# United States Patent

[11] 3,583,626


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[73] Assignee **Overton Company Smithfield, N.C.**


[54] **REINFORCED CONTAINER**
**10 Claims, 13 Drawing Figs.**


[52] U.S. Cl. ..... 229/23, 229/14, 229/37, 217/12
[51] Int. Cl. ..... B65d 5/02
[50] Field of Search ..... 229/23, 14, 37, 49; 217/12



[56] **References Cited**
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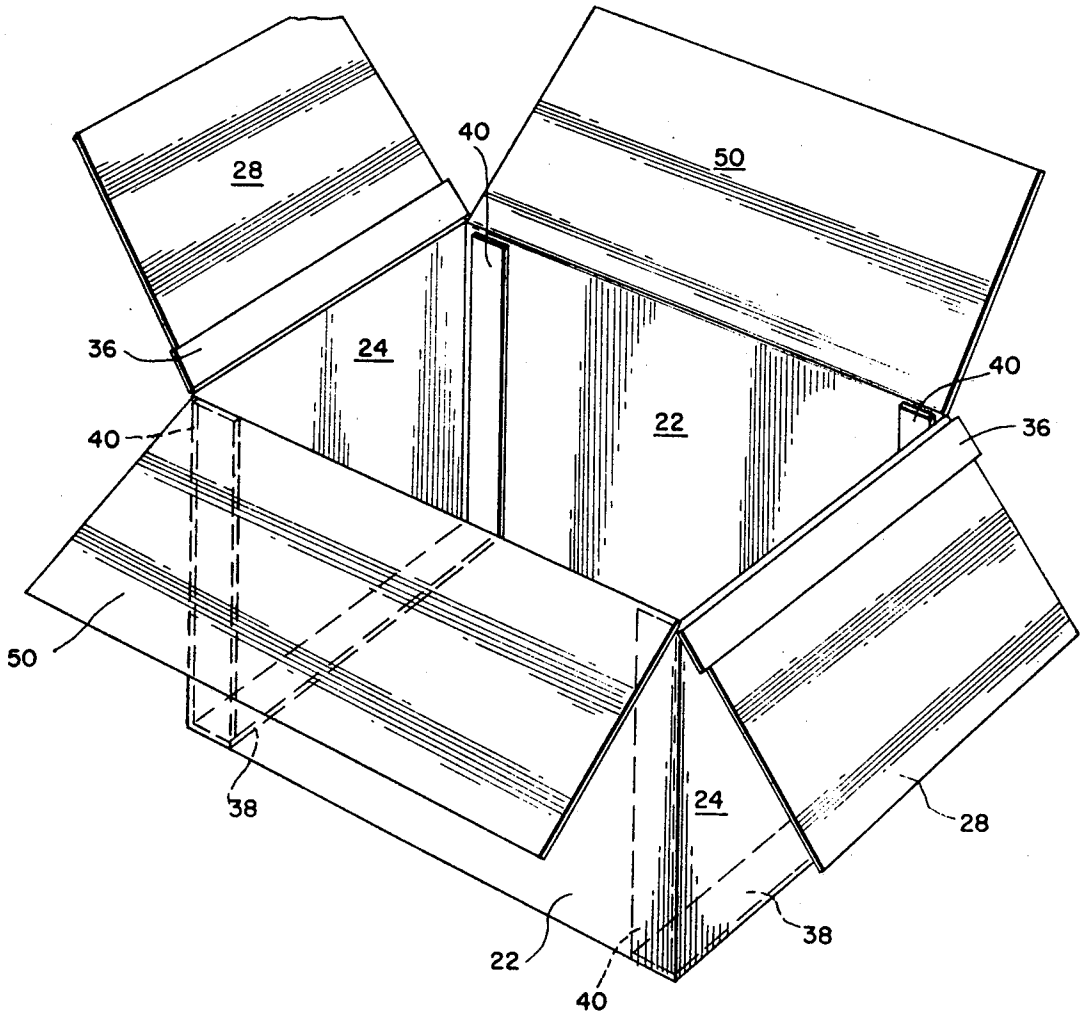
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**ABSTRACT:** Containers formed from foldable fiberboard blanks are reinforced by a pair of structural frames spaced inwardly from each end of the container. The frames are formed by side cleats attached on the sidewalls of the container and by top and bottom cleats attached on top and bottom flaps, respectively. The ends of the top cleats are seated on the upper edge of the side cleats, and the side cleats are seated on the upper edge of the bottom cleats.

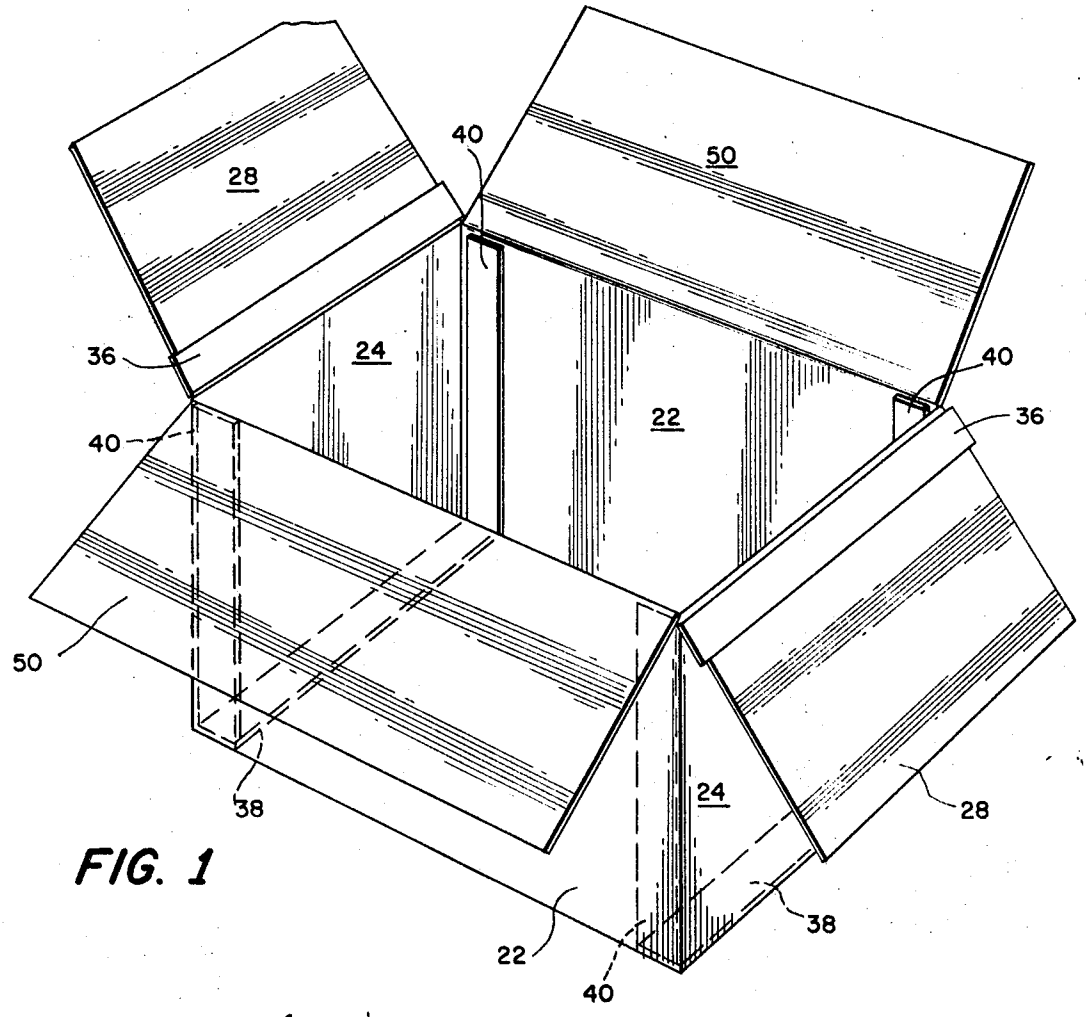



FIG. 1

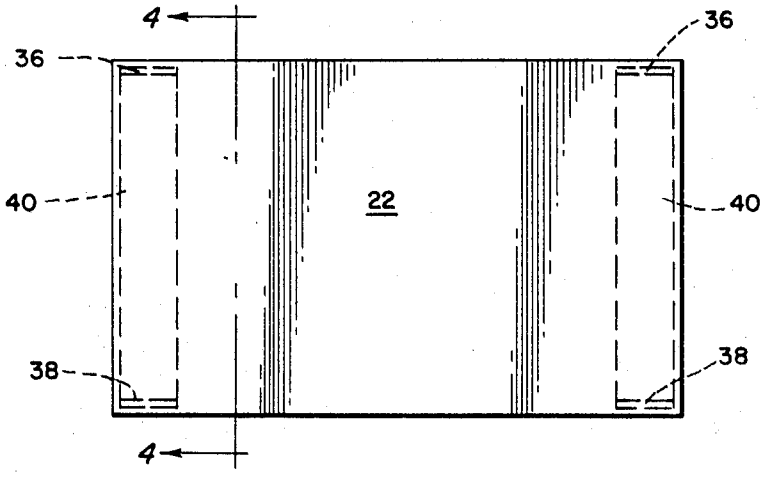



FIG. 3

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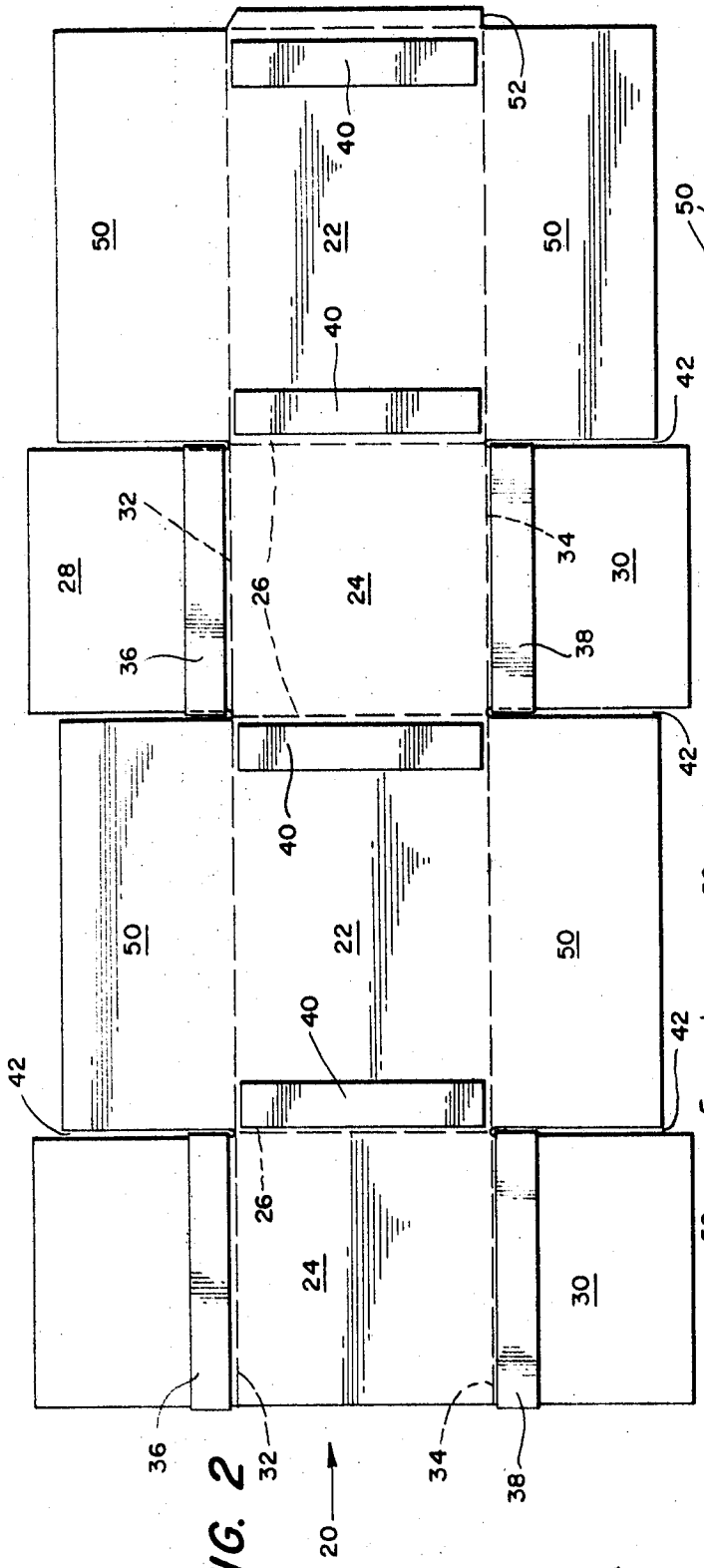



FIG. 2

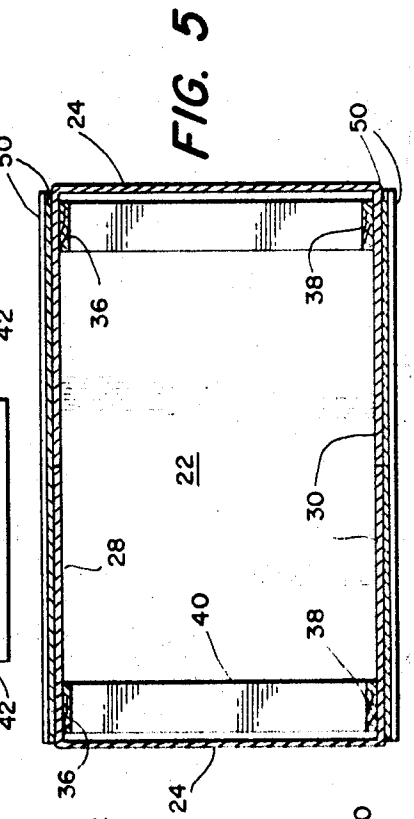



FIG. 5

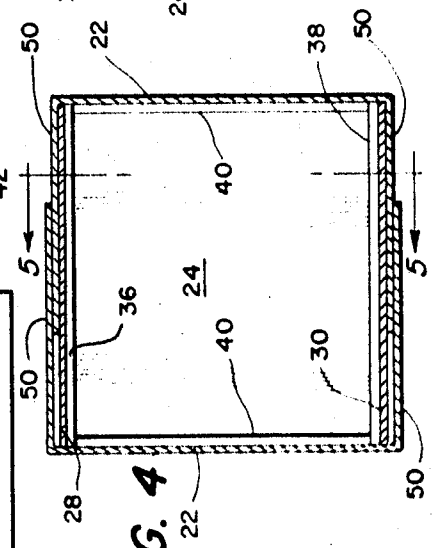



FIG. 4

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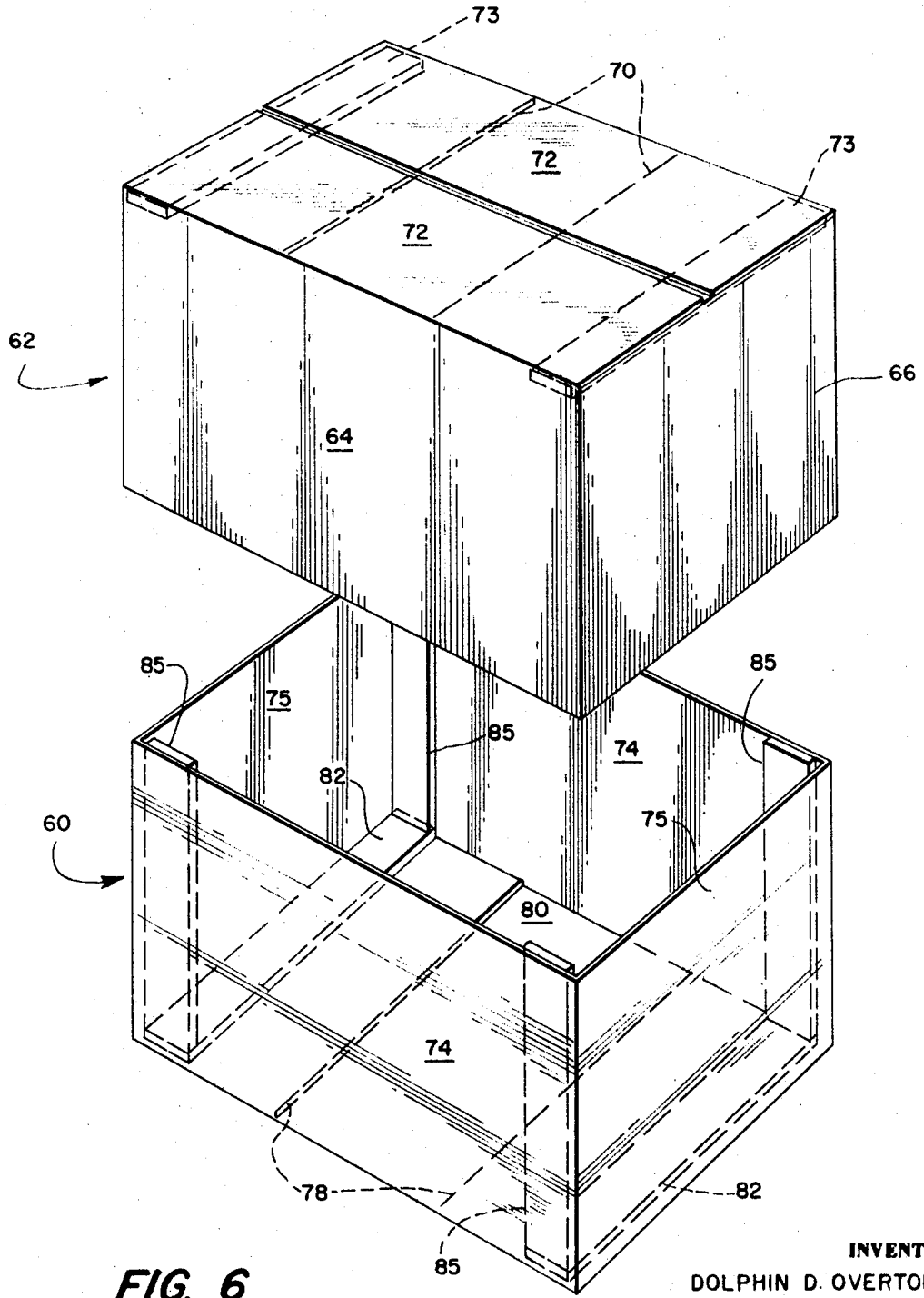



FIG. 6

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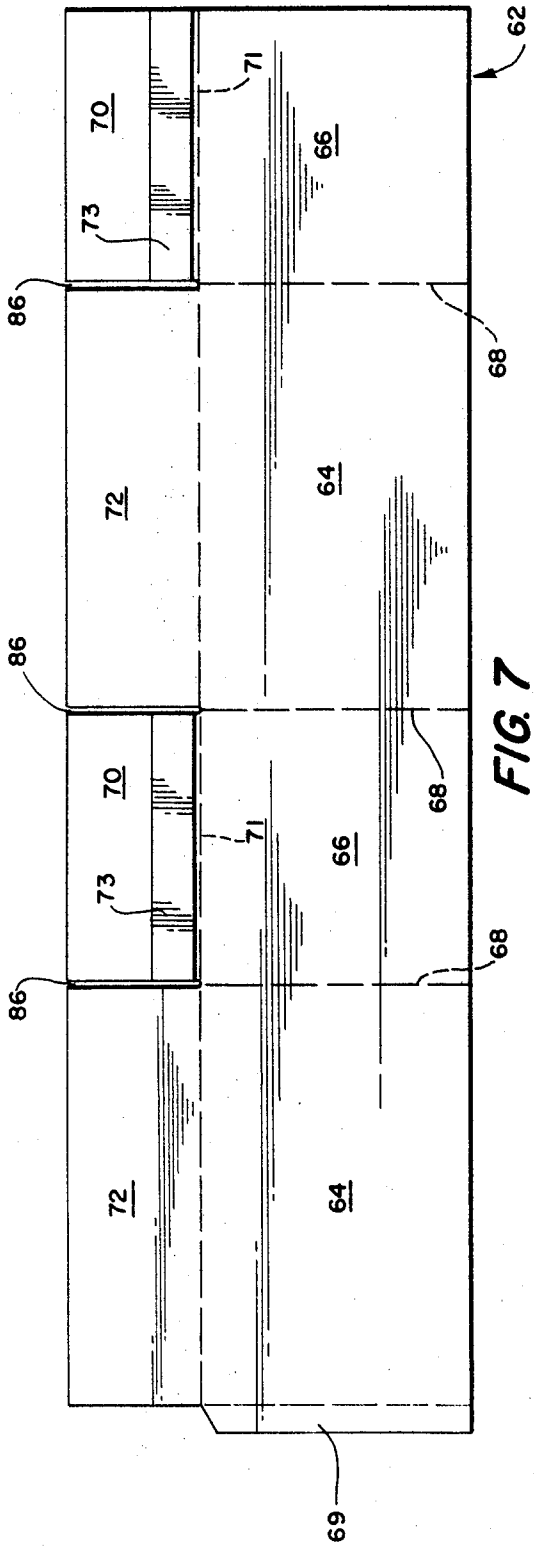



FIG. 7

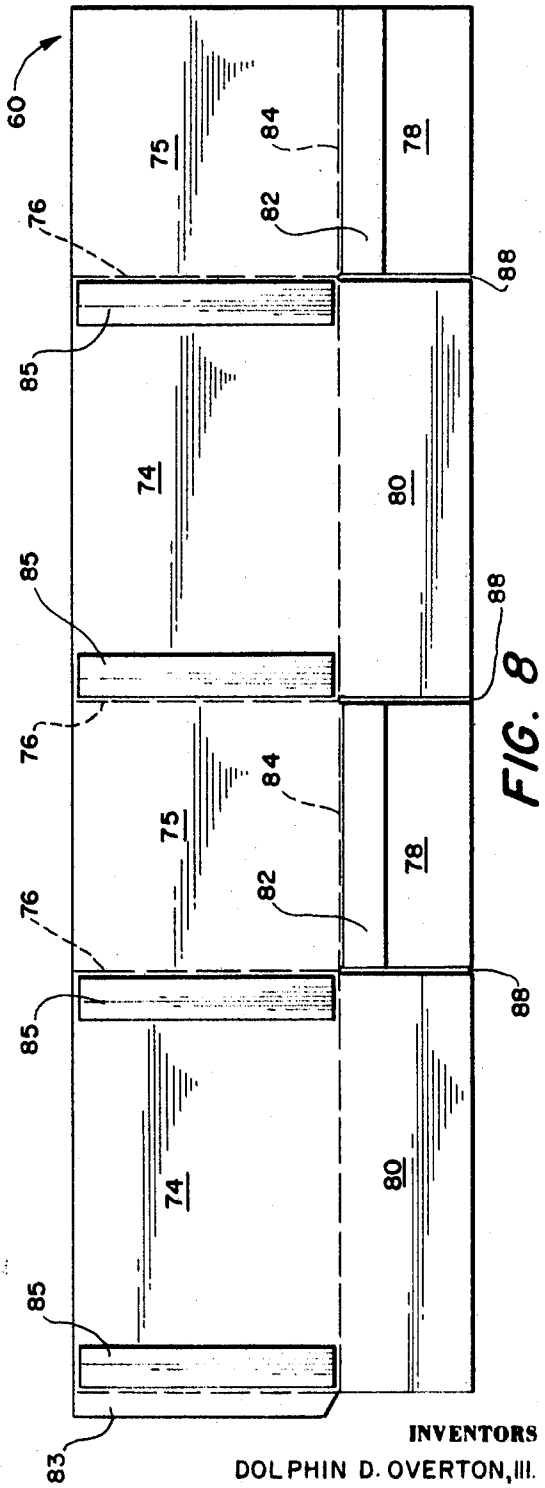



FIG. 8

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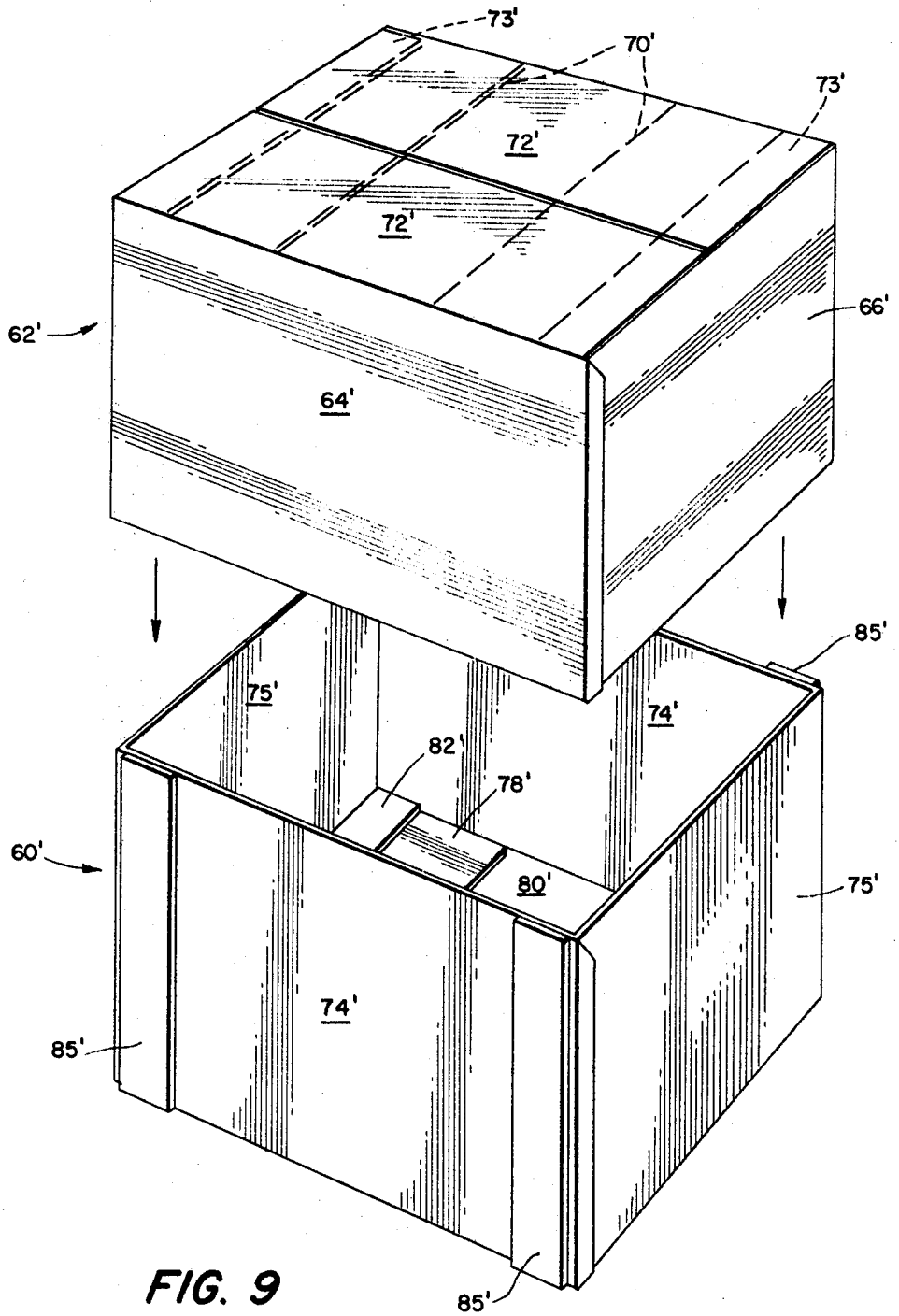



FIG. 9

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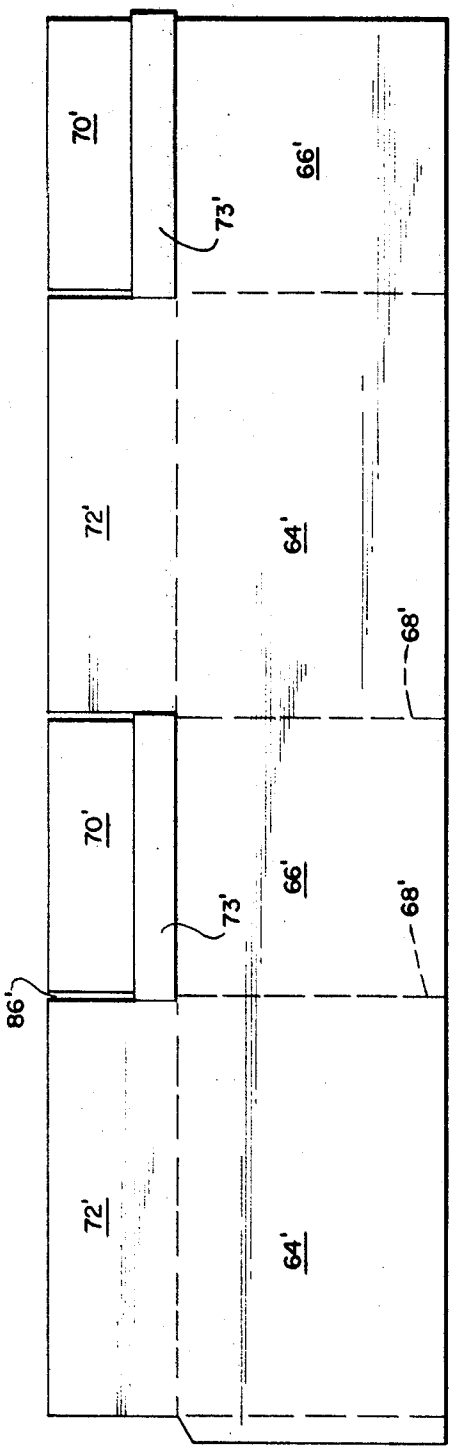



FIG. 10

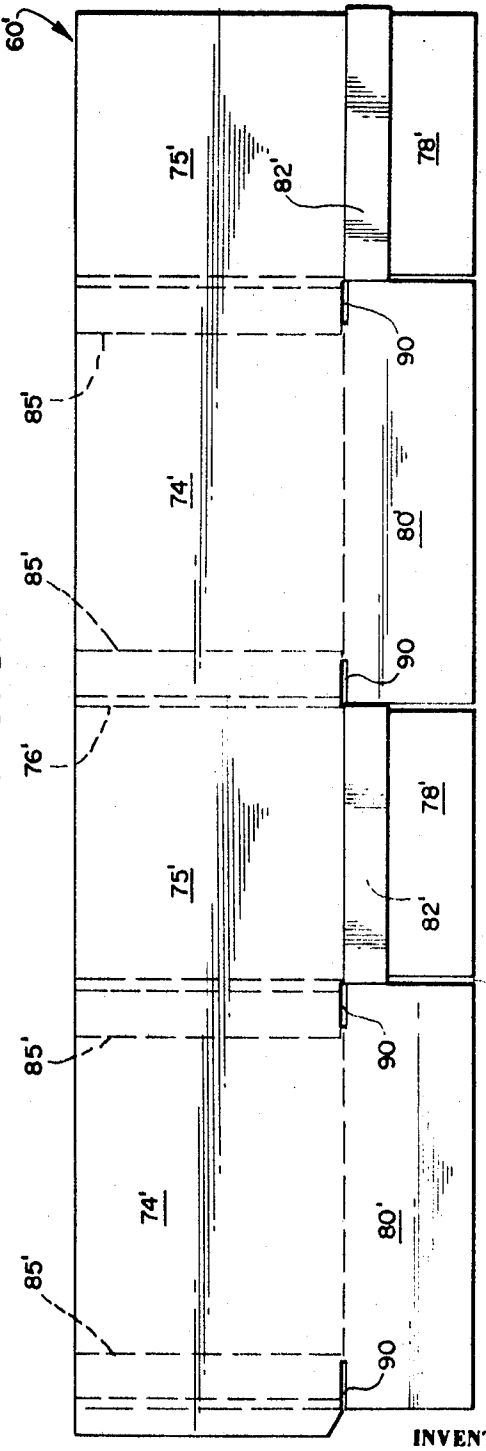



FIG. 11

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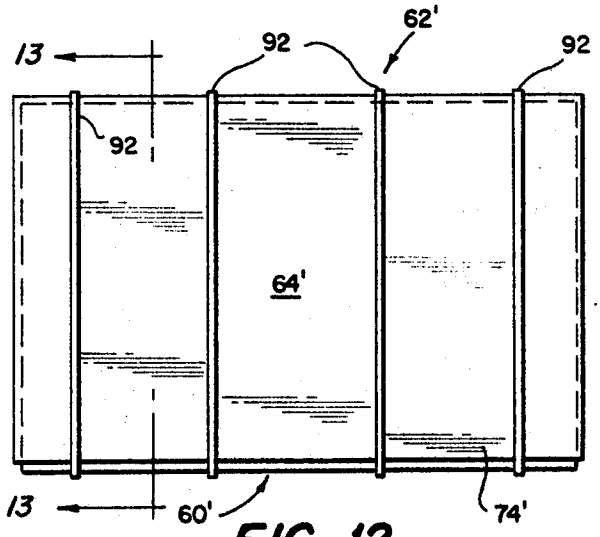



FIG. 12

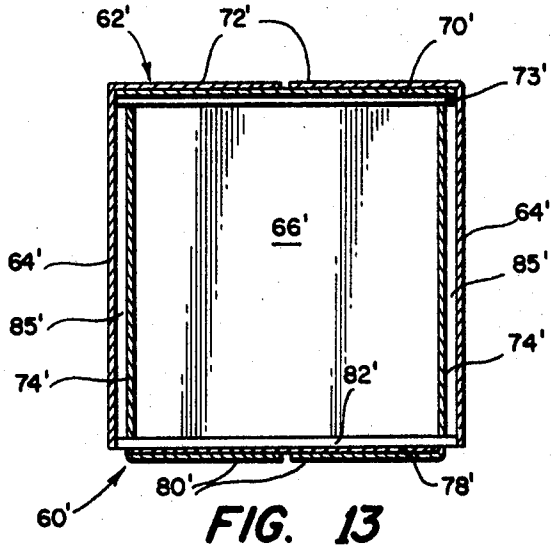



FIG. 13

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# REINFORCED CONTAINER

This invention relates to reinforced containers, and more particularly relates to containers formed from sheet material such as solid or corrugated fiberboard, and reinforced by strips of material attached to the walls of the container.

It is common practice after drying and curing tobacco to package the tobacco in rectangular cases for shipment to plants where the tobacco is utilized. In recent years there has been a noticeable trend towards increased use of corrugated fiberboard containers and a decreased usage of wooden containers for the shipping of tobacco. This trend has been caused by a shortage of skilled labor and by a desire to minimize labor costs in assembling the tobacco case.

However, it has been discovered that tobacco cases formed of even the strongest triple wall fiberboard construction, tend to deform and burst when these tobacco cases are stacked one on top of each other in a warehouse, and allowed to stand in vertical columns for long periods of time. In this regard, tobacco is regularly stored in warehouses for up to 3 years and some warehouses stack the containers in columns up to 12 containers high.

The scope of the problem can be easily seen when it is realized that a standard size tobacco case weighs about 480 pounds when fully loaded. When several such fully loaded cases are stacked one upon each other, as is desirable for efficiently utilizing storage space, the bottom case in the stack is required to support a heavy compressive load.

Thus, while fiberboard wall construction presents desirable economies in costs of assembly, cases formed entirely of fiberboard materials have tended to give less than satisfactory performance when loaded and stored in vertically stacked columns for extended periods of time.

There is also another related, but distinct strength requirement for tobacco cases. Specifically, it is desirable to compress tobacco to pack it compactly into a tobacco container. Generally, a hydraulic press is used to compress the tobacco, and a sleeve which fits inside the sidewalls of the tobacco container, or a corset which fits around the outside of the sidewalls of the tobacco container, is provided to prevent rupture of the sidewalls during the pressing operation. Thus, the design of a reinforced tobacco case desirably makes the case compatible with the corset or sleeve packing apparatus which are designed for conventional fiberboard tobacco cases.

Accordingly, it is a primary object of this invention to provide new and improved containers.

It is a further object of this invention to provide new and improved containers that are capable of being stacked on top of each other without crushing, even when filled with a heavy load.

Another object of this invention is to provide new and improved reinforced containers that can be packed using conventional tobacco packing equipment.

Yet another object of this invention is to provide a new and improved container that may be rapidly assembled and disassembled.

Additional objects and advantages of the invention will be set forth in part in the description which follows, and in part will be obvious from the description, or may be learned by practice of the invention.

To achieve the foregoing objects and in accordance with the purposes of the invention, as embodied and broadly described herein, the reinforced container of this invention comprises a pair of sidewalls; a pair of end walls; a top wall including a pair of top flaps attached to said end walls; a bottom wall including a pair of bottom flaps attached to said end walls; a pair of vertically extending side cleats attached on an inside surface of each of said walls, each of said side cleats spaced from an end of said sidewalls with the side cleats at each end of the container longitudinally aligned; a pair of bottom cleats attached to and extending across the width of each of said bottom flaps and spaced from said end walls to permit the ends of each of said bottom cleats to abut the lower edge of a pair of longitudinally aligned side cleats; and a pair of top cleats, with one top cleat attached to the inside surface of each of said top flaps and extending across the width of said top flap and spaced from said end walls to permit the ends of each of said top cleats to be seated in abutting contact on a pair of longitudinally aligned side cleats.



The invention consists in the novel parts, constructions, arrangements, combinations, and improvements shown and described. The accompanying drawings, which are incorporated in and constitute a part of this specification, illustrate three preferred embodiments of the invention, and, together with the description, serve to explain the principles of the invention.

Of the drawings:

FIG. 1 is a perspective view of a partially assembled container constructed in accordance with the teachings of this invention;

FIG. 2 is a plan view of the foldable blank of the container of FIG. 1 showing the position of the cleats on the wall panels;

FIG. 3 is a side elevation of the container of FIG. 1 illustrating the abutting contact of the internal cleats;

FIG. 4 is a vertical section taken along line 4–4 of FIG. 3;

FIG. 5 is a vertical section taken along line 5–5 of FIG. 4;

FIG. 6 is a perspective view of another embodiment of the container of this invention illustrating the top section disengaged from the bottom section;

FIG. 7 is a top plan view of the foldable blank which forms the top section of the container of FIG. 6;

FIG. 8 is a top plan view of the foldable blank which forms the bottom section of the container of FIG. 6;

FIG. 9 is a perspective view of another embodiment of the container of this invention illustrating the top section of the container disengaged from the bottom section;

FIG. 10 is a top plan view of the foldable blank that forms the top section of the container of FIG. 9 showing the position of the cleats on the top flaps;

FIG. 11 is a top plan view of the blank that forms the bottom section of the container of FIG. 9 showing the position of the cleats on the wall panels and flaps;

FIG. 12 is a side elevation of the assembled container of FIG. 9; and

FIG. 13 is a vertical section taken along line 13–13 of FIG. 12.

A plywood-reinforced container for packing tobacco is illustrated in FIGS. 1—5. This container, as seen in FIG. 2, is formed from a single foldable blank, generally 20, which includes alternating side panels 22 and end panels 24 with the end panels and side panels separated by fold lines 26. A top flap 28 and a bottom flap 30 are attached on each end panel and are connected to the end panel by fold lines 32 and 34, respectively. A top cleat 36 extends across the inside surface of each top flap and a bottom cleat 38 extends across the bottom surface of each bottom flap 30. The ends of these cleats protrude past the corresponding edges of the flaps a distance which is substantially equal to the thickness of side cleats described below.

The top and bottom cleats are spaced from fold lines 32 and 34 a distance which slightly exceeds the thickness of the top or bottom flap to which they are attached and a distance which corresponds to the spacing of side cleats from the end of the container so that the ends of the top and bottom cleats abut the top and bottom edges, respectively, of side cleats, described below.

A pair of side cleats 40 are attached on the inside surface of each side wall panel in a parallel, longitudinally spaced relationship. The side cleats extend substantially the height of the side panels and are spaced from the top and bottom of the side panels a distance that corresponds to the thickness of the top and bottom cleats, respectively. Side cleats 40 are spaced inwardly from the edges of the side panels formed by fold lines 26 a distance which slightly exceeds the thickness of the top and bottom flaps. Preferably, the spacing corresponds to the thickness of the side cleats to permit the end of the blank to be easily fastened together and to permit the blank to be folded

from a flat configuration to a boxlike configuration without deforming the flat wall surfaces of the blank due to contact with the edges of the cleats. This positioning of the side cleats also is important in avoiding excessive vertically applied shearing forces at the ends of the container when the loaded containers are stacked on top of each other. Unless the frames formed by the internal cleats are positioned near the ends of the container, these vertical shearing forces tend to cause the ends of the container to fail.

As here embodied, reinforcing flaps **50** are attached at the top and bottom of each of the side panels **22**. As illustrated in FIG. **2**, top flaps **28** and reinforcing flaps **50** at the top of the side panels, and bottom flap **30** and the reinforcing flaps **50** at the bottom edge of the side panels are separated by slots **42** which extend inwardly substantially to fold lines **32** and **34**. The slots between flaps **28** and reinforcing flaps **50** permit adjacent flaps to be folded transversely of each other, from the position of FIG. **1**, to form a closed top for the container.

In the assembled container, and as illustrated in FIGS. **4** and **5**, reinforcing flaps **50** are positioned outside of and overlap top flaps **28** and bottom flaps **30**. Thus, these reinforcing flaps contribute to the structural rigidity of the assembled container and help seal the container.

A closure flap **52**, which extends the height of one of the side panels, as illustrated in FIG. **2**, is attached at one end of blank **20** to provide a convenient means for connecting one end of the blank to the other end. In the assembled container, closure flap **52** is overlapped on the edge of end wall portion **24** at the other end of blank **20** and attached to the end wall portion by staples and/or glue.

As illustrated in FIGS. **4** and **5**, blank **20** is folded to provide a container including a pair of side walls formed by side panels **22**, a pair of end walls formed by end panels **24**, a top wall formed by top flaps **28** and top reinforcing flaps **50**, and a bottom wall formed by bottom flaps **30** and reinforcing flaps attached to the bottom edge of the side panels. The top and side, and the side and bottom cleats at each end of the container are in abutting relationship and are spaced from the end of the container.

The embodiment of the invention illustrated in FIGS. **6—8** is a two-section container formed of a bottom section generally **60** which can be filled with tobacco and then compressed using either a sleeve-type of tobacco pressing apparatus or a corset-type pressing apparatus, and a top section **62** which telescopes over the bottom section.

As here embodied, and as seen in FIG. **7**, top section **62** is formed of a foldable blank including two side panels **64** and two end panels **66** which alternate and are connected by fold lines **68**. A closure flap **69** extends along one edge of one side panel and provides a convenient means for connecting the ends of the blank to form a boxlike open bottom section. Closure flap **69** is overlapped on the edge of the end panel **66** at the other end of the blank and attached to the end panel by staples and/or glue.

Top flaps **70** are connected by fold lines **71** to the top of end panels **66** and reinforcing flaps **72** are attached at the top of side panels **64**. As illustrated in FIG. **6**, top flaps **70** and reinforcing flap **72** are folded inwardly, with the top flaps positioned inside the reinforcing flaps, to form a closed top for the assembled container.

A top cleat **73** is attached on the inside surface of each top flap **70** and extends across the top flap parallel to and spaced from score lines **71**, a distance which corresponds to the thickness of the end walls of bottom section **60**.

As illustrated in FIG. **8** bottom section **60** is formed from a foldable blank and includes a pair of side panels **74** and a pair of end panels **75** with the end panels and side panels alternating and connected by score lines **76**. Bottom flaps **78** are hingedly connected by fold lines **84** to the lower end of end panels **75**, and bottom reinforcing flaps **80** are hingedly connected to the lower end of side panels **74**. A closure flap **83** is provided at one end of the blank and attached to a side panel **74**.

As illustrated in FIG. **6**, bottom flaps **78** and bottom reinforcing flaps **80** are folded inwardly with the bottom flaps positioned inside the bottom reinforcing flaps, to form a closed bottom for bottom section **60** and the assembled container.

A bottom cleat **82** is attached on the inside surface of each bottom flap **78** and extends across the bottom flap parallel to and spaced from score line **84**.

A pair of side cleats **85** are attached on the inside surface of each side wall **74** in a parallel, longitudinally spaced relationship. Preferably, the side cleats extend substantially the height of the side panels and are spaced slightly inwardly from the edges of the sidewalls formed by fold lines **76** to permit easy fastening of the ends of the blank together, to permit folding of the blank from a flat to a rectangular boxlike configuration, and to avoid excessive shearing forces at the ends of the container.

As illustrated in FIGS. **7** and **8**, slots **86** separate top flaps **70** and reinforcing flaps **72** and slots **88** separate bottom flaps **78** and the bottom reinforcing flaps **80**. The slots permit adjacent flaps to be folded transversely of each other with the top and bottom flaps positioned inside the top and bottom reinforcing flaps as shown in FIG. **6**.

Another embodiment of the invention is illustrated in FIGS. **9—13** and comprises a two-section container. This container differs from the embodiment of FIGS. **6—8** in the placement of side cleats on the outside surface of the bottom section. This placement of the cleats in conjunction with a selection of external dimensions makes the container suitable for use with conventional corset or sleeve tobacco-pressing apparatus.

The elements of the container of FIGS. **9—13** have been designated by primed numbers which correspond to the same elements of the container of FIGS. **6—8**. With reference to FIG. **9**, it can be seen that in the assembled container of this embodiment, side cleats **85'** are positioned on the outer surface of side panels **74'**. This positioning of side cleats **85'** is accomplished by attaching side cleats **85'** on one surface of the blank forming bottom section **60'**, the bottom surface as shown in FIG. **11**, and by attaching bottom cleats **82'** on the other surface.

Four cutouts **90**, as illustrated in FIG. **11**, are provided in bottom section **60'** to permit the ends of bottom cleats **82'** to project through sidewalls **74'** and abut the bottom edge of side cleats **85'**. Cutouts **90** are generally rectangular and have dimensions which correspond to the cross section of bottom cleats **82'**. Preferably, the cutouts extend above and below the fold lines connecting side panels **74'** and bottom reinforcing flaps **80'**.

Another difference in the container of FIGS. **9—13** is that the ends of bottom cleats **82'** protrude past the edges of bottom flaps **78'** a distance which corresponds to the combined thickness of a side panel **74'** and a side cleat **85'**.

In the assembled container, illustrated in FIGS. **12** and **13**, top section **62'** extends downwardly to the plane of the lower surface of bottom cleats **82'**. Wrapping means such as steel banding **92** is extended around the container and fastened with its ends clipped together under tension to hold top section **62'** telescoped on bottom section **60'**. If tobacco is being packaged in the container, the wrapping means resists the tendency of the mass of tobacco to resiliently expand upwards after a pressing operation.

With reference to FIGS. **2** and **13**, it can be seen that assembly of the containers of this invention provides an internal structural frame that strengthens the container and is especially effective in resisting compressive forces exerted on the exterior of the container, such as caused by stacking containers on top of each other. In each container the ends of the lower surface of each top cleat are seated on the upper edges of a pair of longitudinally aligned side cleats, and the bottom edges of the side cleats are seated in abutting contact on the top surface of the bottom cleats.

Thus, in each of the three embodiments described above, an internal three-dimensional structural frame is provided at

each end of the container. These illustrated embodiments using cleats having a width to thickness ratio above 5 provide a sufficient area of contact between the frame and the fiberboard blank to prevent the blank from being sheared while at the same time providing for ease of fabrication and for a minimum storage space requirement for the disassembled container.

Fiberboard, and preferably corrugated fiberboard, forms a preferred material of construction for the wall portions of the container of the invention. The cleats used to form the structural frame can be constructed of a variety of materials which possess good compressive strength with plywood being presently preferred. It has been found that relatively thin sheets of plywood, for example three-eighths of an inch plywood, provide sufficient reinforcement to enable fiberboard containers to be stacked without sustaining damage. It is desirable that the cleats have a width-to-thickness ratio of over five to provide a large contact area for the frames with the top and bottom of the container and to minimize the vertical dimension of the blanks in a planar knocked-down condition and thus permit storage of the disassembled containers in a minimum of space. It is also desirable that the top, side, and bottom cleats have a uniform thickness.

Preferably, a container manufacturer prefabricates the various elements of the container which are shipped to the user in a knocked-down condition for assembly by the user to provide economical utilization of shipment and storage space. The container manufacturer would, for example, preferably score the fiberboard blanks that form the walls of the container, and attach the cleats to the wall portions of the blanks using staples and/or glue, but would not attach the ends of the foldable blanks to each other to form rectangular sections.

A preferred procedure for assembling the container of FIGS. 1—5 will now be described. Foldable blank 20 is folded from its flat condition as illustrated in FIG. 2 to form an open-topped rectangular container as shown in FIG. 1. Closure flap 52 is fastened to the free end of end panel 24 by conventional fastening means such as glue and/or staples.

As illustrated in FIG. 1, the partially assembled container, can be loaded with tobacco when top flaps 28 and top reinforcing flaps 50 are folded to be positioned outside the walls 22 and 24. Preferably, a metal sleeve (not shown) is inserted adjacent the inside wall surface of the container. After piling up tobacco in a chute positioned above the container, the tobacco in the chute is compressed into the container by applying a hydraulic ram to the top of the pile of tobacco. Subsequently, the metal sleeve is removed from the container and flaps 28 are folded inwardly into a horizontal position with the ends of the lower surface of top cleats 36 seated on the top edge of side cleats 40. Top reinforcing flaps 50 are then folded inwardly into a horizontal position to form a closed top for the container.

The assembly of the containers of FIGS. 6—8 and FIGS. 9—13 can be accomplished using similar techniques for both containers. A typical method of assembly will be described with reference to the embodiment of FIGS. 6—8. Initially, bottom section 60 is folded from its flat configuration shown in FIG. 8, to the open-topped rectangular box configuration illustrated in FIG. 6 and closure flap 83 is fastened to the end panel 75 at the other end of the blank. Subsequently, a metal sleeve (not shown) is inserted adjacent the walls of the bottom section to help resist bursting forces during compression of tobacco within the container. A corset could be substituted for the sleeve, and the corset would be applied around the exterior of the assembled bottom section 60.

Tobacco is loaded into a chute positioned above the open-topped container formed by the bottom section and compressed by application of a hydraulic press. Subsequently, the sleeve is removed and top section 62, which has been folded into a generally rectangular configuration, is telescoped over bottom section 60 with the side and end walls of the top section adjacent the side and end walls of the bottom section, respectively. One advantage of the two-section construction of these containers is that previously pressed tobacco, which may exhibit some resilience after release of the hydraulic press and therefore tend to rise above the top of bottom section 60, can be recompressed by exerting a downward compressive force on top section 62 to telescope it down over bottom section 60. It is usually desirable to wrap the assembled container with steel banding or the like which holds the top section in telescoped relation on bottom section 60.

This invention in its broader aspects is not limited to the specific details shown and described, but departures may be made from such details without departing from the principles of the invention and without sacrificing its chief advantages.

What I claim is:

1. A reinforced container comprising: a pair of sidewalls; a pair of end walls; a top wall including a pair of top flaps attached to said end walls; a bottom wall including a pair of bottom flaps attached to said end walls; a pair of vertically extending side cleats attached on an inside surface of each of said side walls, each of said side cleats spaced from an end of said side wall, with the side cleats at each end of the container longitudinally aligned; a pair of bottom cleats attached to and extending across the width of each of said bottom flaps and spaced from said end walls to permit the ends of each of said bottom cleats to abut the lower edge of a pair of longitudinally aligned side cleats; and a pair of top cleats, with one top cleat attached to the inside surface of each of said top flaps and extending across the width of said top flap and spaced from said end walls to permit the ends of each of said top cleats to be seated in abutting contact on a pair of longitudinally aligned side cleats.

2. The container of claim 1 in which the container is formed from a foldable blank including alternating sidewall panels and end wall panels, with each end wall panel having an attached top flap and an attached bottom flap, with a top cleat extending across said top flap and a bottom cleat extending across said bottom flap said top and bottom cleats being spaced from said end wall panel a distance which exceeds the thickness of said top flap and said bottom flap, respectively; each side wall panel having longitudinally spaced side cleats attached on its inside surface and positioned to be seated on said bottom cleats and to support said top cleats.

3. The container of claim 2 in which said side, top, and bottom cleats have a width-to-thickness ratio of at least five.

4. The container of claim 2 including reinforcing flaps attached to the top and bottom of said sidewalls for cooperating with said top and bottom flaps, respectively, to form closed top and bottom walls for the container.

5. A reinforced container including a top section and a bottom section with the top section capable of being telescoped over said bottom section; and

A. the top section including a pair of side panels and a pair of end panels, top flaps attached to the upper end of said end panels, top cleats attached to the inside surface of said top flaps and extending across said flaps and past the outside edges of said flaps a distance substantially equal to the thickness of the adjacent portion of said bottom section; and

B. the bottom section including a pair of side panels and a pair of end panels each having a length dimension slightly less than said side and end panels of said top section, respectively, to permit telescoping said top section over said bottom section; a bottom flap attached at the bottom end of each of said end walls; a pair of spaced cleats attached on the outside surface of each of said side walls adjacent each end of said sidewalls; and longitudinally aligned with said top cleats to permit seating said top cleats on the upper surface of said side cleats in the assembled container; a bottom cleat extending across each of said bottom flaps and protruding therefrom a distance past the outside edges of said flap which is substantially equal to the combined thickness of the adjacent side cleat and side panel of said bottom section, each bottom cleat abutting the bottom surface of a pair of longitudinally

aligned side cleats when a bottom flap is folded into a horizontal position in the assembled container.

6. The container of claim 5 in which said side, top, and bottom cleats have a width-to-thickness ratio of at least five.

7. The container of claim 5 including a pair of reinforcing flaps attached to the side walls of said top section and a pair of reinforcing flaps are attached to the side walls of said bottom section to cooperate with said top flaps and said bottom flaps to form closed top and bottom walls for said container.

8. A reinforced container including a top section and a bottom section; and

A. the top section including a pair of side panels and a pair of end panels, the top flaps attached to the upper end of each of said side and end panels, the top flaps attached to said end panels each having attached on their inside surface a top cleat extending across the top flap;

B. the bottom section including a pair of side panels and a pair of end panels each having a length dimension slightly less than said side and end panels, respectively, of said top



section to permit telescoping said top section over said bottom section; a pair of spaced side cleats attached on the inside surface of each of said side panels adjacent each end of said side panels to permit seating the ends of said top cleats on the upper surface of said side cleats in the assembled container; a bottom flap attached at the bottom end of each of said end panels; a bottom cleat extending across each of said bottom flaps, said bottom cleat abutting the bottom surface of a pair of said side cleats when said bottom flap is folded into a horizontal position in the assembled container.

9. The container of claim 8 in which said side, top, and bottom cleats have a width-to-thickness ratio of at least five.

10. The container of claim 8 including a pair of reinforcing flaps attached to the side panels of said top section and a pair of reinforcing flaps attached to the side panels of said bottom section to cooperate with said top flaps and said bottom flaps to form closed top and bottom walls for said container.