Oct. 15, 1957 H. G. LANKFORD 2,809,746

PACKAGED DISASSEMBLED ARTICLE

Filed Feb. 19, 1954 2 Sheets-Sheet 1

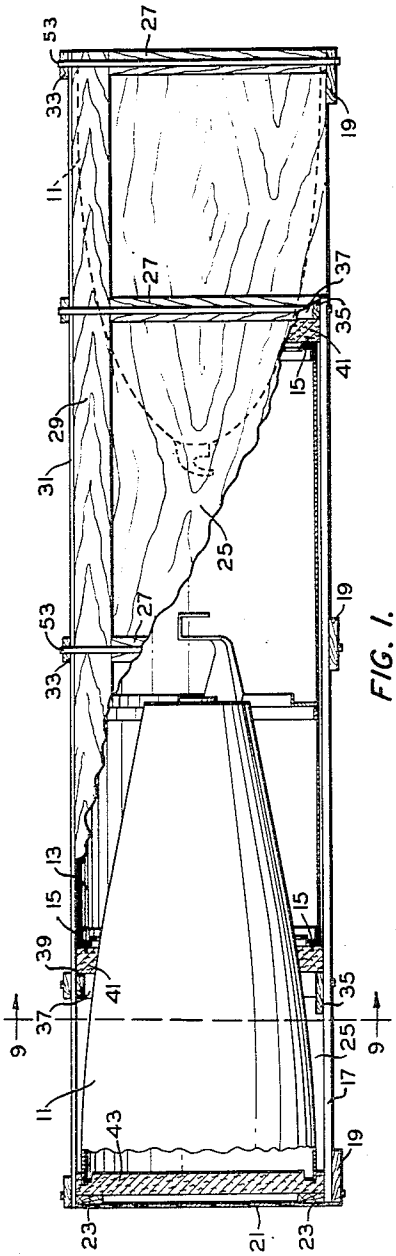


FIG. 1.

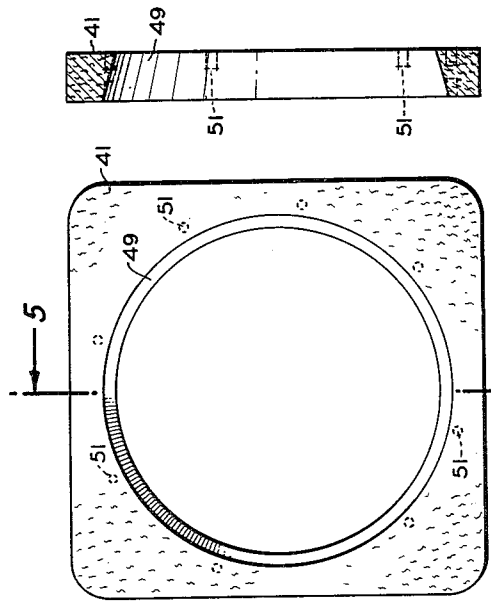


FIG. 4.

FIG. 5.

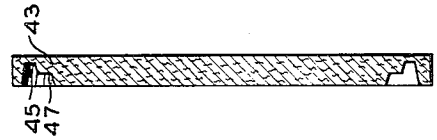


FIG. 3.

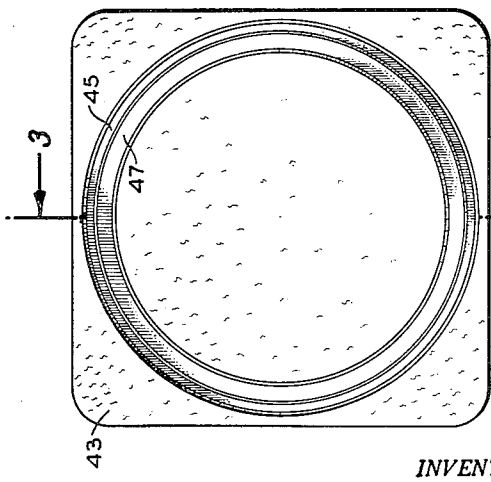


FIG. 2.

INVENTOR.
HARRY G. LANKFORD

BY John H. Widdowson

ATTORNEY

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PACKAGED DISASSEMBLED ARTICLE

Filed Feb. 19, 1954 2 Sheets-Sheet 2

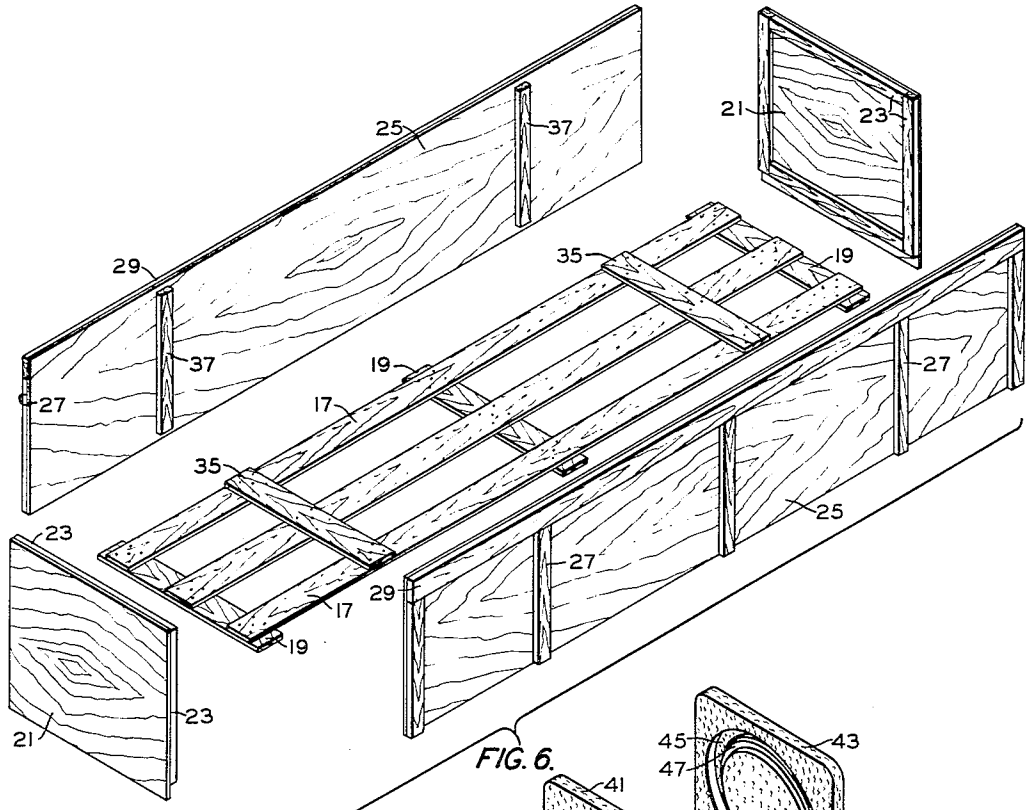


FIG. 6.

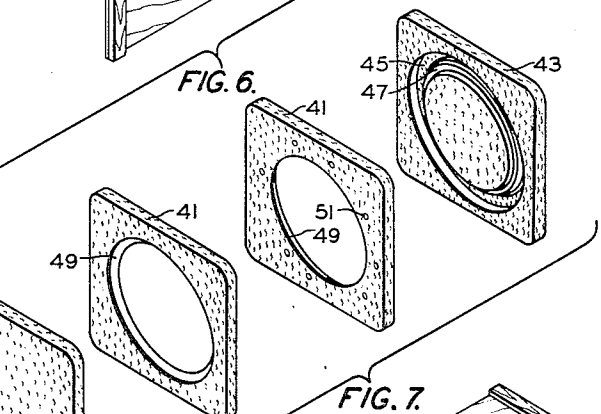


FIG. 7.

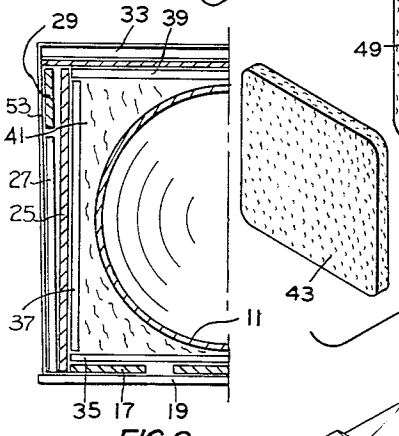


FIG. 9.

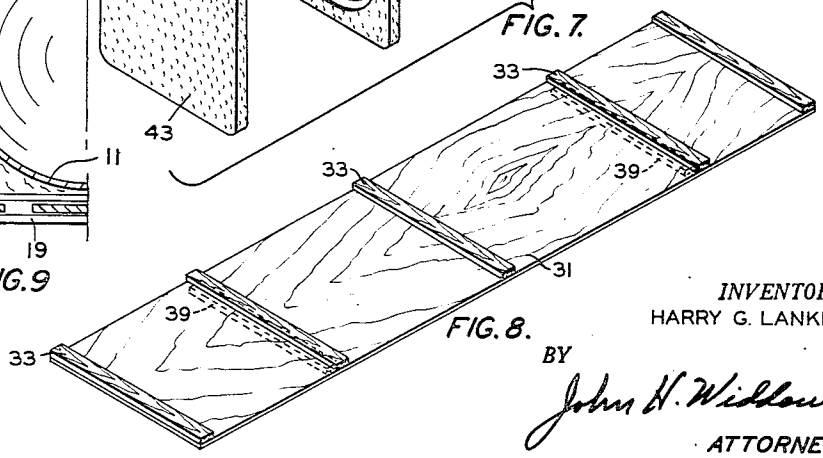


FIG. 8.

INVENTOR.
HARRY G. LANKFORD

BY

John H. Widdowson

ATTORNEY

United States Patent Office

2,809,746

Patented Oct. 15, 1957

2,809,746

PACKAGED DISASSEMBLED ARTICLE

Harry G. Lankford, Wichita, Kans.

Application February 19, 1954, Serial No. 411,330

3 Claims. (Cl. 206—46)

This invention relates to packaging means. In a more specific aspect, this invention relates to means for packaging articles for shipping and/or storing same. In a still more specific aspect, this invention relates to box and packaging means which are particularly advantageously used to ship and/or store out-of-doors where the packages are exposed to the elements, corrodible metal articles, such as disassembled fire-bomb cases and aircraft fuel tanks having conoidal end members and a hollow center member. In another specific aspect, this invention relates to a new weatherproof shipping and/or storing box structure. And, in still another specific aspect, this invention relates to a shipping and/or storing box wherein the box members themselves uniquely support packing members therein which in turn support, space and pad articles packed in the box, particularly nestedly packaged disassembled metal fire-bomb cases and metal aircraft fuel tanks.

This application is a continuation-in-part of my co-pending application, Serial No. 393,061, filed November 19, 1953, and now abandoned.

Crating and box means are known in the art, and it is known to package and store articles in boxes or crates, some of such being designed and constructed for storing the articles therein upon arrival at their destination until such time as it is desired to use the articles. However, the boxes and crates known in the prior art have many disadvantages and will not successfully store articles for any length of time out-of-doors where the box or crate is exposed to elements, such as rain, sleet, snow, dew, etc., if the exposed article will be corroded or damaged by moisture. Moisture can and does result in damage to metal articles, particularly those made of iron and its various alloys, and many articles such as fire-bomb cases, aircraft fuel tanks, etc., are necessarily stored for long periods of time in crates and/or boxes prior to use, this because of the necessity for stockpiling articles of this nature. Moisture to damage such metal articles can result from either snow, rain or hail entering the usual box through openings therein or through cracks at juncture of members thereof, or it can result from condensation of moisture in the air within the box due to temperature change and lack of ventilation.

I have invented box and package means which can be used very successfully in shipping and storing articles out-of-doors where such are exposed to the elements, particularly articles of manufacture which are damaged by moisture by corrosion or otherwise, such as metal fire-bomb cases and metal aircraft fuel tanks. The box means of my invention preferably has a raised slatted bottom; side panel members which preferably extend the length of the box, that is to overlap the end members, such side members preferably being disposed on the outside of the bottom so that no moisture running down the side members will leak or run into the bottom of the box, and preferably having the lower edge of such side panel members higher than the base members of the box to provide for ventilation of the box under the sides and through the

openings in the slatted bottom; end panel members which are preferably disposed on the outside of the bottom so that water running down the ends will not leak into or run into the box at the bottom; and a top panel member which preferably extends the length of the box to overlap the end members thereof and which preferably overhangs the side panel members, so that any water running off the top of the box will contact the end panels and side panels and thus run off rather than run into or leak into the box through any crack or opening at the juncture between the top and ends or top and side members.

The new box means of my invention has been found to have many advantages over those box structures known in the prior art. Some of these advantages have been spelled out in the preceding paragraph which describes preferred specific embodiments of the new box means of my invention. The new structure of my box protects articles stored therein for long periods of time against moisture striking the box in the form of rain, snow, sleet or hail, and the raised side panels and slatted bottom construction has been found to give a box with very good ventilation to prevent moisture condensation on stored articles due to atmospheric temperature change, keeping the humidity of the air within and without the box substantially constant. It has been found that the ventilating features of the box structure of my invention protect the stored articles out-of-doors against moisture condensation thereon except under conditions of extremely high humidity in the neighborhood of 100% relative humidity where ventilation would have little or no effect upon drop in temperature. The new box means of my invention has been found very economical to build and use, and substantial savings have resulted in using the box means of my invention by eliminating expensive auxiliary protective materials for corrodible metal articles, such as special wrappings and plastic film coverings, and the like.

The new box structure of my invention can be made of any suitable material, such as wood, various metals, "hardboard" fiberboard, plastics, various combinations of these, and the like. I have found it preferable and desirable to construct the box means of my invention out of wood, specifically and preferably plywood and dimension lumber, when packaging corrodible metal articles such as disassembled metal fire-bomb cases and metal aircraft fuel tanks. And, in a preferred specific embodiment of these wooden box means of my invention, I prefer that the sections of the box means be weatherproof, particularly the sides, ends and top. Such weatherproof structure is preferably wood impregnated on or near the surface with a weatherproofing material, such as wax, particularly paraffin wax, drying oils, such as tung and linseed oil having plastic materials dissolved therein, paints of the sealing variety, and the like. I have found it advantageous and preferable to use a paraffin base wax with which the panel sections of my box means are treated. Such treating process comprises heating the wood panels, preferably to a temperature in the range of 200° to 300° F. for a period of time of from 10 to 30 seconds, then applying the paraffin type or other suitable wax to the wooden sections of the box preferably in the form of a fine spray or atomized condition and in a heated zone which is preferably maintained at a temperature of from 200° to 300° F. The panel sections of the box having the wax thereon are then given a penetration step treatment wherein they are maintained at a temperature above room temperature for a period of time, preferably at a temperature in the range of 150° to 300° F. for a period of time of from 10 to 45 seconds. Following the penetration step treatment, the wood panel sections are then allowed to cool to room temperature, and such can be done in a zone maintained at room temperature. It is preferred to use from 1.5 to 2.5 lbs. of paraffin base wax per 100 sq. ft. of surface area

of the box members, and I have found it desirable to wax treat the box sections on both sides. Weatherproofing the box according to my invention has given unusual and excellent results. The weatherproof box of my invention will not take in water over the edges of and underneath members, particularly the top and sides, due to capillary action and surface tension of the water. The new weatherproofing process of my invention allows for economical box treatment, with a very small amount of wax accomplishing the weatherproofing of the box.

In a preferred specific embodiment of the new box means of my invention, cleat means secured to the inner sides of the top, sides and bottom of the box cooperate with inner packing members to support same and thereby give support to the packaged articles which the packing members support, space and pad. The supporting, spacing and padding packing members which I prefer to use in conjunction with the new box means of my invention, and the packing means within the box which I prefer to use, are disclosed in my co-pending applications, Serial Nos. 259,945 and 401,307, now Patents Nos. 2,710,096 and 2,732,936, respectively. These applications disclose and claim packaging means wherein the packing members support, space and pad the packaged articles, particularly nestedly disposed disassembled articles having conoidal end members and a hollow center member, such as metal fire-bomb cases and metal aircraft fuel tanks. The conoidal end and hollow center members in the preferred package are spaced from the box members and from each other by such supporting, spacing and padding members. It is preferred that such supporting, spacing and padding members be made of fiberboard, and I prefer to use fiberboard of the kind commonly used for structural purposes, such as that made from wood fibers, sugar cane (bagasse), jute, flax, straw, hemp, or the like, preferably those fiberboards referred to as "softboards," normally having a density in the range of 10 to 25 lbs. per cu. ft. Felted softboards, the fibers of which have been waterproofed and treated against dry rot and termites, have been found very satisfactory.

Such are produced by a building-up process, the fibers being recovered from a slurry using continuous filter means. It is preferable that the felted board be produced from a slurry having a neutral pH so that the board produced will have a pH in the range of 6.5 to 7.5. Usual production procedure where the pH of the fiberboard is essentially immaterial yield acid pH boards, since slurry conditions are normally acid. Basic materials to neutralize and give a basic slurry pH are added to yield the neutral fiberboard product. Felted fiberboards containing additives to enhance their wet strength have been found preferable. Melamine resins, similar resins, and asphaltums work well. Petroleum asphalt in an amount of from 4.5 to 8.5, more preferably 6 to 7, percent by weight with wood fiber fiberboard has been found desirable. The asphalt can conveniently be added in the form of an emulsion to the slurry from which the felted board is produced. It has been found that felted fiberboard having a pH in the range of 6.5 to 7.5 can be used in direct contact with metal members without corroding or damaging such when moisture is present. This is important for atmospheric conditions of temperature and humidity can at times be such that only a negligible change in temperature will result in condensation on exposed surfaces, and even near perfect box ventilation will not prevent this.

The inside cleat means embodiment of my new box means, which adds strength to the box as well as supporting the inner packing members and in turn the articles packed, has been found to be very advantageous, and such of the structure of my new box means providing for this is very simple, economical to build and very efficient in use. In addition, the cooperating cleat and box member means readily adapts itself to unit weatherproofing in the new weatherproofing process of my invention.

It is an object of this invention to provide new packaging means.

It is another object of this invention to provide new box means which is particularly desirable to store articles packed therein out-of-doors where the box means is exposed to the elements, particularly metal fire-bomb cases and aircraft fuel tanks.

It is a further object of my invention to provide a new weatherproof package for corrodible metal articles which it is desired to ship to destination and store for future use out-of-doors where the package is exposed to the elements.

Still another object of my invention is to provide new box and package means wherein the box members themselves have supporting means therewith which support inner packing members, such inner packing members in turn supporting articles stored in the box, particularly nestedly disposed disassembled fire-bomb cases and aircraft fuel tanks.

Yet another object of my invention is to provide box means of weatherproof material, specifically and preferably wooden box means impregnated on and near the surface with weatherproof material, such as paraffin wax.

Other objects and advantages of the box and package means of my invention will become apparent to those skilled in the art upon reading this disclosure.

Drawings accompany and are a part of this disclosure. Such drawings depict preferred specific embodiments of the new box and package means of my invention, and it is to be understood that these drawings are not to unduly limit the scope of my invention.

In the drawings, Fig. 1 is a side elevational view, partly in cross section and partly cut away, showing a preferred specific embodiment of the new package means of my invention wherein a disassembled metal fire-bomb case is nestedly packaged.

Fig. 2 is an elevational view of an end supporting, spacing and padding packing member of the package of Fig. 1.

Fig. 3 is a view taken on line **3—3** of Fig. 2.

Fig. 4 is an elevational view of an inner supporting, spacing and padding packing member of the package of Fig. 1.

Fig. 5 is a view taken on line **5—5** of Fig. 4.

Fig. 6 is an exploded perspective view in relative position of the bottom, sides and ends of the box means of the package of Fig. 1.

Fig. 7 is a perspective view of the two end and two inner supporting, spacing and padding packing members in relative position, each individually shown in Figs. 2 through 5, and of the package of Fig. 1.

Fig. 8 is a perspective view of the top panel member of the box means of Fig. 1, in relative position corresponding to the position of the other members of the box means as shown in exploded perspective view in Fig. 6.

Fig. 9 is a view taken on line **9—9** of Fig. 1. The lefthand side of this view only is shown, since the right side view is symmetrically the same.

Following is a discussion and description of the preferred embodiment of the new box and package means of my invention shown in the drawings. In such discussion and description reference is made to the drawings whereon the same reference numerals are used to indicate the same or similar parts and structure. It is to be understood that such discussion and description is not to unduly limit the scope of my invention.

The drawings depict the new box and package means of my invention to package a disassembled metal fire-bomb case having conoidal end members **11** and a hollow cylindrical center member **13**. Center member **13** has bolt means **15** therewith for mounting conoidal end members **11** on opposite ends of the center member when the bomb is assembled for use.

The new box means of my invention has a wooden slatted and raised bottom comprising bottom members

17 mounted on base members 19. This is a preferred bottom structure, giving good ventilation of the box by air passage up through the slatted bottom members and allowing for easy insertion of the forks of a fork-lift truck under members 17 on either side of center base member 19 to lift the box and its contents. The box of my invention has like wooden end panel members 21 with cleats 23 secured thereto. It is preferred to make the panel of end panel member 21 of plywood and cleat members 23 of dimension lumber, such cleat members strengthening the box and providing means by which to easily secure the box together. The box of my invention has like wooden side panel members having a plywood panel 25 with outer transverse cleats 27 and an upper longitudinal cleat 29 secured thereto. These cleat members 27 and 29 give support to the box and provide means to easily secure together the members of the box. The wooden top panel member of the box has a plywood panel 31 with transverse cleats 33 secured thereto on the outer surface thereof. These cleat members 33 likewise strengthen the box and provide means for securing together the box members.

The slatted bottom of the box has transverse cleat members 35 secured to the upper side of bottom members 17 in the end portions thereof. The side panel members have cleat members 37 transversely secured to the inside and in the end portions thereof. The top panel member has cleat members 39 transversely secured to the inside and in the end portions thereof. These cleat members 35, 37 and 39 support fiberboard packing members 41, inner packing members 41 in turn supporting, spacing and padding the apex end portions of conoidal end members 11 and the end portions of center member 13. These cleat members 35, 37 and 39 are positioned on the bottom, sides and top of the box, respectively, so that the inner edges of the cleat members are flush with each other, thus contacting and supporting packing members 41 all around their outer edges on the inside thereof.

The disassembled fire-bomb case is spaced from the bottom, ends, sides and top of the box and its members from each other by inner and end supporting, spacing and padding packing members 41 and 43. The end fiberboard packing members 43 have annular recesses 45 and 47 therein which receive the base end portions of conoidal end members 11 to mount same in the box. Inner packing members 41 have apertures 49 with their outer edges having substantially the same contour as the surfaces of the apex end portions of the conoidal end members 11, and members 41 receive in such apertures these apex end portions to mount the conoidal end members 11. A ring of spaced holes 51 receives and mounts bolts 15 and in turn cylindrical center member 13 between members 41 and spaced from the top, sides and bottom of the box. For articles whose conoidal end members are joined to the center member by means other than by bolts 15, such as by a centrally located longitudinal rod, holes 51 in members 41 can be replaced by an annular recess corresponding to the ends of the hollow center member.

As one skilled in the art can see from examining the drawings in conjunction with the description set forth hereinbefore, the new box and package means of my invention is very strong and has many cooperations between the box members, the packing members and the article packaged. The top of the box extends the length thereof overlapping the end members and side members so that there are no cracks at juncture of the members on top, and so that water from the top will fall therefrom without running into the box. Also, it is preferred that the side members overlap the end members as shown so that a good seal is obtained against leakage into the box from the ends. I have found that the new box and package means of my invention when constructed of weatherproofed material, as discussed hereinbefore, will store the metal fire-bomb cases out-of-doors for an indefinite period of time, protecting the metal surfaces from moisture and preventing their corrosion.

One of the chief advantages of the box means of my invention is that the package can be assembled easily and economically. An efficient way of accomplishing the assemblage of the package is as follows. Other means, of course, can be used. The bottom, one end and one side panel member can be nailed together with the lower portion of member 25 nailed to the outer edge of the outer member 17, and with the lower portion of member 21 nailed to the ends of members 17. The disassembled fire-bomb case members and packing members can then be inserted, followed by the other end panel member, the other side panel member and the top. I find it desirable to nail the top end cleats 33 to top cleat members 23 on the end members 21 and top panel 31 to cleats 29, and to nail through end cleat members 27 on side members 25 into side cleat members 23 on the end members 21. Metal straps 53 are then preferably placed around the box to better secure the members of the box.

As will be evident to those skilled in the art, various modifications of my invention can be made, in the light of this disclosure and discussion, without departing from the spirit or scope of the disclosure or from the scope of the claims.

I claim:

1. A package for a disassembled article comprising conoidal end members and a hollow center member, which comprises in combination: a box having a slatted bottom, side panel members extending the length of said box and disposed on the outside of said bottom, said bottom and side panel members positioned to form openings for ventilation of said box, end panel members disposed on the outside of said bottom and a top panel member extending the length of said box and overhanging said side panel members; an end packing member in each end portion of said box having mounting means therewith and said conoidal end members mounted therein with each one of said mounting means having a base end portion of one of said conoidal end members mounted therein; a pair of inner packing members in said box, said packing members having apertures therethrough and other mounting means therein and said conoidal end members mounted therein with each one of said apertures having an apex end portion of one of said conoidal end members mounted therein and said hollow center member mounted in said inner packing members with each one of said other mounting means having an end portion of said center member mounted therein; cleats secured to the inner sides of each of said bottom, side and top panel members in each end portion thereof, said cleat means in contact with and supporting said inner packing members on the sides thereof toward said end members of said box; and other cleat means and strap means securing together said bottom, side, end and top panel members of said box.

2. The package of claim 1 wherein said top, end and side panel members of said box are wooden and impregnated with a weatherproofing material.

3. A package for a disassembled article comprising conoidal end members and a hollow center member, which comprises, in combination, a box having a plurality of spaced base members, bottom members secured to said base members in spaced relation to provide a raised and slatted bottom of said box, a pair of side panel members oppositely mounted on said bottom to form the sides of said box, said sides and bottom positioned to form openings for ventilation of said box, a pair of end panel members oppositely mounted on said bottom to form the ends of said box, and a top panel member mounted on said sides and ends of said box, said top panel member being of size to extend when mounted the full length of said box and to overhang said side panel members, an end packing member mounted in each end portion of said box and having mounting means therewith of size and

shape to receive said conoidal end members with each one of said mounting means of said end packing members having a base end portion of one of said conoidal members mounted therein, a pair of inner packing members mounted in said box, said inner packing members having apertures therethrough and other mounting means therein of size and shape to receive said conoidal end members with each one of said apertures having an apex end portion of one of said conoidal end members mounted therein and with said hollow center member mounted in said inner packing members with each one of said other mounting means having an end portion of said center member mounted therein, a plurality of cleat members in each end portion of said box secured on said bottom members, side panel members and top panel member, said cleat members positioned to and having portions supportingly contacting said inner packing members in the edge portions of said packing members on the sides thereof toward said ends of said box, and to along with said conoidal end members and hollow center member cooperatively

contact said inner packing members to maintain said inner packing members in supporting and spacing position, and means securing together said bottom, sides, ends and top panel member of said box.

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