

June 11, 1968

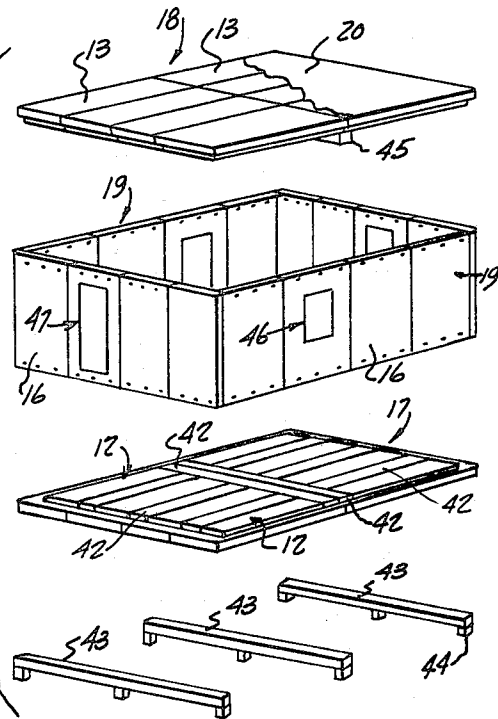
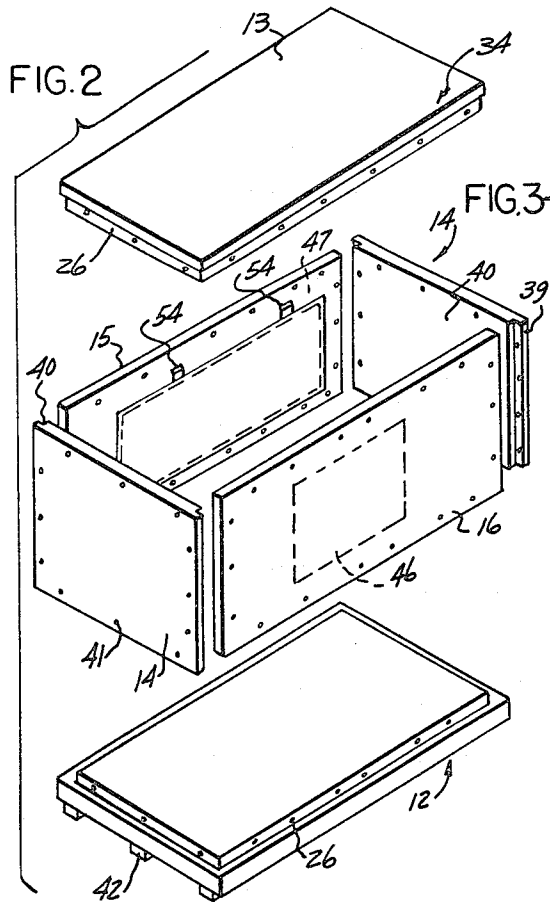
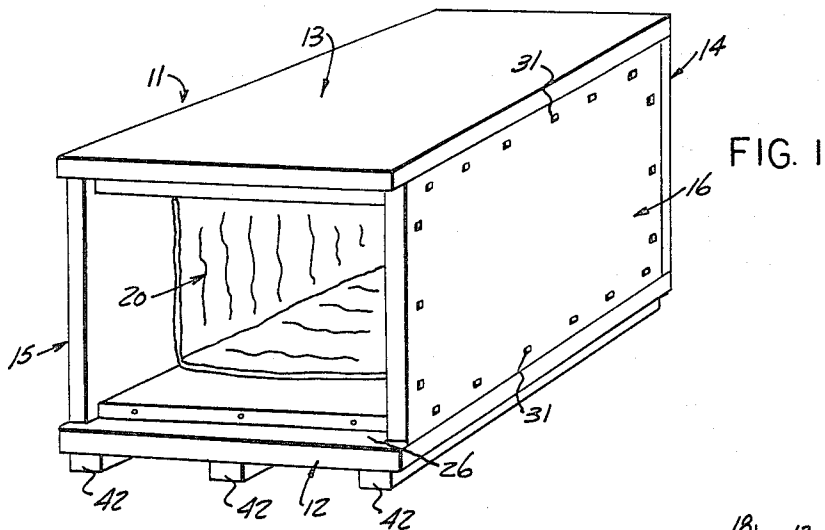
W. L. FIELD

3,387,733

CONVERTIBLE SHIPPING BOX

Filed Jan. 19, 1967

2 Sheets-Sheet 1



INVENTOR

WILLIAM L. FIELD

BY *Cullen, Sloman, & Carter*
ATTORNEYS

June 11, 1968

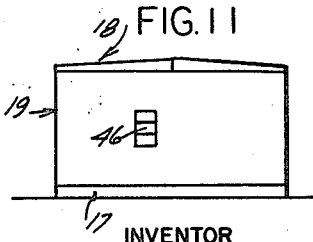
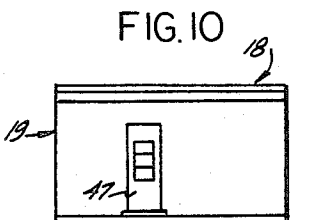
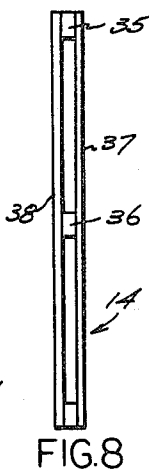
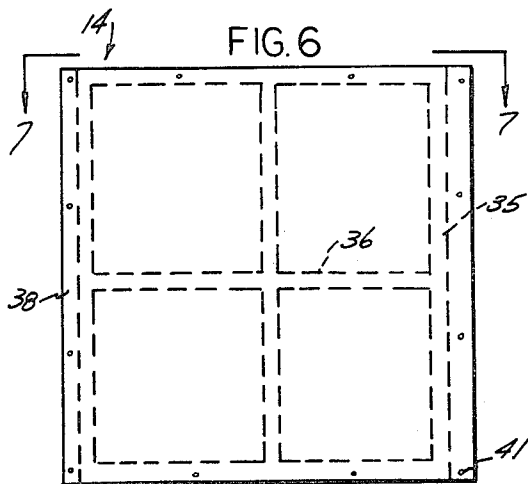
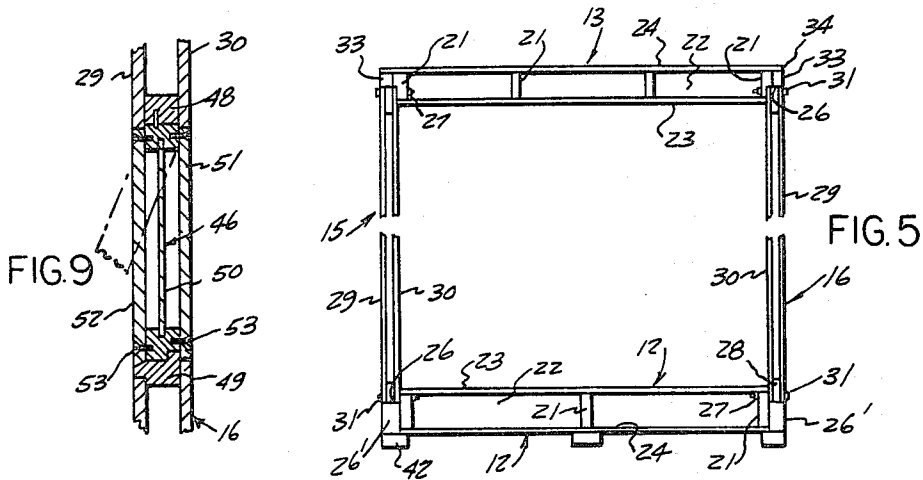
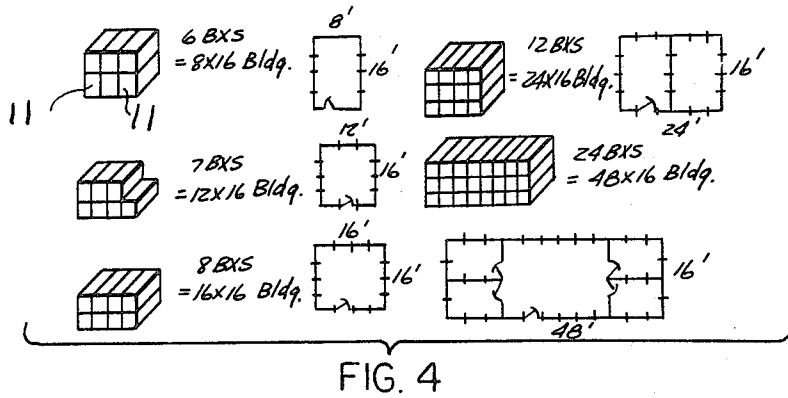
W. L. FIELD

3,387,733

CONVERTIBLE SHIPPING BOX

Filed Jan. 19, 1967

2 Sheets-Sheet 2



INVENTOR
WILLIAM L. FIELD
BY *Cullen, Sloan, & Cantor*
ATTORNEYS

1

3,387,733

CONVERTIBLE SHIPPING BOX
William L. Field, P.O. Box 571,
Royal Oak, Mich. 48073
Filed Jan. 19, 1967, Ser. No. 610,430
4 Claims. (Cl. 217-12)

ABSTRACT OF THE DISCLOSURE

The present invention relates to a shipping box which on disassembly may be converted into a building structure. The present invention relates to a shipping box which includes assembled bottom, top and side panels and ends, a plurality of said boxes on disassembly being adapted for conversion into a building having floor, roof, and wall sections and wherein the corresponding bottom, top and side panels respectively cooperate to form said sections.

Heretofore, in the use of shipping boxes, particularly for use by the Government, but not limited thereto, extensively constructed boxes upon initial usage for shipment have been discarded or destroyed with accompanying waste. It is the object of the present invention to present a novel form of shipping box assembly including a series of panels; namely, bottom, top, and side panels and ends so removably secured together that upon disassembly of a series of such shipping boxes the same may be reassembled into a building having corresponding floor, roof, and wall sections without requiring additional parts.

It is another object of the present invention to provide within the said assembled box panels and ends a series of pre-spaced apertures adapted for cooperative registry and wherein suitable nuts such as T nuts are fixedly secured within some of the said apertures and wherein the lag bolts, for illustration, may be assembled within the pre-located additional registering apertures for securing assembly and wherein upon disassembly of the said box, the same registering apertures or other registering apertures may be employed and using the same lag bolts without requiring any tools except for a screwdriver, a wrench, and hammer.

These and other objects will be seen from the following specification and claims in conjunction with the appended drawings in which:

FIG. 1 is a fragmentary perspective view of the present shipping box with one of its ends removed for clarity of illustration.

FIG. 2 is a perspective exploded view of the box parts.

FIG. 3 is a perspective exploded view showing the reassembly of a series of said boxes for a building structure including floor, roof, and wall sections.

FIG. 4 is a diagram illustrating schematically the plurality of building floor plans when reassembled from corresponding series of shipping boxes.

FIG. 5 is a broken away elevational view illustrating the structure adjacent the end portion of the box shown in FIG. 1.

FIG. 6 is an elevational view of a box end.

FIG. 7 is a plan view thereof taken on line 7-7, FIG. 6.

FIG. 8 is a side elevational view thereof.

FIG. 9 is a fragmentary broken away section of one of the box side panels which includes an enclosed window assembly.

FIG. 10 is a front view of the converted house formed from the reassembly of eight boxes as schematically shown in FIG. 4.

2

FIG. 11 is a side view thereof.

It will be understood that the above drawings illustrate merely a preferred embodiment of the invention, and that other embodiments are contemplated within the scope of the claims hereafter set forth.

Referring to the drawings the present convertible shipping box is designated at 11, FIG. 1 and includes bottom panel 12, top panel 13, ends 14, and side panels 15 and 16.

In the converted box a series of bottom panels are reassembled in coplanar relation to define floor section 17 of FIG. 3.

A series of top panels 12 are reassembled in coplanar relation to define the roof section 18 of FIG. 3. A series of side panels 15-16 are reassembled into a series of coplanar assemblies to define a plurality of right angularly related groups of panels and thus defining the wall sections generally indicated at 19, FIG. 3 for the building structure.

Within the assembled box, FIG. 1 there is provided a waterproof liner sheet 20 of a suitable kraft paper or fibre reinforced paper sometimes referred to as "sisal kraft" or other suitable moisture proof material. In the converted building structure the liners from a plurality of the said disassembled boxes may be employed as a three-ply roof covering as designated fragmentarily at 20, FIG. 3 in the completed roof assembly.

Bottom panel

Referring to FIG. 5 bottom panel 12 includes a supporting framework consisting of a series of joists 21 of an illustrative dimension 2" x 6" and with right angularly related cross bridging 22 of the same dimension, and fixedly secured thereover the inner wall 23 which in the illustrative embodiment is formed of plywood one half inch thick, for illustration. An outer wall 24 is also arranged over the same framework and consists of plywood, for illustration, of one quarter inch thickness, the said inner and outer walls being suitably secured to the framework as by gluing and by fasteners forming a unit bottom panel which is essentially hollow for insulating purposes and for strength of construction.

As shown in FIGS. 2 and 5 said bottom panel includes a peripheral cutaway ledge 26 which is defined by outer framing 26' which extends around and is secured to bottom panel frame 21-22, being of a dimension 2" x 4", for illustration.

A series of longitudinally spaced outwardly opening apertures are formed through the bottom panel frame elements 21 and 22 adjacent the ledge 26 and there are secured within each of the said apertures a metallic nut such as a T nut 27 which remains in position at all times and which is adapted to cooperatively receive suitable fasteners such as the lag bolts 31, FIG. 5 which extend through correspondingly spaced apertures within the adjacent side panels and ends of the box construction.

Side panels

The respective side panels 15 and 16, said numerals being used interchangeably in FIG. 3, include a hollow frame 28 which in the illustrative embodiment has a dimension of 5/4" x 3" with outer wall 29 of 3/8" plywood, for illustration, and inner wall 30 of 1/4" plywood, for illustration, also suitably glued and otherwise fastened to the said frame 28.

Each of the side panels have formed therethrough the correspondingly referred to apertures which register with the said nuts 27 and which removably receive the fasteners or lag bolts 31, FIGS. 1 and 5.

Top panel

The top panel 13 consists of a hollow framework which

includes corresponding joists 21, preferably 2" x 6" and the intersecting cross bridging 22 of corresponding dimensions. Surrounding frame 21-22 there is provided an additional outer frame 33 in cross section 2" x 4", for illustration, to thus define within the undersurface of the top panel 13 a peripheral ledge 26 corresponding to the peripheral ledge 26 of the bottom panel. Outer wall 24 of $\frac{3}{8}$ " plywood, for illustration; and inner wall 23 of $\frac{1}{4}$ " plywood, for illustration, are glued upon opposite sides of frame 21-22 and otherwise secured thereto. As particularly noted in FIG. 2 the elements which make up the top panel include portions of gradually increasing height towards one end thereof to define a small pitch angle 34, which is approximately 2" over the length of said top panel, which in the illustrative embodiment is 8 feet long. This pitch is useful when the top panels of a series of disassembled boxes are reassembled as shown in FIG. 3 to define the roof section 18 for the converted building structure to give it a slight pitch angle.

Box ends

The detail of the box ends 14 are best illustrated in FIGS. 6, 7, and 8, and include the hollow frame 35 with cross frame elements 36 and secured upon its opposite sides respectively inner wall 37 which is of $\frac{1}{4}$ " plywood, for illustration, outer wall 38 which is of $\frac{3}{4}$ " plywood, for illustration. As shown in FIG. 7 at least one pair of the outer edges of each end 14 are laterally flanged at 39 to define ledges or adjacent cutaway portions 40 which in the assembled box, FIG. 2 permit the said ends and the said cutaway portions to be projected between the respective panels throughout 360°.

Corresponding apertures are formed through adjacent edge portions of the ends 14 and through the said flanges as at 41 and are adapted to receive additional fasteners such as the lag bolts 31 or screws by which the said ends in the completed box construction may be secured to the respective box panels.

As shown in FIG. 1 there are provided upon the undersurface of bottom panel 12 a series of elongated laterally spaced skids 42, of rectangular cross-section. In the disassembled box these skids are removable and are shown in FIG. 3 as providing securing fillers nested within the slots defined between adjacent ledges of the assembled bottom panels which define the floor section 12 and also provide one means by which the adjacent floor panels may be secured together in coplanar edge to edge relation and to thus provide a flat floor assembly.

When the boxes have been disassembled and have been reassembled to form the respective floor section 17, roof section 18 and wall section 19, the preassembled floor section is mounted over a series of longitudinally spaced parallel foundation beams 43, FIG. 3 which includes supporting piers 44 nested down into the ground surface and which are prepared locally for supporting the converted building construction as shown in FIGS. 10 and 11.

In the completed building a suitable elongated support beam 45 is interposed and secured between an opposing pair of building side wall sections 19 to supportably span the adjacent inner registering ends of the assembled coplanar top panels 13 which form the roof section 18.

Window construction

FIG. 9 is a fragmentary illustration of one of the side panels 16 which incorporates an initially protected window assembly when used in the box construction, such as shown in FIG. 2. The window assembly 46, FIGS. 2, 3 and 9 includes rectangular window frame 48 nested and secured within and between the inner and outer walls 30 and 29 of side panel 16, for illustration, and including the formed sill 49. Assembled therein is window 50 which is pivotally mounted at its upper end within said frame and which is adapted to swing outwardly as shown in dotted lines, FIG. 9. Adjacent portions of the inner wall 30 and outer wall 29 relative to said window are cutaway 75

and removable cover elements or panels 51 and 52 are secured therein coplanar with the inner and outer walls which form the side panel and which in normal use of the construction as a box protect the window assembly against breakage.

Outer cover panel 52 is secured by fasteners 53 to the window assembly 50 and upon opening of the window may remain thereon or can be removed as desired. The inner cover panel 51 secured as at 53 to an inner portion of the window assembly 50, in a coplanar registry within the cutaway portion of the inner wall 30 of the side panel but a lower portion at least of the panel element 51 overlaps window frame 49 to normally retain the complete window assembly against opening until the said panel 51 has been removed by removal of fasteners 53. Under some conditions the window may not be used in the reassembled building structure and accordingly the panels 51 and 52 will remain secured in place.

Within one or some of the side panels, as for example, side panel 15, FIG. 2 and FIG. 3, there is also provided a rectangular door frame as an integral part of said panel similar to but of different dimensions than window frame 48, FIG. 9. Removably nested within said door frame is door 47 which is hinged along one of its edges as at 54 which may be used in the assembled building as the door to the building, FIGS. 3, and 10. If not so used, said door is covered by removable panels similar to removable panels 51 and 52 of FIG. 9.

With reference to FIG. 4 there is shown in a diagram and schematically a series of boxes as, for example one group showing six boxes stacked together which when disassembled may be reassembled to provide a building having the floor plan such as shown adjacent thereto. In other words six reassembled boxes will provide a building which has the front and side dimensions of eight feet by sixteen. Seven boxes will provide a floor plan twelve by sixteen; eight boxes a floor plan sixteen by sixteen; twelve boxes a floor plan sixteen by twenty-four; twenty-four boxes a floor plan forty-eight by sixteen. This illustrates the means by which the modular box construction can be on this assembly reassembled into useful building structures. The eight boxes shown in FIG. 4 and the floor plan adjacent thereto corresponds to the building shown in FIG. 3.

Thus by the present invention wherein old shipping boxes and containers are destroyed it is seen wherein the present invention that the present convertible box may be reused for the assembly of a building which requires no additional materials other than what is shown in the building construction and which can be assembled with the minimum of effort and requiring only a screwdriver, hammer and wrench. Thus, the same containers which provide enclosures for machines or other equipment shipped have incorporated therein the pre-assembled materials for the fabrication of buildings, being merely a reuse of the respective parts of the shipping box.

For emergency disaster areas, food, clothing, and medical supplies, shipped in the present box arrive simultaneously with the shelter buildings into which said boxes are converted.

In the conversion, the said end panels 14 of the shipping boxes may be used as partitions in the assembled building, if desired. The present invention contemplates also the reconversion of the building back to shipping boxes as desired.

Having described my invention reference should now be had to the following claims.

I claim:

1. A shipping box including assembled inter-connected bottom, top and side panels and ends, a plurality of said boxes on disassembly adapted for conversion into a building having floor, roof and wall sections;

each of said panels and ends being hollow including a rectangular frame, and inner and outer walls covering each frame;

- said top and bottom panels each including a peripheral cutaway ledge for cooperative nesting registry with the corresponding top and bottom edges of said side panels and ends;
- a series of nuts anchored and nested within outwardly facing spaced apertures in said top and bottom panels at their edges throughout 360°;
- and corresponding removable fasteners projected through correspondingly spaced apertures formed in said side panels and ends and threaded into said nuts; said box ends upon at least a pair of opposing sides being cut-away and defining a pair of flanges, with the cutaway portions snugly nested between and supportably engaging all said panels throughout 360°, and fasteners securing said flanges and adjacent portions of said ends to the ends of the side panels.
2. In the shipping box of claim 1, at least one of said box side panels including a rectangular window frame nested and secured therein;
- a window pivotally mounted within said window frame; adjacent portions of the inner and outer walls of said panel having cutaway portions;
- and selectively removable protective window covers nested in and coplanar with said cutaway wall portions and secured therein.
3. In the shipping box of claim 2, the outer window cover being secured to said window and pivotally movable therewith on opening thereof;
- the inner window cover being secured to said window and overlapping said window frame.
4. The method of converting a plurality of like shipping boxes, with each box including interconnected bottom, top

and side panels and ends, and a moisture proof liner, into a building having floor, roof, and wall sections which consist of the following steps;

- (1) disassembling the boxes;
- (2) reassembling the bottom panels in coplanar registry defining a unit rectangular floor section;
- (3) reassembling the top panels in coplanar registry defining a unit rectangular roof section;
- (4) flattening, stacking and securing said liners upon said roof section forming a multiple ply cover therefor;
- (5) reassembling interconnecting said side panels edge to edge into groups of upright coplanar wall panels;
- (6) assembling and securing said groups at right angles to each other upon and around and interconnecting marginal portions of said floor and roof sections.

References Cited

UNITED STATES PATENTS

2,418,868	4/1947	Cole et al.	217—65 XR
2,453,326	11/1948	Lambert	52—285 XR
2,801,018	7/1957	Yount	217—3
2,884,125	4/1959	Cadillac et al.	217—43 XR
2,915,791	12/1959	Hauf	52—270 XR
2,960,249	11/1960	Walsh	220—9 XR
3,236,014	2/1966	Edgar	52—270

FOREIGN PATENTS

212,428	1/1958	Australia.
---------	--------	------------

RAPHAEL H. SCHWARTZ, *Primary Examiner.*