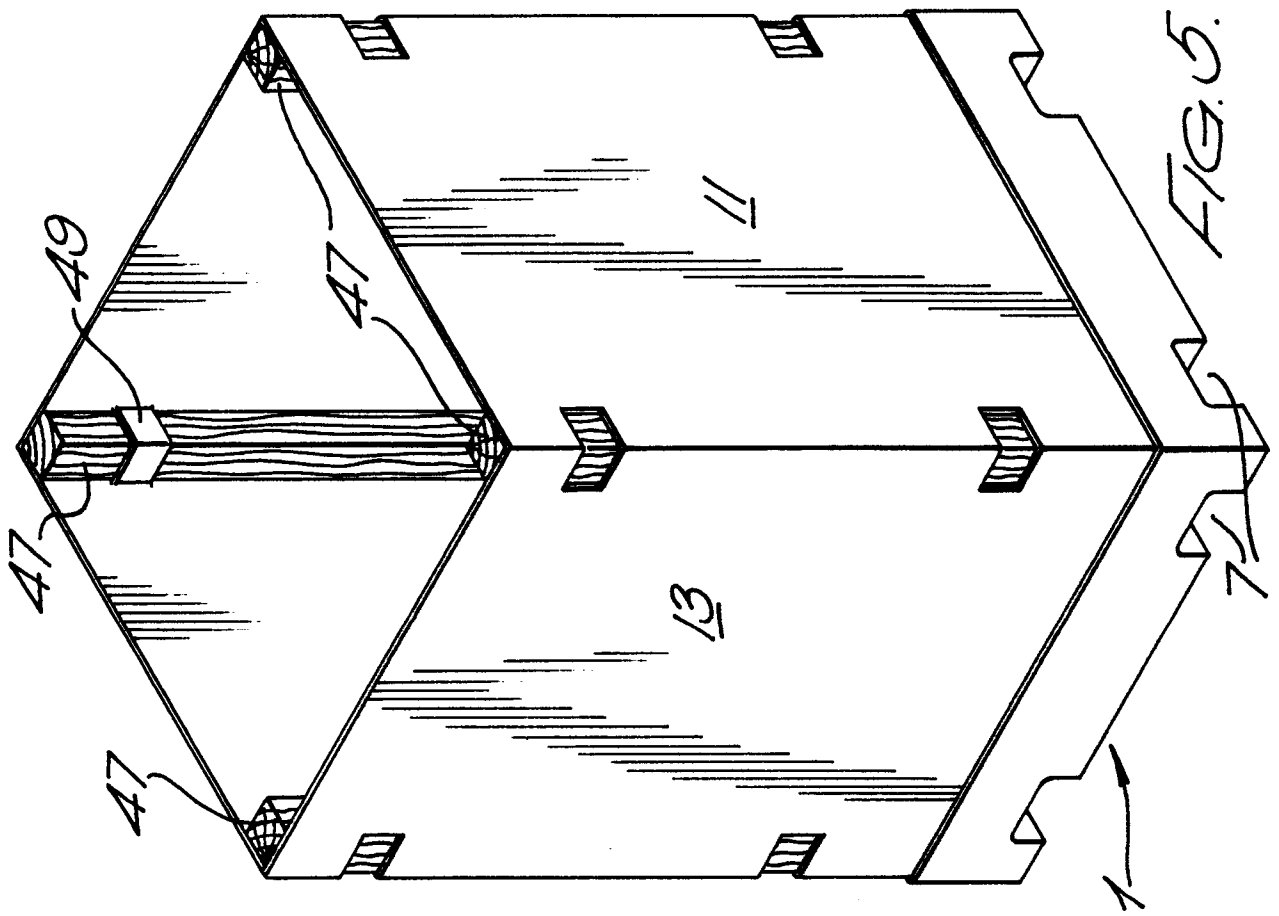


FIG. 1.





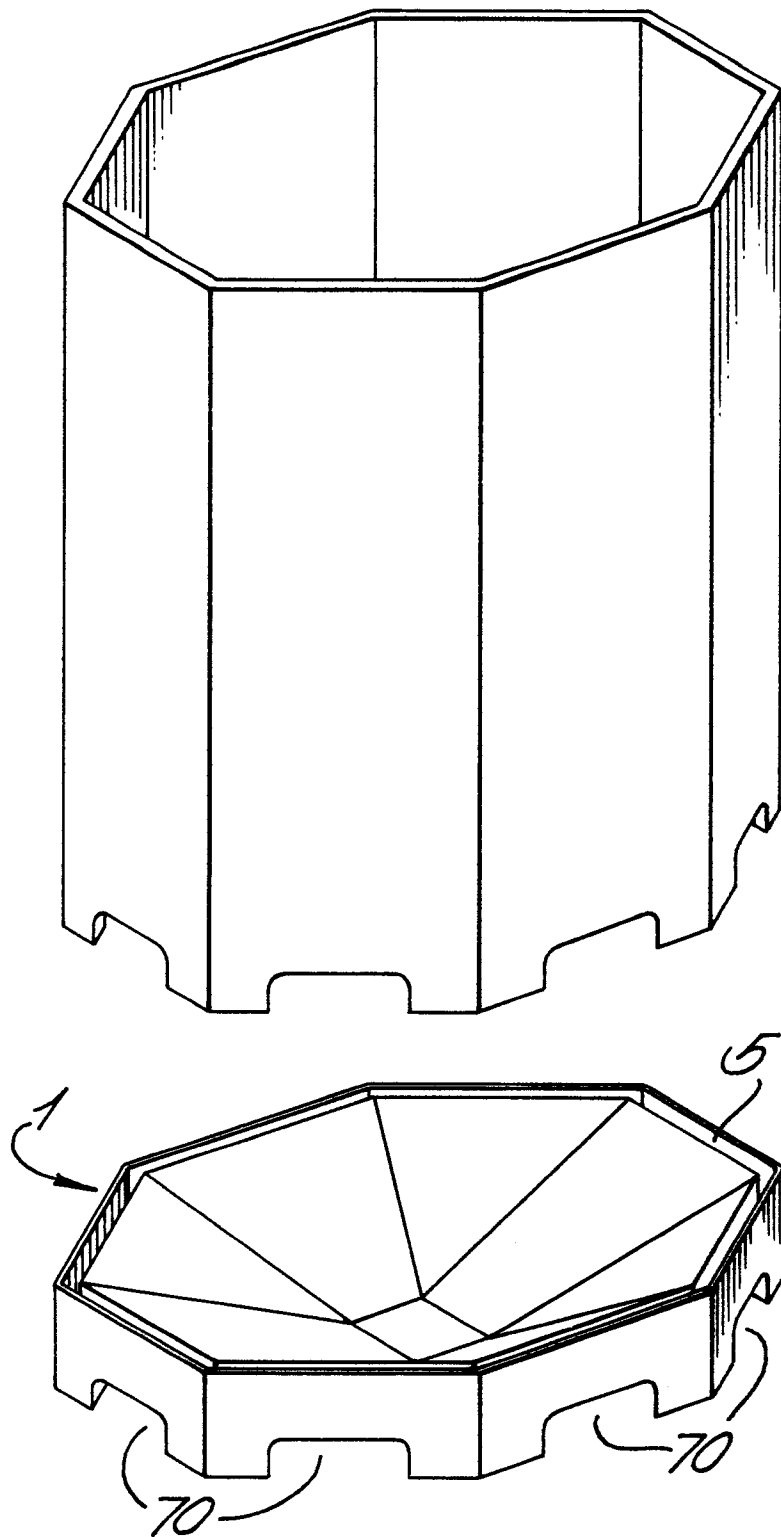


FIG. 6.