Jan. 10, 1950 A. P. DOWLING 2,494,473

PLASTIC CASKET

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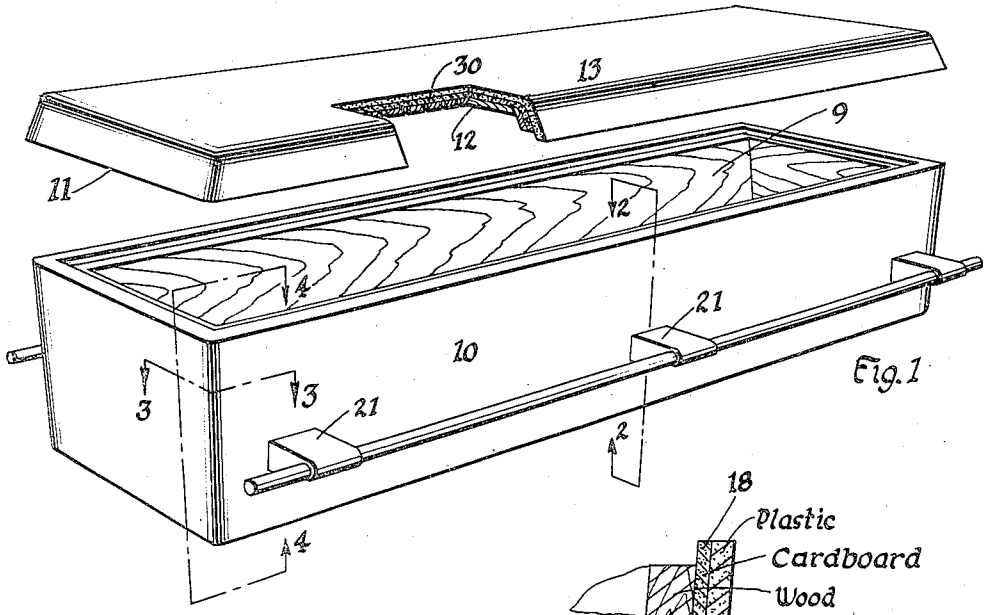

Fig. 1

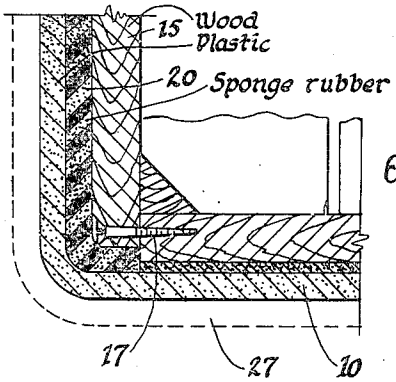

Fig. 3.

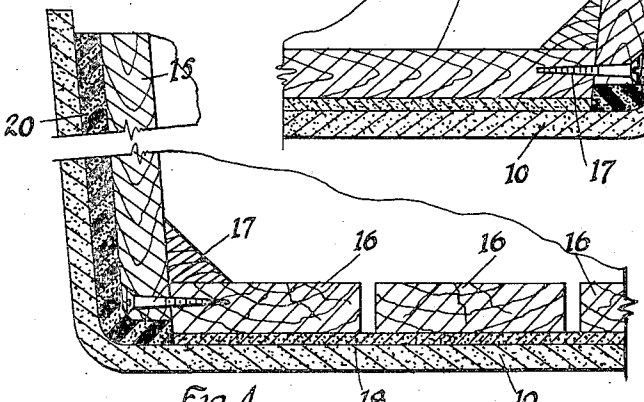

Fig. 4

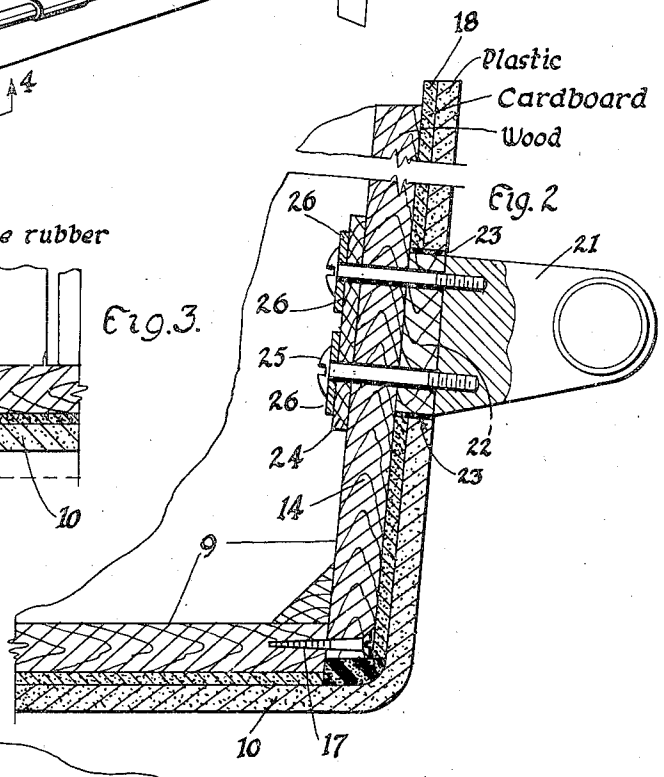

Fig. 2

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PLASTIC CASKET

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13 Claims. (Cl. 27—3)

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The present invention relates to burial equipment and more particularly to a composite casket.

It has been proposed heretofore to fabricate caskets of plastic utilizing a resinous base molding powder, a fabric, such as glass, cotton, etc., impregnated with a resinous substance, or a casting resin. Each of these prior methods has practical difficulties which leave the problem of how to successfully fabricate a plastic casket unsolved. In molding resinous base powders, high molding pressures are required necessitating complicated and expensive equipment, high cost tools and dies, and a curing cycle too prolonged for commercial purposes. In molding, or laminating, as it is more properly termed, resin-impregnated fabric, while it is possible to carry out the process at low molding pressures, the resulting product is unsightly so that expensive hand finishing is needed. The casting method failed because cognizance was not taken of the difference between the expansion and contraction characteristics of the cast plastic and an associated reinforcement.

Some of the objects of the present invention are: to provide an improved casket made of polymer; to provide a casket which can be cast at low cost and in a minimum of time; to provide a casket in which shrinkage of the polymer during or after fabrication has no deleterious effect upon the finished product; to provide a casket made of composite wood and polymer in which the wood part forms one part of the mold in which the polymer is shaped; to provide a novel means of anchoring the handle fittings to a polymer casket; to provide means in the casting of a polymer casket for preventing cracking of the polymer during the setting of the plastic; to provide a casket having a seamless polymer exterior having no joints; to provide a casket characterized by great beauty; to provide a casket having stable and durable characteristics when exposed to adverse conditions of moisture or temperature, and to provide other improvements as will hereinafter appear.

In carrying out the invention in an illustrative but preferred form, I utilize a cast polymer as an outer encompassing seamless layer for an interior mold-forming reinforcing member with materials between the inner and outer layers predetermined in characteristics for the nature of the stresses encountered at various points of the contiguous layers to permit differential relative shrinking without disruptive strains in either the reinforcement or the outer seamless layer.

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In the accompanying drawings, Fig. 1 represents a perspective of a casket embodying one form of the present invention with the top spaced from the body and partly broken away for better illustration; Fig. 2 represents a section on line 2—2 of Fig. 1; Fig. 3 represents a construction detail in section on line 3—3 of Fig. 1; and Fig. 4 represents a section on line 4—4 of Fig. 1.

Referring to the drawings, one form of the present invention comprises an inner box 9 of a shape following generally the contour of a casket, and outer cast layer 10 forming with the box 9 the sides, ends and bottom of a casket, plus a lid 11 formed of an inner reinforcement frame 12, and an outer layer 13. The box 9 is preferably made of wood of the pine species because of its light weight and general abundance, and this wood prior to assembly is preferably adjusted as to a moisture content of between six and eight percent by storing in a dry room at normal room temperatures for the required time. In cutting the wood to proper dimensions for assembly, this should be done so that the grain direction of the wood runs the length of the box on the sides 14 and across the box on the ends 15. The bottom of the box 9 is formed by slats 16 of the wood which are separated from each other by about one-eighth of an inch, these slats 16 being four or five inches in width and being as long as the casket is wide. By assembling the box in this way, any dimensional changes of the wood due to moisture content variations are largely neutralized. The parts of the box 9 are preferably connected together by screws 17, which are placed in the wood to carry shear loads, that is the screws are perpendicular to the sides to enter the slats 16, as shown in the several figures. The box 9 as so assembled becomes the male member of the mold during the molding operation which latter results in the outer encompassing layer 10.

This outer layer 10 is molded of a casting polymer which is preferably a phenolic resin of the phenol-alcohol type made by reacting phenol with formaldehyde in the presence of an alkaline catalyst by methods well known in the art. Prior to casting, the polymer is in a liquid state and contains the smallest possible amount of free water, being preferably condensed to a specific gravity which will be as close as possible to the specific gravity which will characterize the hardened or set polymer, in order to minimize volumetric changes. An acidic accelerator of either the organic or inorganic type is preferably

added to the polymer to accelerate the curing of the liquid polymer to the soild, infusible state, at a moderate temperature, for example, about 140° F., although the temperature may be between 140° F. and 200° F. All ingredients are preferably mixed under vacuum so as not to mix air into the mass.

In order to allow for relative shrinkage between the two materials forming the box 9 and the layer 10, and thereby prevent cracking or breaking of the outer polymer layer 10, the outer faces of the sides and bottom of the box 10 are covered with cardboard 18, preferably corrugated and tacked or glued to the wood. A cardboard of a thickness of about one-eighth of an inch has been found satisfactory. Across the ends of the box 9 and around the bottom of these ends, sponge rubber 20 is glued to the wood to thereby form resilient spacing elements between the box ends and the layer 10, when the latter is molded into place. The thickness of this rubber 20 is preferably about three-eighths of an inch across the ends, and about one-quarter of an inch along each bottom edge.

For the purpose of mounting the usual handle brackets 21, wood blocks 22 are glued at the proper locations to the outer faces of the respective box sides, and are then wrapped by an edge encircling strip of sponge rubber 23, which is glued in place. The cardboard 18 is cut away at these locations to frame the rubber 23, and the thickness of the blocks 22 is approximately equal to the sum of the thicknesses of the cardboard 18 and the outer layer 10. On the inner faces of the respective sides of the box 9 reinforcing plates 24, preferably of wood, are glued in place opposite the locations of the respective blocks 22. Thus, a rigid reinforcement is obtained for the handle brackets 21, and which latter are attached after the casting operation by means of screws or other fastening devices 25 passing through the sides to enter threaded openings in the aforesaid brackets 21. Washers 26 are interposed between the screw heads and the plates 24.

In the casting of the polymer outer layer 10, the box 9 is suspended within a mold 27 (indicated by dotted lines —Fig. 3), so that a minimum of about three-eighths inches clearance is provided between the inner mold walls and the cardboard and rubber covering. After the polymer has been mixed, it is preferable to pour the mix about at room temperature into the clearance to thereby form a complete unitary encompassing layer about the ends, sides and bottom of the box 9.

To cure the polymer, the mold, polymer and box assembly are placed in an oven or heated room at about 150° F. and allowed to remain until the polymer has hardened, after which, it is allowed to cool to room temperature. The box 9 with the cast layer 10 thereon is removed from the mold, any rough exposed edges trimmed off, and the exposed wood varnished. The casket is now ready for the attachment of the handle fittings, and linings.

The lid 11, like the box 9, is formed of a wood reinforcement frame 12, covered on the outer face with cardboard 30, which latter in turn has the polymer layer 13 cast thereon, as will be understood. The cardboard of the lid is supplemented by strips of sponge rubber where required by shrinkage conditions. The lid 9 when completed is attached to the casket body by hinges or other fastening means.

Since the reinforcing box 9 forms the male part of the mold, a very simple female part mold only is required, and preferably, this is of glass or lead cast from a master metal pattern. Also, since the cardboard and sponge rubber completely covers the outer surface of the box 9, the liquid polymer cannot contact the wood to become glued thereto. This is important because one essential feature of the invention resides in having a construction in which relative movement between the setting polymer and the wood is permitted. Were this not so the expansion of one part and the shrinkage of the other part would result in cracking and breaking of the polymer. By reason of the compressible material between the wood and the polymer this damaging action cannot take place as any adverse stretching or contracting is automatically compensated.

An illustrative polymer for forming the encompassing layer 10 is the general type of phenol-formaldehyde resin sold under the trade-mark "Catalin" and is described in various phases of United States Patents 1,854,600, 1,858,168, 1,892,848, 1,909,786, 1,909,788 and 1,909,789, among others. This is obviously one of many types of polymers that may be used.

It may be useful to recite the characteristics of the preferred form of casting polymer in place of or in augmentation of the chemical nature thereof. Thus, preferably, the polymer has a softening point above 120° F., a minimum tensile strength of 3000 pounds per square inch, a minimized impact strength of .1 foot-lb. per inch of notch, a water absorption of not more than 5% by weight absorbed after immersion in water for forty-eight hours, a minimum flexural strength of 4000 pounds per square inch, shrinkage in cooling from highest temperatures used in casting process preferably .012 inch per inch maximum, and the polymer must be stable in the cast state, that is, be capable of being cast in a slab at least seven feet in length, four feet in width and one inch in thickness without any cracks or excessive warpage occurring and the hardened slab so cast shall not exhibit any cracks or excessive warpage after being exposed to at least six cycles of the following conditions that might be met in storage: twenty-four hours at 120° F., followed by twenty-four hours at 32° F.

The internal reinforcement may also be disclosed by the conditions which must be met by it, whether it be made of wood or wood products; or by any structural material which is superior to the surrounding polymer on a strength/weight and/or stiffness/weight basis. Since all rigid polymers have a relatively high degree of compressive strength, the inner reinforcement need not have a compressive strength equal to or exceeding the surrounding polymer, but it is essential that if the reinforcement is to constitute a reinforcement, that it have a higher stiffness/weight ratio; that it have a higher specific flexural strength and higher specific modulus of elasticity in flexure; that it have a higher impact strength; in most but not all cases its specific gravity should be less than that of the surrounding polymer. Of course, it should also be capable either of being glued or the like, or to hold nails or screws or the like.

It will be understood that appropriate dyes, waxes, and fillers of any desired sort may be incorporated directly into the polymer prior to casting, if desired.

The assembled unit, while possibly using the

most expensive type of polymer, at least of the three types of synthetic resins mentioned herein, effects a casket of beauty, strength, durability, relatively effective warmth to the touch because of low thermal conductivity, and which has an extremely low labor cost.

In conclusion, it will be understood that not only does the method described furnish an improved and useful casket, but it is one in which changes in external design are simply accomplished by changing the external master-mold pattern from which it is possible to cast a great number of individual low cost molds of lead or glass, or the like, whereas for compression molding of caskets each and every high cost mold has to be changed, or in place of the elaborate wood carving of the past in wooden casket making; that a wide range of colors is available with selected colors in richer texture and saturation than in the past; and in which there are no external glued joints and therefore the casket continues to exclude moisture even long after the internal wooden or other reinforcements has decomposed, and hence establishes a casket of extremely long and useful life or duration, as the phenolic resins, if used, resist corroding and deteriorating agents which attack other known materials of which present caskets are constructed.

Having thus described my invention, I claim:

1. A casket comprising a polymer molded to a predetermined generally oblong shape having end, side, and bottom walls meeting in angular corners, a box of different and stronger material of generally oblong shape complemental to that of the shaped polymer so as to substantially nest therein internally reinforcing said shaped polymer, sponge rubber interposed between the juxtaposed ends of said box and of said shaped polymer and coextensive about the internal corners formed by said end walls with the side and bottom walls of said polymer shape and terminating adjacent thereto, strips of sponge rubber disposed for coextension about the internal corners formed by the intersection of said side walls with said bottom of said polymer shape terminating adjacent thereto, and cardboard interposed between the bottom and sides of said box and said polymer and extending substantially the distance between the terminations of the respective interposed sponge rubber strips, whereby relative dimensional changes of the polymer shape and said box are ineffective to disrupt said polymer shape.

2. A casket comprising a box-like mold unit, one wall of the unit having an external flattened protuberance of smaller area than the wall, a layer of polymer encompassing the outer surface of said unit except for the protuberance with which it has spaced relation, a handle for the casket having a part juxtaposed to the protuberance, and means connecting the handle to the mold unit through the protuberance whereby stresses pass between the handle and unit without appreciable incidence on the polymer layer.

3. A casket comprising a box-like mold unit, one wall of the unit having an external flattened protuberance of smaller area than the wall, a layer of polymer encompassing the outer surface of said unit except for the protuberance with which it has spaced relation, a handle for the casket having a part juxtaposed to the protuberance, means connecting the handle to the mold unit through the protuberance whereby stresses pass between the handle and unit without appreciable incidence on the polymer layer, and compressible material encircling the protuberance and in contact with the protuberance and the adjacent portions of the polymer layer.

4. A casket comprising an inner reinforcing mold polyangular portion, an outer polyangular encompassing seamless polymer layer, substantially enclosing the reinforcing portion, and an intermediate compressibe layer formed of two different elements in endwise substantial coextension, of which one element is capable of yielding under compression and is disposed about the angles of the respective polyangular mold portion and the other element of which is capable of yielding under shear and is disposed adjacent to the areas between the angles of the said polyangular mold, said intermediate layer being disposed between the portion and the polymer layer permitting relative differential contraction and expansion without disruption of the outer layer.

5. A casket comprising an inner reinforcing mold portion, an outer encompassing seamless polymer layer, substantially enclosing the reinforcing portion, an intermediate layer between the portion and the polymer layer permitting relative differential contraction and expansion without disruption of the outer polymer layer, said polymer layer having an opening, a supplemental reinforcement anchored to the first mentioned reinforcement and located in said opening in spaced relation to the edges thereof.

6. A casket comprising an inner reinforcing mold portion, an outer encompassing seamless polymer layer, substantially enclosing the reinforcing portion, an intermediate layer between the portion and the polymer layer permitting relative differential contraction and expansion without disruption of the outer polymer layer, said polymer layer having an opening, a supplemental reinforcement anchored to the first mentioned reinforcement and located in said opening in spaced relation to the edges thereof, said second reinforcement being of substantially the same thickness as the polymer layer and the intermediate layer adjacent to the opening.

7. A casket comprising an inner reinforcing mold portion, an outer encompassing seamless polymer layer, substantially enclosing the reinforcing portion, and an intermediate layer between the portion and the polymer layer permitting relative differential contraction and expansion without disruption of the outer polymer layer, said polymer layer having an opening, a supplemental reinforcement anchored to the first mentioned reinforcement and located in spaced relation to the edges of said opening, and a strip of compressible material disposed between the edges of the opening and the sides of the secondary reinforcement to insulate the polymer layer and secondary reinforcement.

8. A casket comprising an inner reinforcing mold portion, an outer encompassing seamless polymer layer substantially enclosing the reinforcing portion, an intermediate layer between the portion and the polymer layer permitting relative differential contraction and expansion without disruption of the outer polymer layer, said polymer layer having an opening, a secondary reinforcement anchored to the first mentioned reinforcement and located in spaced relation to the edges of said opening, a strip of compressible material disposed between the edges of the opening and the sides of the secondary reinforcement to insulate the polymer layer and secondary reinforcement, and a handle device anchored to the

first mentioned reinforcement substantially out of physical contact with the polymer layer.

9. A casket comprising a rigid inner reinforcing mold portion, an outer polymer layer having an opening, a handle device extending through said opening and having a portion for engagement against the mold portion and another portion for disposition externally of said polymer layer, said handle device adjacent to the polymer layer being of smaller dimensions than said opening so as to be out of direct physical contact with the polymer layer.

10. A casket comprising an inner reinforcing mold portion comprising sides, ends and a bottom connected together, said bottom comprised of spaced slats, a polymer layer molded about the mold portion, and means bridging the slats to preclude entry of the polymer into the space between the said slats.

11. A casket comprising an inner reinforcing portion having sides, ends and a bottom, a layer of fibrous material disposed on the sides of the said portion, a polymer layer molded about the portion in contact with the fibrous layer, said fibrous layer arranged to shear to permit differential relative contraction of the portion and polymer layer without disruptive strains on either the portion or polymer layer, and a plurality of strips of sponge rubber disposed on each of a plurality of corners between sides and ends and between sides and bottom of the reinforcement in contact with the polymer layer arranged to yield in two planes under contraction of the polymer layer during hardening to prevent disruptive strains on the polymer layer.

12. A casket comprising a box-like mold unit having substantial corners, yielding means superimposed on said mold unit and forming with the unit a substantially liquid tight box, the yielding means between corners comprising a layer of fibrous material primarily capable of yielding in shear, the yielding means at the corners comprising material different from said fibrous material primarily capable of yielding in compression, a layer of organic polymer cast upon and

permanently encompassing the outer surfaces of the box, said cast layer having a different expansion ratio from that of the mold unit so that differential relative expansions of the mold unit and encompassing layer can occur by subjecting the yielding means to varying degrees of compression and shear without rupture of the encompassing cast layer.

13. A casket comprising a box-like mold unit having substantial corners between relatively flat walls, yielding means superimposed on said mold unit and forming with the unit a substantially liquid tight box, the yielding means adjacent and surrounding the substantial corners comprising porous resilient material and the yielding means between the substantial corners adjacent to certain of the flat walls comprising fibrous material, a layer of organic polymer having the characteristic of shrinking in setting up from a liquid to a solid state cast about and permanently encompassing the box, said porous resilient material being susceptible to compression under stress occasioned by said relative shrinking of said layer and being under a condition of compression between the mold unit and the said layer of polymer, and said fibrous material in part at least being distorted in shear between the mold unit and the said layer of polymer when the shrinkage of said layer has been completed.

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