United States Patent [19]

Clingenpeel

[11] **3,861,340**

[45] **Jan. 21, 1975**

[54] **FLOATING DOCK STRUCTURE**

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[22] Filed: **Feb. 22, 1973**

[21] Appl. No.: **334,580**

[52] **U.S. Cl.** ..... **114/.5 F**, 9/6
[51] **Int. Cl.** **B63b 35/34**
[58] **Field of Search** ..... 114/.5 F, 61; 9/6

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Assistant Examiner—Gregory W. O'Connor
Attorney, Agent, or Firm—Stein and Orman

[57] **ABSTRACT**

A marine structure in the form of a dock which is free floating in the water and which comprises a main deck area mounted in supported relation to a plurality of floating elements arranged in a rectangular or predetermined configuration depending upon the shape of the deck wherein the floating elements are formed from a core of material having a specific gravity less than water, such as foam. An outer protective shell or coating such as fiberglass is arranged on the outer surfaces of the floating element so as to protect them from the environment. At least one of the floating elements is dimensioned to be larger and arranged in predetermined orientation relative to the remaining floating elements to compensate for additional loads placed on the dock such as ramps. The deck is directly connected to a plurality of slats arranged in spaced relation to one another and mounted on the floating elements in interconnecting relation between the deck and floating elements.

8 Claims, 9 Drawing Figures

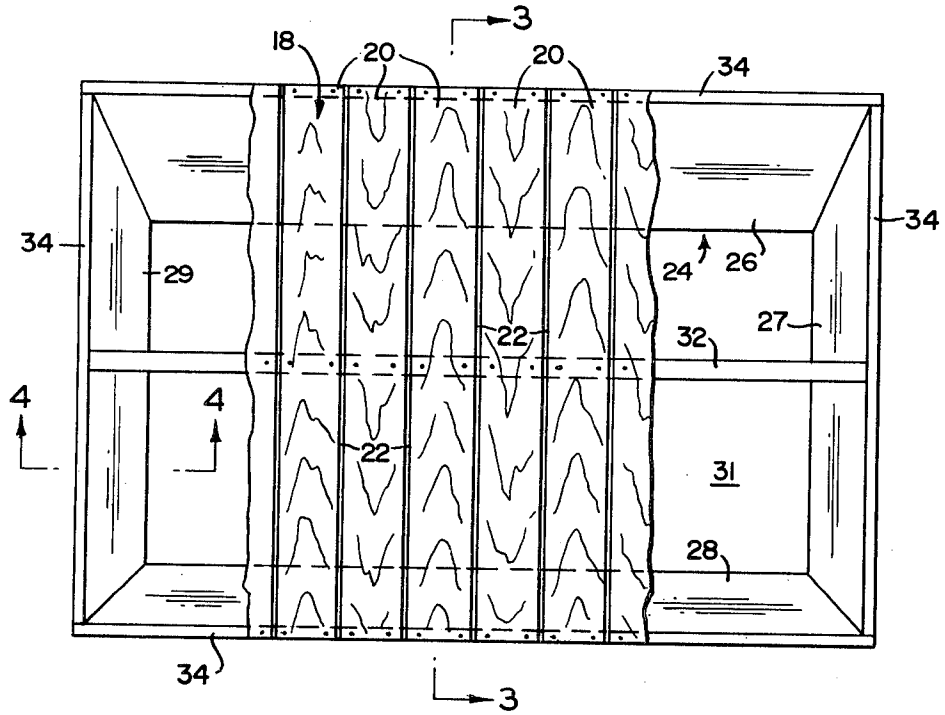


FIG. 1

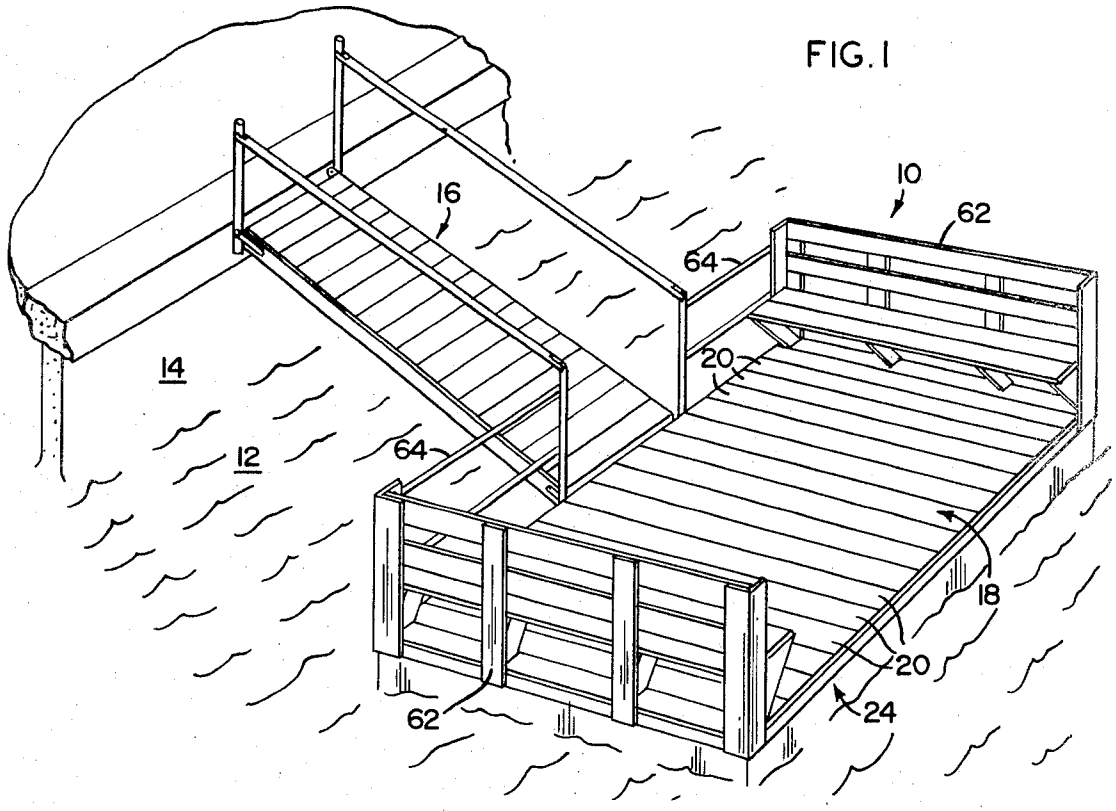

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FIG. 2

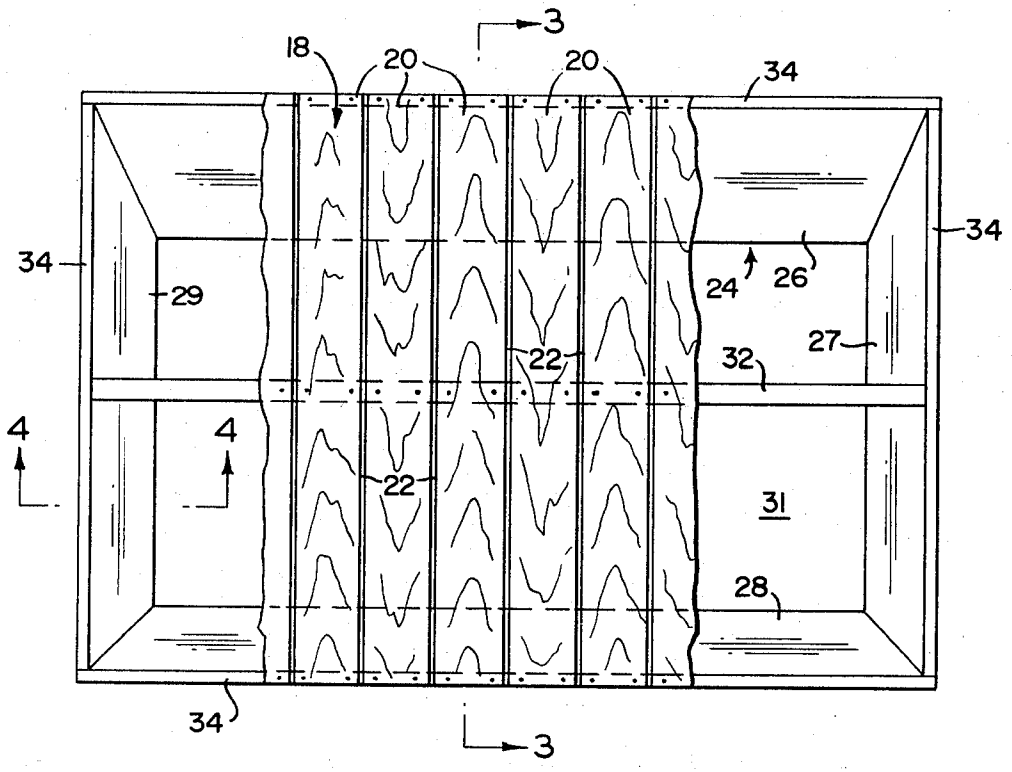

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FIG. 3

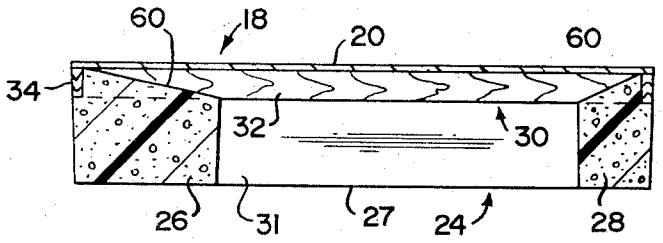
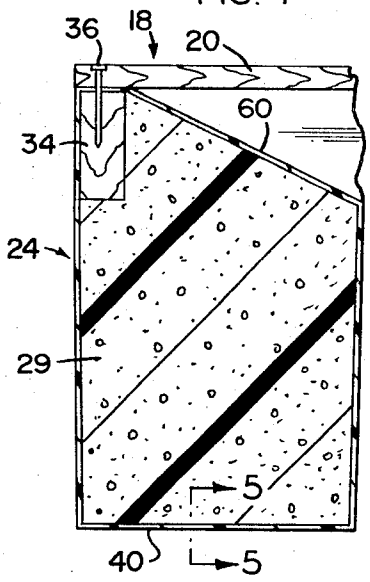


FIG. 4



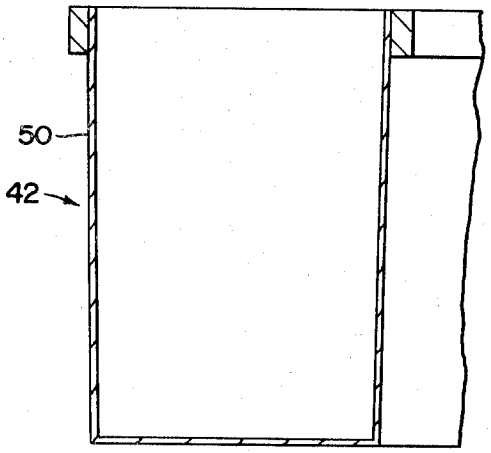
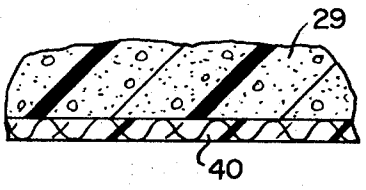


FIG. 7

FIG. 5



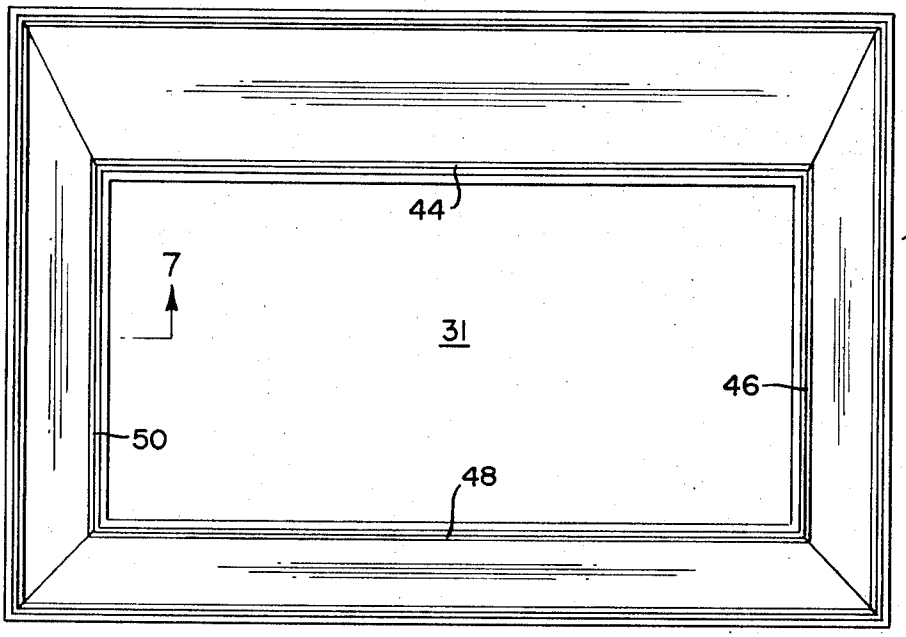
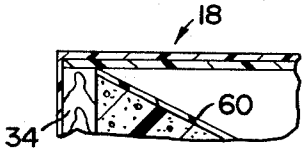


FIG. 6

FIG. 8



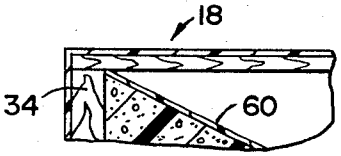


FIG. 9

FLOATING DOCK STRUCTURE

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to a dock or like structure capable of floating and moving on the surface of a body of water wherein the dock includes a deck and floating means arranged in supporting relationship to the deck so as to maintain it above the surfaces of the water.

2. Description of the Prior Art

A wide variety of marine structures in the form of floating docks, barges, boats and the like have been known for many years in the prior art. The wide variety and various styles available have been the result of vast specialization of various structures to accomplish specific purposes or obtain certain results. In modern day society the amount of leisure time avaiable to a great many people has increased. As a result a great number of people have turned to water sports and activities as recreation to fulfill these many leisure hours. Accordingly, there has been an increase in the productivity in order to fill the demand put on the industry for marine structures of various types. Therefore, in order to solve many of the problems associated with this increased demand it is important that any of the modern day structure presently being designed and produced are of a relatively simple structure which are easy to manufacture and which are capable of being inexpensively maintained.

Included among the special purpose marine structures presently finding great popularity are marine docks of the type which may be portable and free floating in the water and therefore may be located at almost any desired location. Many such dock structures are utilized for recreation as set forth above and also for industrial type purposes such as mooring cargo ships, fishing vessels and the like. While many of these floating dock structures differ greatly in structural design and appearance, a large number of these prior art devices suffer from the same basic problems. Such problems include stability when in use, deterioration from the corrosive effects of a salt water environment and overly complicated designs resulting in higher costs.

Similarly, the smaller, recreational type docks are intended to be used for a variety of purposes but similarly suffer from the above mentioned problems. The costs of production and maintenance may be more critical in the design of a recreational type dock due to the fact that the user of such a structure often times will not be willing to expend large sums of money for either the purchase or maintenance thereof. As pointed out above, stability is also a very important features and it is highly desirable since people of all ages will be using a recreational type dock with general unconcern for their safety.

It is therefore readily apparent that there is a need, especially in the area of recreational activity, for a dock structure which is simply designed and structurally sound so as to be generally inexpensive both to construct and maintain while at the same time being safe for use for people of all ages.

SUMMARY OF THE INVENTION

This invention relates to a free floating marine structure which may be in the form of a dock or the like. The dock comprises a deck formed from slatted wood or

applicable material planks. A float means is arranged on the undersurface of the deck in supporting relation to the deck and formed from a material having a specific gravity less than water.

The material from which the floating means is formed may be an inner core of polyurethane in that urethane material is generally resistant to corrosion from the element to which the dock structure would normally be subjected. Any material having a specific gravity less than that of water would of course be usable as the floating means but for various reasons a foam material is preferred.

To further guard against corrosion due to salt water or the like the floating means may be completely or partially encased in a coating of fiberglass. This fiberglass coating may be sprayed on, applied by hand or formed on the floating means in any applicable manner. In addition, the floating means may be formed into a single integral unit such as molded into a one piece predetermined configuration applicable to the specific configuration of the deck of the dock structure.

Alternately, the floating means may comprise a plurality of logs joined together by any applicable means so as to form the predetermined configuration referred to above. Regardless of the embodiment used, the floating means is preferably formed into a substantially square or rectangular closed configuration and adhered to the undersurface of the deck adjacent to the peripheral portion thereof.

The floating means and the deck are interconnected by a supporting means. This supporting means comprises a plurality of slats arranged in spaced, substantially parallel relation to one another wherein the end of each of the slats are substantially embedded in oppositely disposed members of the floating means.

As stated above, stability is a prime factor in the design and construction of such a dock structure. Along these lines, predetermined portions of the floating means are especially configured and dimensioned to establish and maintain this stability regardless of the load distribution on the deck of the dock structure. More particularly, one embodiment of the present invention comprises an elongated side portion of the floating means having a thickness substantially twice as great as the thickness of the opposing elongated member. This allows for the placement of a relatively heavy ramp or like access means between the side of the dock on which the thicker member is located and the shore of other structure to which the dock is moored. While the particular embodiment of the present invention is described with the elongated member being approximately twice as great, it should be obvious that the dimensions of the particular portions of the floating means can be determined based on the particular application and configuration of the dock structure.

Another structural feature of the present dock structure comprises either all or at least a portion of the upper surface of the floating means, located adjacent the undersurface of the deck, being angularly arranged or inclined relative to the plane defined by the deck. This allows water or other material to pass through the deck and onto the upper surface of the floating means from which it is drained off the upper surface along the direction of incline of this surface.

The invention accordingly comprises an article of manufacture possessing the features, properties and the relation of elements which will be exemplified in the

invention hereafter described, and the scope of the invention will be indicated in the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

For a fuller understanding of the nature and objects of the invention, reference should be had to the following detailed description taken in connection with the accompanying drawings in which:

FIG. 1 is a perspective view of the dock structure of the present invention having a ramp or other access means attached to one side thereof.

FIG. 2 is a top cutaway view of a portion of the deck structure, support means and floating means which comprises the dock of the present invention.

FIG. 3 is a sectional view taken along lines 3—3 of FIG. 2 showing details of the floating means and support means.

FIG. 4 is a sectional view taken along lines 4—4 of FIG. 2 showing various details of the float means.

FIG. 5 is a sectional view taken along lines 5—5 of FIG. 4 showing details of the protective covering of a portion of the float means.

FIG. 6 is a top view of the mold in which the floating means may be formed.

FIG. 7 is a sectional view taken along lines 7—7 of FIG. 6 showing greater detail of the interior of the mold.

FIG. 8 and FIG. 9 are fragmentary sectional views similar to that of FIG. 4, FIG. 8 showing the deck structure made of a plurality of fiberglass layers and FIG. 9 showing the deck structure formed of a layer of fiberglass covering a sheet of plywood.

Similar reference characters refer to similar parts throughout the several views of the drawings.

DETAILED DESCRIPTION

As shown in FIG. 1 the present invention relates to a floating dock structure generally indicated as **10** which is principally designed to float on a body of water **12** and which may be connected to a dock or shore **14** by an access ramp or like means generally indicated as **16.** As shown in FIGS. 1–4 the dock structure comprises a deck generally indicated as **18** which includes a plurality of boards or slats **20** arranged in adjacent, side by side relation in a substantially planar array. The planks **20** may be arranged in substantial relation to one another being separated by space **22** so as to provide efficient drainage of water and other liquid from the surface of deck **18.** A float means generally indicated as **24** comprises one or more float members **26, 27, 28** and **29.** These elements are arranged in a substantially closed configuration as shown in FIG. **2.** This closed configuration is clearly represented in FIGS. **2** and **6** and is characterized by float members **26, 27, 28** and **29** defining the peripheral boundaries of an open space **31.** Referring to FIG. **3,** when the dock structure is in a normal upright position, the upper limits of space **31** is defined by support means generally indicated as **30.** The lower limit of space **31** essentially comprises a plane defined by exposed substantially coplanar surfaces of float elements **26, 27, 28** and **29** positioned oppositely from the support means **30.** In operation, when the dock is in floating orientation on a body of water, an air pocket is formed in space **31** between the level of water on which the dock structure is floating and the support means **30.** Of course, the specific configuration in which the elements **26–29** are formed depends on the desired configuration of the dock structure. Any applicable configuration may be utilized and still be within the intended scope of the present invention. It should be further noted that the dock structure may be molded into a single unit or alternately may be made of individual float members as mentioned which are connected together at their corresponding ends. This will be described in greater detail with relation to the mold structure shown in FIGS. **6** and **7.**

The deck **18** is interconnected to the float means **24** by a support means generally indicated as **30** (FIG. **3**) which comprises a plurality of cross beams **32** having its opposite end at least partially embedded in float members **26** and **28** as shown. Connecting boards **34** may be arranged about the periphery of the outer surface of the float means **24** so as to aid in the connecting of the deck to the float means. This is clearly shown in FIG. **4** wherein a nail **36** or like connecting device serves to securely fasten the deck planks **20** to the float means **24.**

Another embodiment of the present invention contemplates the deck structure **18** being fabricated from a sheet of plywood covered with a layer of fiberglass. Alternately, one or more layers can be formed by a mold structure and integrally formed to the float structure of said dock.

Referring more specifically to the specific structure of the float means, each of the float means includes float elements **26–29** as pointed out above and each of these elements may be at least partially or entirely enclosed by a protective coating. This protective coating is clearly shown in FIGS. **4** and **5** and comprises at least one outer layer or shell **40** of fiberglass or like material. This fiberglass layer ideally is applied to all surfaces of each float element comprising the float means. However, it can be readily seen that this protective layer or shell **40** of fiberglass may cover only predetermined surfaces of the float element if so desired.

Other structural features of the float means comprises forming the float element **26,** arranged along one longitudinal peripheral edge of the dock means **18,** to have an enlarged thickness. In actual application, this thickness should be approximately twice that of the oppositely disposed float element **28** (FIG. **3**). This enlarged thickness of float element **26** is provided to compensate for the increased weight of ramp or access means **16** which is mounted on the side of the dock corresponding to the location of float element **26.**

The formation of the float means may be accomplished through the use of a mold or like structure (FIG. **6**). The mold structure comprises mold elements **44, 46, 48** and **50.** As clearly shown in FIG. **7** each of the elements, represented by the cross section of element **50,** comprises a substantially hollow, open top channel in which the material is placed for forming the core of element **29.** As stated above, it is found that polyurethane foam is the most practical material for use of the core of the float element. Once the foam has formed and hardened, the protective coating of fiberglass **40** is placed on each of the surfaces of each of the elements as desired.

Referring back to FIGS. **3** and **4,** the upper surface of each float element may be formed at an incline **60** which allows for the free drainage of any material passing through deck **18.**

Other various structures may be placed on the deck **18** of the dock. Such structures may include benches

62, guard rail 64 or any other furniture or facility desired by the particular user of the dock, such as fiberglass swivel-type seats.

It wil thus be seen that the objects made apparent from the preceding description, are efficiently attained and since certain changes may be made in the above product without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention which, as a matter of language migh be said to fall therebetween.

Now that the invention has been described, what is claimed is:

1. A floating marine structure of the type used as a dock or the like, said structure comprising: a deck, float means connected in supporting relation to said deck, said float means comprising a core of resinous material having a specific gravity less than water, said float means further comprising shell means at least partially surrounding said core, said shell means including at least one layer of fiberglass material positioned contiguous to the outer surface of said core and substantially defining the cross-sectional configuration thereof, the length of said core disposed into a substantially closed configuration, a space disposed on the interior of said core and defined by the closed configuration of said core such that the length of said core comprises the outer peripheral boundaries of said space, said core comprising a plurality of float elements integrally connected to define a closed configuration of predetermined shape; at least one of said float elements disposed along the outer peripheral edge of said deck and having a thickness substantially greater than the thickness of another of said plurality of float elements disposed in opposite relation thereto relative to said deck; whereby said structure may be free floating and said float means is substantially protected from the surrounding environment by said one layer of fiberglass material.

2. A structure as in claim 1 wherein said fiberglass is arranged to cover a major portion of the surface area of said float means.

3. A structure as in claim 1 wherein at least a portion of the upper surface of said float means disposed adjacent to said deck is inclined relative to the plane of said deck, whereby drainage from said deck is channeled by said incline to a desired disposal area.

4. A structure as in claim 3 wherein the entire upper surface of said float means is inclined inwardly towards the center of the configuration defined by said joined float means.

5. A structure as in claim 1 further comprising supporting means including a plurality of beams mounted in spaced relation to one another such that the ends of each of said beams is at least partially imbedded in oppositely located portions of said core, said deck mounted in supported relation to said support means, whereby said deck is supported in floating relation to the water or surface on which said float means is positioned.

6. A structure as in claim 1 wherein said deck is formed at least in part from at least one layer of fiberglass connected to said float means.

7. A structure as in claim 6 wherein a substrate is arranged in supporting engagement with said one fiberglass layer of said deck.

8. A structure as in claim 1 wherein said resinous material includes polyurethane.

* * * * *

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,861,340 Dated January 28, 1975

Inventor(s) Jerry L. Clingenpeel

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 2, line 49, delete "of" and insert therefor -- or --.

Signed and sealed this 17th day of June 1975.

(SEAL)
Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents
and Trademarks

FORM PO-1050 (10-69)

USCOMM-DC 60376-P69
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