

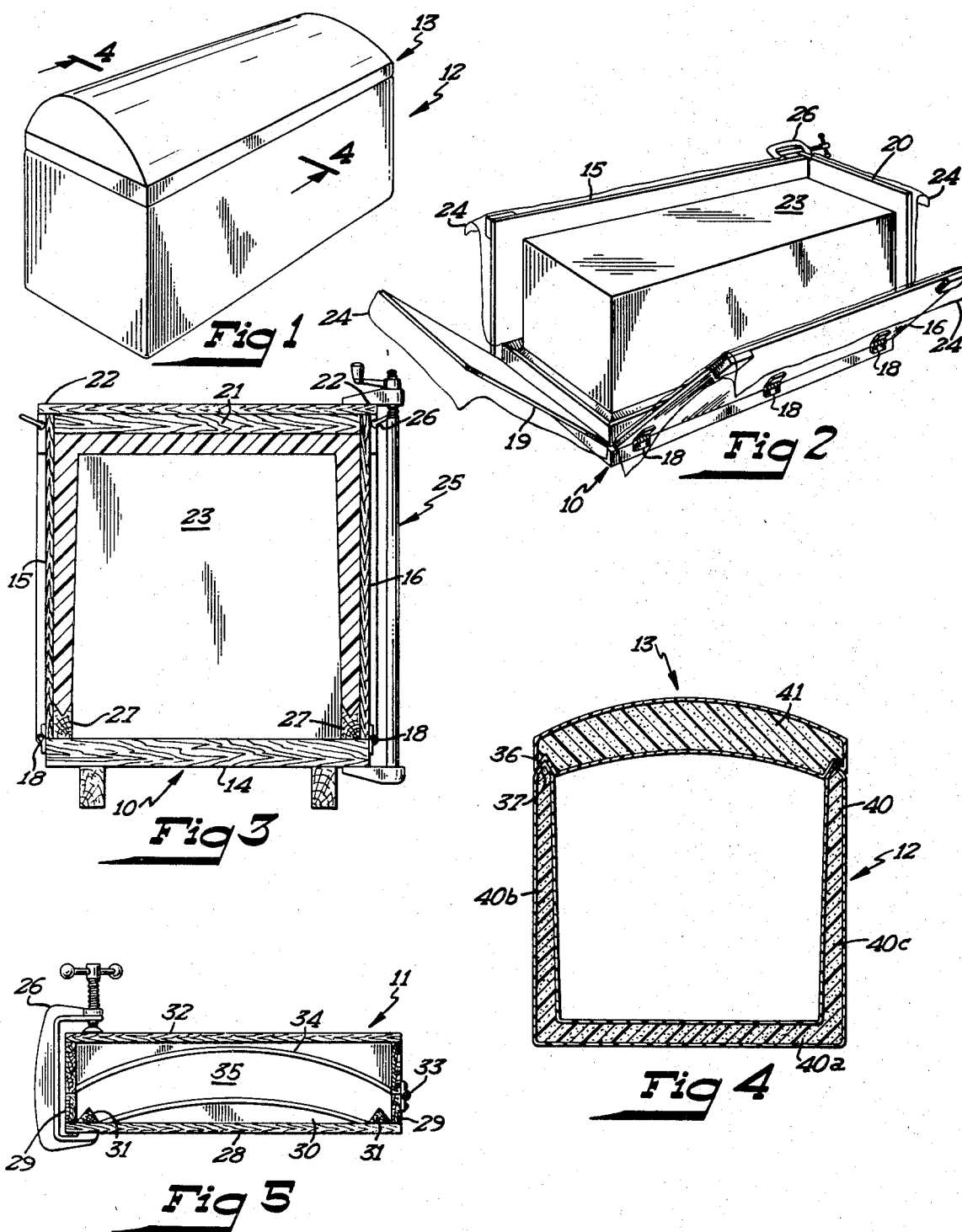
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BURIAL VAULT

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1

2

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BURIAL VAULT

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6 Claims

ABSTRACT OF THE DISCLOSURE

Disclosed herein is an incombustible burial vault having box and lid members each of which is comprised of smooth thin spaced inner and outer walls supported by a polyurethane core having a density of about two-three times that of its free foam density as a result of having been formed under substantial pressure and being otherwise devoid of reinforcing structure.

This application is a continuation of Ser. No. 449,777, filed Apr. 21, 1965, now abandoned.

The present invention relates generally to improvements in the field of burial vaults.

It is a general object of our invention to provide a novel burial vault of improved construction and utility.

A more specific object is to provide a novel burial vault of improved construction so as to have substantially less weight than burial vaults heretofore known and yet having the required strength, and to provide a novel method for manufacturing the same.

An other object is to provide a novel burial vault of improved construction which can be manufactured more inexpensively than burial vaults having the required features as heretofore known.

Another object is to provide novel methods and structures having unique construction, so as to provide the required strength while substantially reducing the weight thereof as compared to burial vaults as heretofore known with such strength and at the same time having a manufacturing cost substantially lower than those heretofore known.

These and other objects and advantages of our invention will more fully appear from the following description, made in connection with the accompanying drawings, wherein like reference characters refer to the same or similar parts throughout the several views, and in which:

FIG. 1 is a perspective view of a burial vault manufactured in accordance with the methods of manufacture of our invention and having the desired attributes;

FIG. 2 is a perspective view of the form used in manufacturing the box member of our novel burial vault;

FIG. 3 is a vertical sectional view of the form used in manufacturing the box member of the burial vault with the form in closed position;

FIG. 4 is a vertical sectional view of our finished box member with its lid member secured thereto; and

FIG. 5 is a vertical sectional view of the old or form utilized in forming the lid member of our burial vault.

The methods which we utilize in manufacturing our novel burial vault requires the furnishing of a pair of molds indicated generally by the numerals 10 and 11. These molds or forms 10 and 11 are designed and constructed for the manufacture of the box member indicated generally by the numeral 12 and the lid member indicated generally by the numeral 13 of the burial vault.

The mold 10, as best shown in FIGS. 2-3, includes a flat bottom panel 14 and opposite vertically extending

side panels 15 and 16. Each of these side panels 15 and 16 are provided with hinges such as indicated by the numeral 18 for pivotally connecting the side panel at its lower edge to one side of the bottom panel 14 as best shown in FIG. 3. End panels 19 and 20 are also provided and are similarly hinged to the opposite ends of the bottom panel 14. A cover member 21 is also provided for closing the form and sealing the same when the side members 15 and 16 and the end panels 19, 20 have been swung upwardly to vertically extending position as shown in FIG. 3. As best shown in FIG. 3, the cover member 21 has an outwardly extending peripheral flange portion 22 which rests upon the upper edges of the side panels 15, 16 and the end panels 19, 20. Centrally disposed within the form 10 is an interior form member 23 which is rectangular in shape and has closed sides, ends, top and bottom and which rests upon the panel member 14 so as to be substantially equidistant from the side panels 15, 16 and end panels 19, 20 of the form when the form is closed. A sheet 24 of polyethylene is utilized to line the mold or form 10 so as to facilitate freeing the form from the molded lid member core and to aid in sealing the form.

The forms which we utilize are made of wood and the panels 15, 16, 19 and 20 as well as the cover member 21 and the bottom panel 14 are sealed at all of their joints so as to make the form sufficiently well sealed to contain the substantial pressure generated therewithin by the chemicals which are utilized to form the box member core as will be hereinafter described. It will be understood, of course, that the molds or forms may be made of metal or other material so long as they have the necessary strength to contain the pressures developed therewithin during the molding process. We anticipate coating the interior of these molds with Teflon so as to eliminate the need for the sheet 24 of polyethylene. Conventional clamping members 25 are utilized to clamp the cover member 21 tightly upon the upper ends of the side panels 15, 16 and end panels 19 and 20, as best shown in FIG. 3, and conventional C-clamps 26 are utilized to clamp the end panels 19, 20 and side panels 15, 16 together in sealed position.

Secured to the outer side of the form 23 along its lower edge and extending therearound is a V-shaped lip-forming member 27. This can best be seen in FIG. 3. The member 27 is designed to form the upper terminal edges of the vertically extending walls of the lid member into an inverted V-shaped configuration entirely around the periphery thereof so as to cooperate with a conforming configuration formed upon the lower terminal portions of the cover member of the vault as will be hereinafter described. This can best be seen by reference to FIG. 4. It will also be noted that the form 23 tapers upwardly and inwardly slightly so that the walls of the box member of the vault will increase in transverse dimensions from the upper peripheral edges towards the bottom thereof.

The area between the side panels 15 and 16 and end panels 19, 20 and the form 23 receives the chemicals from which the box member core is to be formed. Preferably this space is approximately 1 inch wide adjacent the lower portions of the form 23 and is approximately 1 1/4 inch wide adjacent the upper portions of that form. The space between the cover member 21 and the upper surface of the form 23 likewise is approximately 1 1/4 inch wide so that the bottom panel 14 will have such transverse dimensions. The core of the box member 12, when it is formed in the mold 10 will, of course, have corresponding dimensions.

The mold 11 is constructed similar to the mold 10 in that it has a bottom member 28 which is rectangular in shape and has upstanding end and side walls such as

3

those designated by the numeral 29 and a central built-up arcuate form 30 which extends substantially from end to end of the form and entirely around which an inverted upstanding V-shaped member 31 extends. The cover member 32 is hinged as by hinges 33 to an upstanding side wall 29 of the bottom member 28, as shown, and has a concave inner surface 34 designed to form the curved upper surface of the core of the lid member 13. The space 35 between the members 28 and 32 has the same horizontal dimensions as the corresponding space in mold 10 and is designed to conform to the configuration of the upper edges of the core of the box member to be formed therein and is designed to be filled with the same chemical as that utilized to form the core of the box member 12. Since the inverted V-shaped lip-forming members 31 extends completely around the periphery of the arcuate form 28, the core of the lid member 13 formed therearound will have a V-shaped lower peripheral surface 36 that meets with the inverted V-shaped surface 37 of the box member core after it has been formed as described herein. C-clamps such as indicated by the numeral 26 are utilized to hold the form in sealed position during the period in which the core of the lid member is being formed, as shown in Fig. 5.

In practice, after placing the polyethylene sheet 24 in position beneath the form 23, we bring the side panels 15, 16 and end panels 19, 20 into vertically extending position as shown in Fig. 3 and clamp them together with C-clamps such as clamp 26. Thereafter we spray into the interior of the form equal parts by weight of liquid polyurethane and a blowing agent, so that they are intermixed with each other and the latter causes the liquid polyurethane to be formed into a water impervious rigid foamed core of polyurethane. This foamed core has been indicated by the numeral 40 in the box member 12 and by the numeral 41 in the lid member 13 when the latter is formed in the same manner as the mold 28. We prefer to utilize a product which is identified as RCR 6059 Glid-Foam as the liquid polyurethane and a blowing agent identified as RCR 5027 Glid-Foam, each of which are manufactured and sold by The Glidden Company, 900 Union Commerce Building, Cleveland, Ohio. The latter product is believed to be the well-known blowing agent marketed under the trademark "Freon."

In practice, we utilize one gallon of the combined liquid for each two cubic feet of space which is to be filled in the molds. In other words, if the area within the mold to be filled totals four cubic feet, we will utilize one gallon of RCR 6059 Glid-Foam and one gallon of RCR 5027 Glid-Foam to produce the desired water impervious rigid foamed core. Thus the walls of the box member will approximate 1 inch in transverse dimension and the upper wall of the lid member will approximate 3 inches in vertical transverse dimension.

As soon as we have sprayed the requisite amounts of the liquid polyurethane and foaming agent into the space surrounding the central form 23 or into the space 35, as the case may be, we close the appropriate form and apply the C-clamps 26 and the clamps 25 as hereinbefore indicated. In this manner we provide an effective seal so that the pressure generated by the interaction of the blowing agent and the liquid polyurethane will be contained therein. The entire forming period takes approximately thirty minutes for the box member and by the end of that period the box member core 40 having water impervious rigid walls of foamed polyurethane will have been formed and will completely fill the void within the mold. The cover member core 41 is formed in a similar manner and, of course, can be formed simultaneously so that the entire vault can be formed in approximately 25-30 minutes. When this procedure is followed, the bottom wall core 40a and the side wall cores 40b and 40c of the box member 12 will have a density of preferably 4-6 pounds per cubic foot. Actually, our tests have shown that if the density of the cores of the wall structure of the box member 12

4

and the lid member 13 are within a range of 3-10 pounds per cubic foot, the resulting structure will have adequate strength when it is completed. As indicated previously, however, the preferred density is 4-6 pounds per cubic foot and we prefer to utilize the amounts of liquid polyurethane and blowing agent required to provide such densities. Of course, they could be made with a greater density but in doing so, they soon reach a level of impracticability because of the cost of the chemicals required and the resultant increased weight which we have minimized through our invention.

After the foamed polyurethane cores of the box member 12 and the lid member 13 have been formed as hereinbefore described, they are then completed through the application of a layer of $\frac{1}{8}$ inch solid fiber glass completely around their exterior surfaces. They may, of course, be applied by means of applying a fiber glass mat to the exterior and sealing the same with a polyester resin of the type conventionally used in affixing fiber glass mats of this type to any given surface. In practice, we utilize a gun which is available on the market which chops the fiber glass into relatively small pieces and mixes the same with the necessary polyester resin and blows the mixture against the surface desired to be coated and against which the gun is directed. When the entire surface, both inside and out of the cores of the box member 12 and the lid member 13 have been so coated and sealed with the fiber glass and polyester resin so as to provide a coating approximately $\frac{1}{8}$ inch thick therearound, they are permitted to dry and thereby seal and their manufacture has then been completed.

In spraying the fiber glass and polyester resin upon the polyurethane cores, we utilize a fiber glass applying spray gun currently available on the market and sold under the trademark "Poly-Gun" by Glas-Craft of California, 3225 N. Verdugo Road, Glendale, Calif. We utilize in the gun a polyester resin currently sold under the trademark "Pleogen 1828" by the Mol-Reg Division of American Petro Chemical Corporation, 3134 California St. NE., Minneapolis, Minn.

In introducing the liquid polyurethane and blowing agent into the cavities of the molds 10 and 11, we utilize a Model 43P "Airless Foam Gun" currently sold on the market by Binks Manufacturing Company, 3136-A Carroll Ave., Chicago, Ill. This gun utilizes compressed air and mixes and discharges the intermixed RCR 6059 Glid-Foam and RCR 5027 Glid-Foam into the cavities of the molds 10 and 11 in a layer approximating 1 inch in depth. This layer, subsequent to closing of the molds, blows and expands through action of the blowing agent to completely fill the cavity of the mold and forms the foamed core under pressure generated.

In usage the box member 12 and lid member 13 are sealed when the lid member 13 is placed into position in the conventional manner and as shown in FIG. 4. Immediately prior to applying the lid member to the box member 12, the V-shaped surfaces 36 and 37 are coated with a sealing resin which is a polyester resin. Here again, such a resin is of the type conventionally used when it is desired to apply fiber glass to a surface or to cause two such fiber glass surfaces to adhere to each other and its composition and availability is well-known by anyone versed in the art of fiber glass application. After the sealing resin has been applied to these surfaces and the lid member is placed in position, the resin will set and seal off the entire interior of the box member 12 with respect to air, water, etc. We prefer to utilize the polyester resin previously identified herein as "Pleogen 1828."

A burial vault, which usually has over-all dimensions of 2 feet x 2.5 feet x 7 feet when manufactured in accordance with our methods has been found to be of unusually light weight and durability. It has approximately equal strength to the strength of a conventional concrete vault but it weighs only approximately 60-70 pounds in contrast to the weight of a concrete vault which approxi-

5

mates 2000 pounds. We have found that burial vaults can be manufactured substantially more inexpensively by our methods for it takes only approximately 25-30 minutes to manufacture each vault whereas to manufacture a concrete vault takes at least a day's time. In addition, vaults manufactured in accordance with our methods require much less equipment for handling and storage of the same for by practicing our methods, no overhead cranes, no heavy trucks, etc., are required for the movement, handling, and storage of such items. At the same time we have found that such burial vaults have all of the desirable characteristics of a concrete vault but are much preferable in view of their substantially lesser weight, equal strength, and more effective seal for a concrete vault is more porous than the combination of the fiber glass lining and polyurethane core which we utilize.

It will, of course, be understood that various changes may be made in the form, details, arrangement and proportions of the parts without departing from the scope of our invention which consists of the matter shown and described herein and set forth in the appended claims.

What is claimed is:

1. A burial vault comprising:

- (a) a box member, and
- (b) a unitary lid member therefor;
- (c) each of said members having relatively thin spaced inner and outer rigid walls made of glass fiber-reinforced polyester resin;
- (d) the outer walls of each of said members having a continuously smooth inner surface and being devoid of additional reinforcing structure;
- (e) each of said members having a water impervious relatively thick solid foamed core separate from its said inner and outer walls and completely filling the space therebetween and having a density within the range of 4-6 pounds per cubic foot as a result of being formed under substantial pressure;
- (f) said core being made of a polyurethane material having a free foam rise density of approximately 2 pounds per cubic foot.
- (g) each of said members being devoid of any separate adhesive material between its said core and its said walls.

2. The structure defined in claim 1 wherein said core in said lid member is substantially twice as thick as the core in said box member and is of substantially uniform thickness throughout.

3. A burial vault comprising:

- (a) an incombustible box member, and

6

- (b) an incombustible unitary lid member therefor;
- (c) each of said members having relatively thin spaced inner and outer rigid walls made of glass fiber-reinforced polyester resin;

- (d) the outer walls of each of said members having a continuously smooth inner surface and being devoid of other reinforcing structure;

- (e) each of said members having a water impervious relatively thick solid foamed core separate from its said inner and outer walls and completely filling the space therebetween;

- (f) each of said cores being made of a polyurethane material having a free foam rise density approximating two pounds per cubic foot;

- (g) said core of each of said members having an actual density within a range of four to six pounds per cubic foot as a result of having been formed under substantial pressure; and

- (h) each of said members being devoid of any separate adhesive material between its said core and its said walls.

4. The structure defined in claim 3 wherein the thickness of the core in each of said members is substantially uniform throughout said member.

5. The structure defined in claim 3 wherein said core in each of said members constitutes the only strengthening element for the inner and outer walls of said member.

6. The structure defined in claim 3 wherein the space between said inner and outer walls is devoid of any reinforcing structure other than said core.

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