

Jan. 31, 1956

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2,732,936

PACKAGED DISASSEMBLED HOUSINGS

Filed Dec. 30, 1953

3 Sheets-Sheet 1

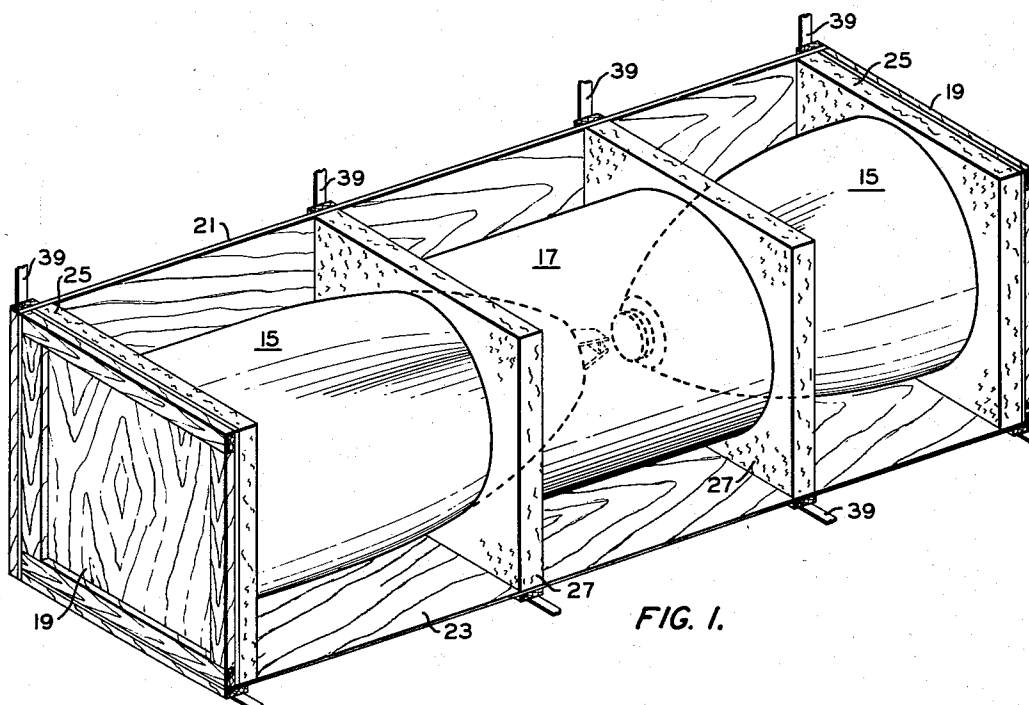


FIG. 1.

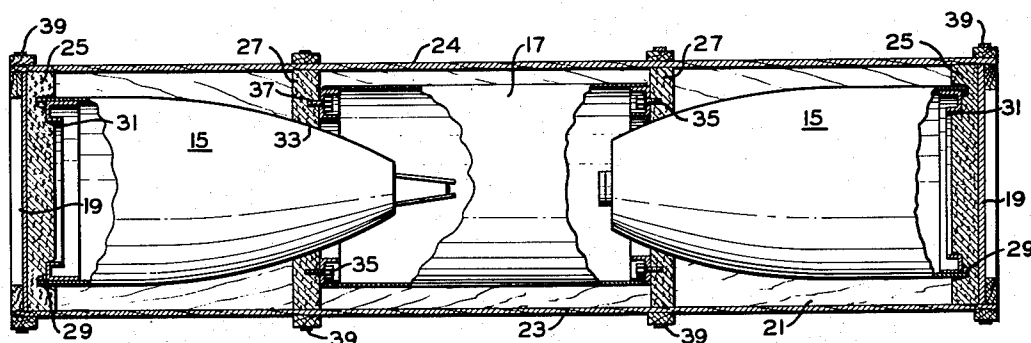


FIG. 2.

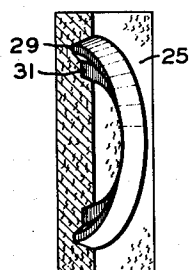


FIG. 3.

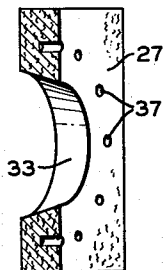


FIG. 4.

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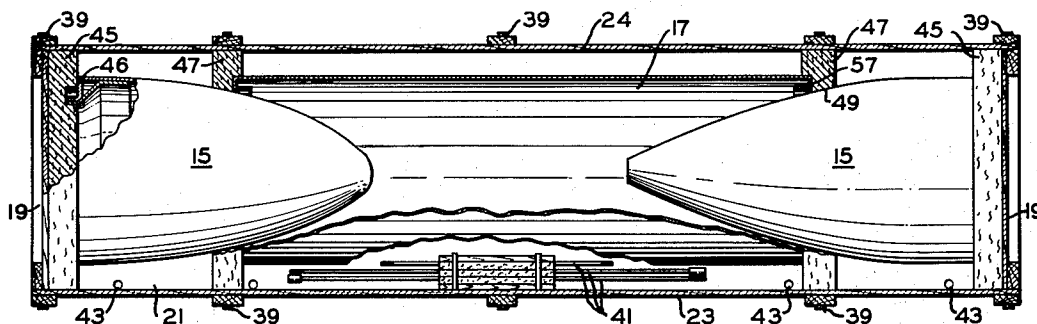


FIG. 5.

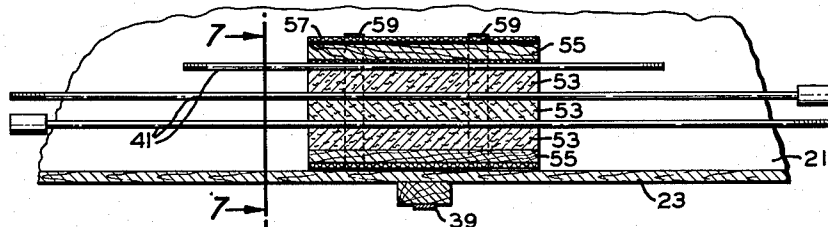


FIG. 6.

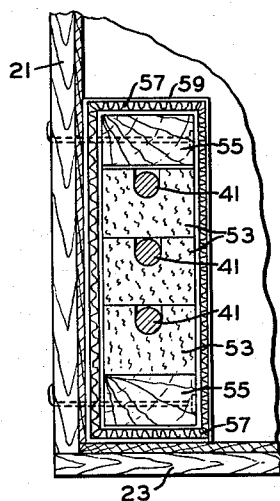


FIG. 7.

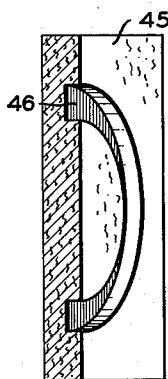


FIG. 8.

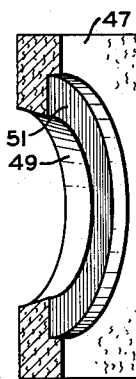


FIG. 9.

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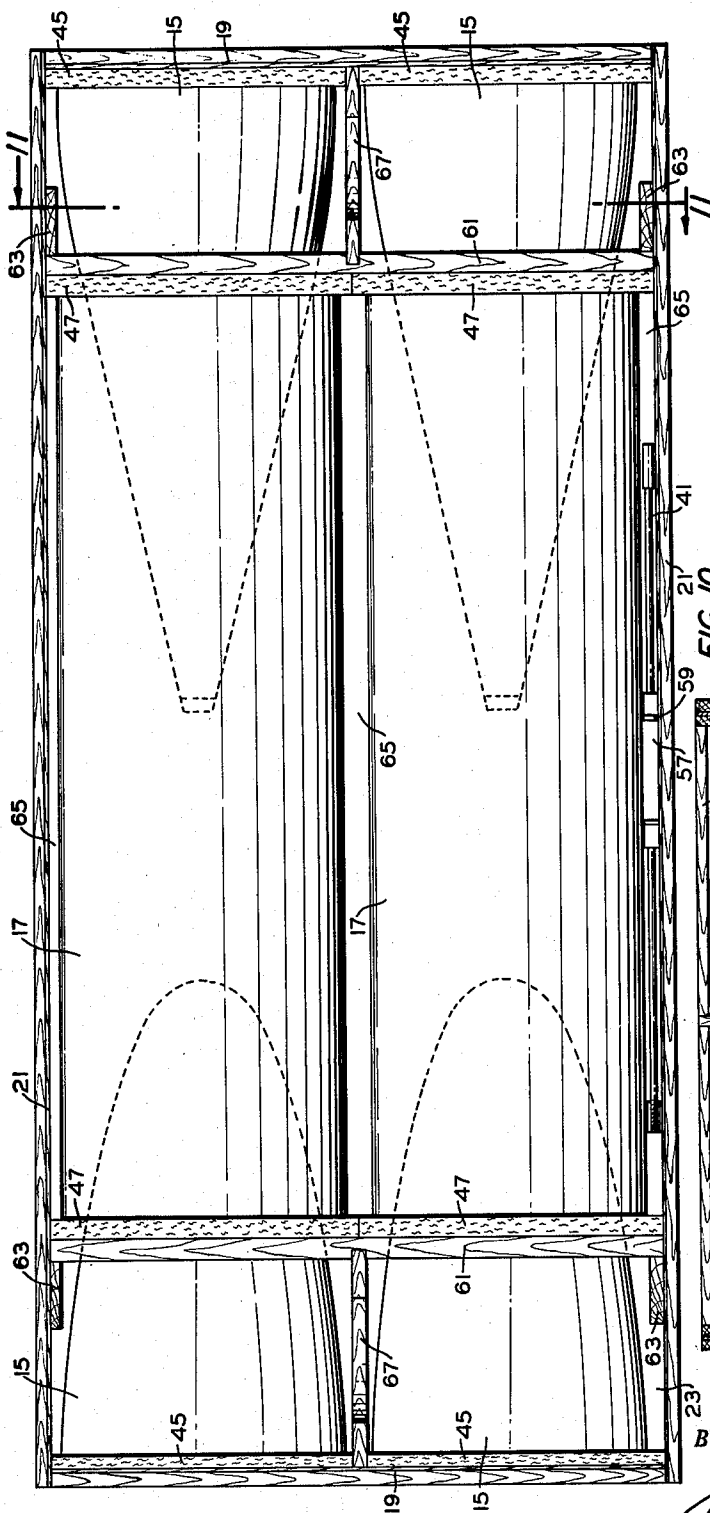
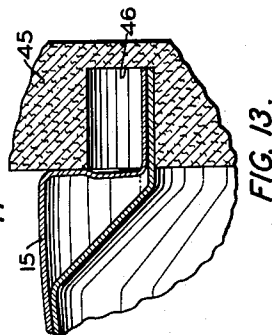
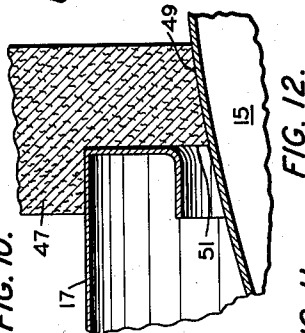
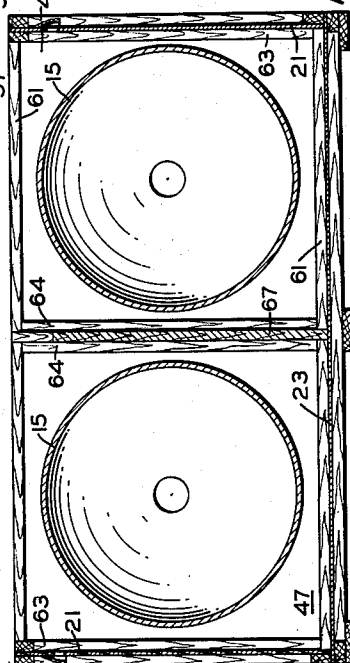
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PACKAGED DISASSEMBLED HOUSINGS

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3 Sheets-Sheet 3



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PACKAGED DISASSEMBLED HOUSINGS

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Application December 30, 1953, Serial No. 401,307

3 Claims. (Cl. 206—65)

This invention relates to packaging. In a more specific aspect, this invention relates to packaging means for shipping and storing outer housing members comprising conoidal end members and a hollow center member. In a still more specific aspect, this invention relates to packaging means for disassembled hollow fire-bomb cases and aircraft fuel tanks comprising two conoidal end members and a cylindrical shaped middle member. In yet a more specific aspect, this invention relates to packaging means for shipping and storing a plurality of outer housings comprising conoidal end members and a center member.

This application is a continuation-in-part of my co-pending application, Serial No. 259,945, filed December 5, 1951, now Patent No. 2,710,096, issued June 7, 1955.

I have invented new packaging means for disassembled outer housing members comprising conoidal end members and a hollow center member, particularly fire-bomb cases and aircraft fuel tanks which have similar hollow conoidal end members and a hollow cylindrical center member. The new packaging means of my invention has outer cover means, and supporting, spacing and padding members within the cover means which pack them from the cover means and each other. The supporting, spacing and padding members used in the package are (1) a first end member in one end of the cover means between it and the base of one of the conoidal end members of the fire-bomb case or fuel tank, (2) a second end member in the other end of the cover means between it and the base of the other conoidal end member of the fire-bomb case or fuel tank, (3) a first inner member between the apex end of one of the conoidal end members and the end of the center member, and (4) a second inner member between the apex end of the other conoidal end member of the fire-bomb or fuel tank and the other end of the center member. The end supporting, spacing and padding members mount the base ends of the conoidal end members of the packaged housings. The inner supporting, spacing and padding members have apertures into which the apex ends of the conoidal end members project, and annular mounting means in the inner members mount the ends of the center member. As a result in a preferred specific embodiment of the package of my invention, a disassembled fire-bomb case or fuel tank is packaged with but four supporting, spacing and padding members and the outer cover means.

In the preferred packages of my invention, the supporting, spacing and padding members can be in direct contact with the metal housing members. I have found this can be accomplished by using fiberboard as the material of construction for the supporting, spacing and padding members. 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

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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, per cent 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 is an object of my invention to provide new packaging means.

It is another object of my invention to provide new package means for shipping and storing outer housing members comprising conoidal end members and a center member.

It is still another object of my invention to provide new packaging means for disassembled hollow fire-bomb cases and aircraft fuel tanks comprising two conoidal end members and a hollow cylindrical shaped middle member.

Yet another object of my invention is to provide protective means for shipping and storing a plurality of outer housings comprising conoidal end members and a middle member.

Other objects and advantages of the new packaging means of my invention will become apparent to one 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 packaging means of my invention, and it is to be understood that such drawings are not to unduly limit the scope of my invention.

In the drawings, Fig. 1 is a perspective view with the top and one side of the outer cover means removed showing a disassembled fire-bomb case nestedly packaged by the means of my invention.

Fig. 2 is a longitudinal elevational view partly in cross section and partly cut away of the packaging means of my invention shown in Fig. 1.

Fig. 3 is a perspective view of a half section of the end supporting, spacing and padding members shown in Figs. 1 and 2.

Fig. 4 is a perspective view of a half section of the inner supporting, spacing and padding members shown in Figs. 1 and 2.

Fig. 5 is a longitudinal elevational view partly in cross section and partly cut away showing a preferred specific embodiment of the means of my invention as applied to packaging a disassembled fuel tank whose members are connected together for use by longitudinal and centrally located connecting rod means.

Fig. 6 is an elevational view partly in cross section showing the means of mounting the connecting rod means shown in Fig. 5 in the new package of my invention.

Fig. 7 is a view taken on line 7—7 of Fig. 6.

Fig. 8 is a perspective view of a half section of the end supporting, spacing and padding members of the package shown in Fig. 5.

Fig. 9 is a perspective view of a half section of the inner supporting, spacing and padding members of the package shown in Fig. 5.

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Fig. 10 is a longitudinal plan view with top cover member removed of packaging means of my invention wherein a plurality of disassembled fuel tanks are nestedly packaged.

Fig. 11 is a view taken on line 11—11 of Fig. 10.

Fig. 12 is a cross sectional view showing the inner supporting, spacing and padding members of Figs. 5, 9, 10 and 11 with an end conoidal member and the center member of the fuel tank mounted therein.

Fig. 13 is a cross sectional view showing the end supporting, spacing and padding members shown in Figs. 5, 8 and 10 with the base end of the conoidal end member of the fuel tank mounted therein.

Following is a discussion and description of the new packaging means of my invention. Such discussion and description is made with reference to the drawings on which the same reference numerals are used to indicate the same parts or structure. It is to be understood that such discussion and description is not to unduly limit the scope of my invention.

Figs. 1 through 4 depict a package of my invention wherein the conoidal end members 15 and the hollow cylindrical center member 17 of a fire-bomb case are nestedly packaged. The package has end panels 19, side panels 21, bottom panel 23 and a top panel 24. These panels of the outer cover means can be made of any suitable material, such as wood, metal, plastic, and the like, plywood panels with wooden cleat members having been found to be very satisfactory. The supporting, spacing and padding fiberboard members used in the package consist of end members 25 and inner members 27. The end members 25 have annular grooves 29 and 31 therein into which the base ends of conoidal end members 15 fit. Grooves 29 are recessed more than grooves 31 so that the base end of members 15 fit snugly into the grooves and members 15 are strongly supported against lateral movement. Inner supporting, spacing and padding fiberboard members 27 have apertures 33 therethrough with an outer edge shaped to correspond to the contour of the apex end of conoidal end members 15. The conoidal end members snugly fit into the apertures. The conoidal end members of the fire-bomb housing are connected to opposite ends of center member 17 using bolt means 35. Inner fiberboard members 27 have holes 37 in a ring around aperture 33 into which bolts 35 fit as shown in Fig. 2. Tie means are preferably used to hold the package together, such tie means conveniently being metal straps 39 around the package over the outer cleats. The package is assembled in any suitable manner, such as by mounting the fire-bomb members and supporting, spacing and padding members 25 and 27 in the package with one end panel 19 secured in place, the other end panel 19 being inserted and secured just prior to placing the top and/or side panel on the package. As can be seen by one skilled in the art, I have invented a package which through the cooperation of the supporting, spacing and padding members, the disassembled fire-bomb case packaged and the outer cover means results in a very simple package, requiring a minimum of packaging parts and which spaces the packaged articles from each other and from the outer cover means, pads therebetween, and supports and protects the packaged articles. The package of my invention is very strong and gives excellent results in shipping and storing.

In Figs. 5 through 9 a hollow disassembled fuel tank is shown packaged by the means of my invention, such fuel tank being of the type wherein the end conoidal members 15 are connected to opposite ends of center member 17 by connecting rods 41. In use these connecting rods are co-axial with the longitudinal axis of members 15 and 17. Here again the outer cover means is end panels 19, side panels 21, bottom panel 23, and a top panel 24. Side panel 21 has holes 43 therein at the bottom for water run-off and/or ventilation. This

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means can be likewise used in the package shown in Figs. 1 through 4, if desired. The end inner supporting, spacing and padding members 45 have an annular groove 46 therein into which the base ends of conoidal members 15 fit. Inner supporting, spacing and padding members 47 have apertures 49 therethrough, the outer edge of which is shaped to correspond to the contour of the apex end portions of the conoidal members 15, and an annular recess 51 around aperture 49 is provided in members 47 to mount the ends of hollow cylindrical center member 17 of the fuel tank. End fiberboard members 45 have an annular recess 46 therein in which the base ends of conoidal end members 15 are snugly mounted. The whole of the package is assembled to nest the fuel tank end and center members in much the manner of the package in Figs. 1 through 4. The package of Figs. 5 through 9 has the same advantages as that package of Figs. 1 through 4, and one skilled in the art can see that the package of my invention is easily adapted to package any article of this nature having conoidal end members and a hollow center member. The versatile features of my package are very advantageous. Rod means 41 is desirably packaged and kept along with the case members 15 and 17. This is easily and readily accomplished by my new package means. Fiberboard members 53 are elongated and grooved as shown to receive and surround the center portions of connecting rods 41. Wooden block members 55, or blocks made from any other suitable material such as metal, plastic, or the like, are mounted above and below fiberboard packing members 53. The whole assembly is wrapped with strong paper packing material 57, and secured to a side member 21 by suitable means, such as nails through wooden blocks 55 as shown in Fig. 7. Metal ties 59 on the outside of paper packing material 57 to hold same around blocks 55 and 53 have been found desirable.

In Figs. 10 and 11, a package is depicted wherein two fuel tanks are nestedly packaged by the means of my invention. These fuel tanks are of the type which are connected in use by rod means 41 co-axially located with the longitudinal axis of end members 15 and center member 17. Two fiberboard end supporting, spacing and padding members 45 are used in each end of the cover means having end panels 19 similar to those of the packages of Figs. 1 and 5, the substantial difference being that they are larger to provide for packaging two fuel tanks. And, four inner fiberboard supporting, spacing and padding members 47 are employed, two each for one set of fuel tank members. The apex ends of conoidal end members 15 and the ends of center members 17 are mounted in fiberboard members 47 in the same manner as the package of Fig. 5, and the base ends of conoidal end members 15 are mounted in fiberboard members 45 in the same manner as in the package of Fig. 5. Figs. 12 and 13 show in detail such preferred mounting of members 15 and 17 in members 47 and 45. I have found it desirable due to the weight created by two sets of fuel tank members to incorporate cooperating inner cleat and supporting members in the package for inner fiberboard members 47. This is accomplished by upper and lower transverse cleat members 61 in each end portion of the package. These members 61 can be secured in any suitable manner such as by nailing. Cleat members 63 and cleat members 64 secured in any suitable manner afford support for the sides of members 47 on the outside thereof. Longitudinal cleat members 65 secured in any suitable manner support members 47 on the insides thereof. Center members 67, which contact end members 19 and cleat members 61, and are between fiberboard members 45, support the center portions of transverse cleats 61. The connecting rod members 41 are conveniently packaged in the same manner as shown in Figs. 5, 6 and 7. The package means of my invention as applied to packaging

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a plurality of fuel tanks has been found to result in a very strong package, using a minimum of materials, and protecting the fuel tank members from corrosion and abrasion. The same advantages are realized when employing my invention to package a plurality of fire-bomb cases like those shown in Figs. 1 and 2.

The fiberboard support, spacing and padding members used in the package of my invention can be formed in any suitable manner such as by being die-cut, punched, drilled, sawed, routed, scored or otherwise worked from sheet fiberboard. The recesses or depressions and holes in the members may be formed by any of the above-mentioned methods, and I have found it desirable that in forming the package, the fire-bomb case members and fuel tank members snugly fit in the particular mounting means in the supporting, spacing and padding members. The size and shape of the fiberboard supporting, spacing and padding members can vary widely, depending, of course, on the size, contour and weight of the particular case having conoidal ends and a hollow center member being packaged. Generally speaking, the fiberboard members will be of such dimension so as to project beyond the housing members and space them from the outer cover means of the package, and they will be of sufficient thickness to support the members in their suspended position within the outer cover. I have found fiberboard of a thickness from $\frac{3}{4}$ " to 3" to be preferable.

The package of my invention takes a minimum of space in which to store same, making it possible to transport a great number of the packaged fire-bomb cases in the given space of a truck bed or freight car. Also, a great number of the fire-bomb cases can be stored in a warehouse or in available open space, as desired.

As will be evident to those skilled in the art, various modifications of this invention can be made or followed 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, which comprises, in combination: outer cover means; two sets of disassembled outer housings, each of said sets of housings comprising conoidal end members and a hollow center member nested together within and spaced from said outer cover with an apex end portion of one of said conoidal members projecting into an end portion of said center member and an apex end portion of the other of said conoidal member of said set projecting into a portion of the other end of said center member of said set, and said two sets of housings disposed side by side within said cover means; each of said two sets of housings having a first end fiberboard member at one end portion of said cover means between the end thereof and a base end portion of one of said conoidal end members and a second end fiberboard member in the other end portion of said cover means between the end thereof and a base end portion of the other conoidal end member, said end fiberboard members having mounting means therein and base end portions of said conoidal end members mounted in their respective end fiberboard member mounting means; each of said two sets of housings having a first inner fiberboard member between an apex end portion of one of said conoidal end members and an end portion of said center member of the set into which it projects and a second inner fiberboard member between an apex end portion of the other conoidal end member of the set and an end portion of said center member into which it projects, said inner fiberboard members having apertures therethrough and mounting means therein around said apertures, and apex end portions of said conoidal end members mounted in their

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respective apertures and end portions of said center members mounted in their respective inner fiberboard member mounting means; cleat means attached to said cover means between said inner fiberboard members and the ends of said cover means adapted to support said inner fiberboard members; and cleat means disposed between the conoidal end members of each set of housings adapted to along with said first-named cleat means support said inner fiberboard members.

2. A package which comprises, in combination, outer cover means, a plurality of sets of disassembled outer housing members comprising hollow conoidal end members and a hollow center member, said sets nested side by side within and spaced from said outer cover means, each of said sets having an apex end portion of one of its end members projecting into one end portion of its center member and the apex end portion of the other of its end members projecting into the other end portion of its center member, an end fiberboard member in each end portion of said cover means between the end thereof and said outer housing members and in contact therewith, said end fiberboard members having mounting means therein for each of said sets of housing members and base end portions of said conoidal end members of said sets mounted in their respective end fiberboard mounting means, and an inner fiberboard member mounted in each end portion of said cover means in contact therewith and spaced from said end fiberboard members, said inner fiberboard members having portions between and in contact with said center members and said conoidal end members projecting therinto and having apertures therethrough through which said conoidal end members project, and said sets of housing members spaced from each other.

3. A package which comprises, in combination, outer cover means, a plurality of sets of disassembled outer housing members comprising conoidal end members and a hollow center member, said sets nested side by side within and spaced from said outer cover means, each of said sets having an apex end portion of one of its end members projecting into one end portion of its center member and the apex end portion of the other of its end members projecting into the other end portion of its center member, an end member in each end portion of said cover means between the end thereof and said outer housing members and in contact therewith, said end members having portions which support, space and pad said housing members and having mounting means therein for each of said sets of housing members and base end portions of said conoidal end members of said sets mounted in their respective end member, and an inner member mounted in each end portion of said cover means, in contact therewith, and spaced from said end members, said inner members having portions between and in contact with said center members and said conoidal end members projecting therinto, and said inner members having portions which support, space and pad said housing members and having apertures therethrough through which said conoidal end members project, and said sets of housing members spaced from each other.

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