Feb. 9, 1960 F. L. BLUMQUIST ET AL 2,924,191

FLOAT APPARATUS

Filed Feb. 12, 1959 2 Sheets-Sheet 1

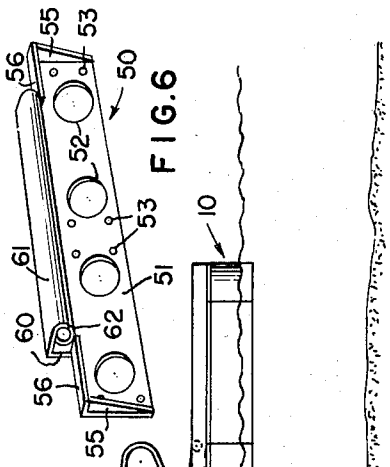


FIG. 6

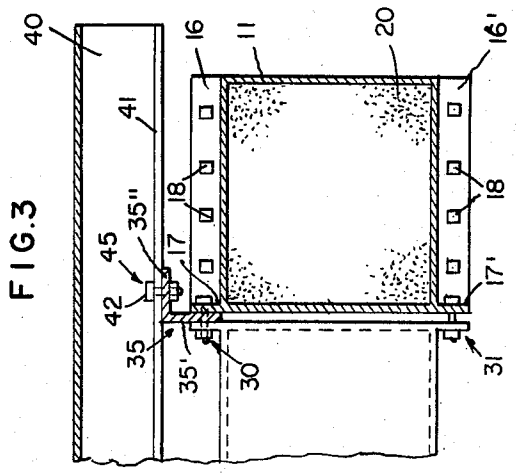


FIG. 3

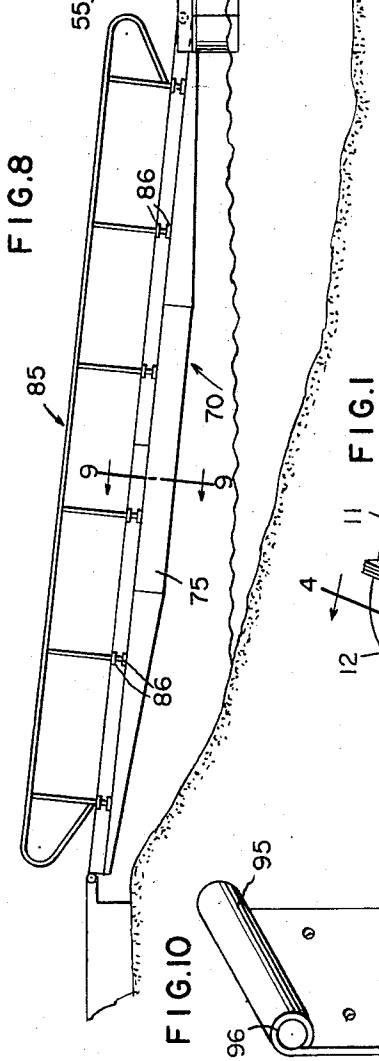


FIG. 8

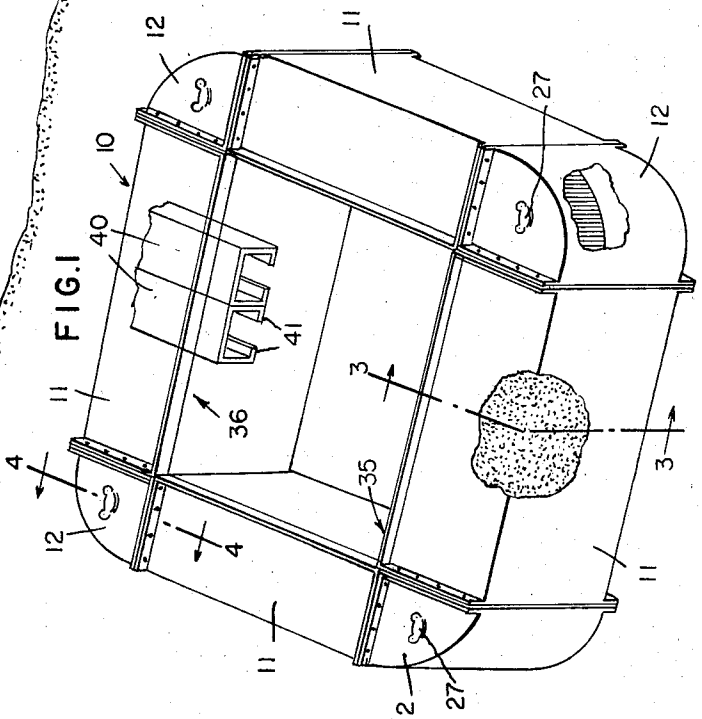


FIG. 1

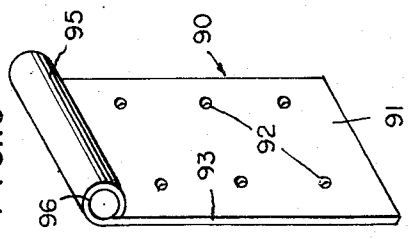


FIG. 10

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Feb. 9, 1960 F. L. BLUMQUIST ET AL 2,924,191

FLOAT APPARATUS

Filed Feb. 12, 1959 2 Sheets-Sheet 2

FIG.7

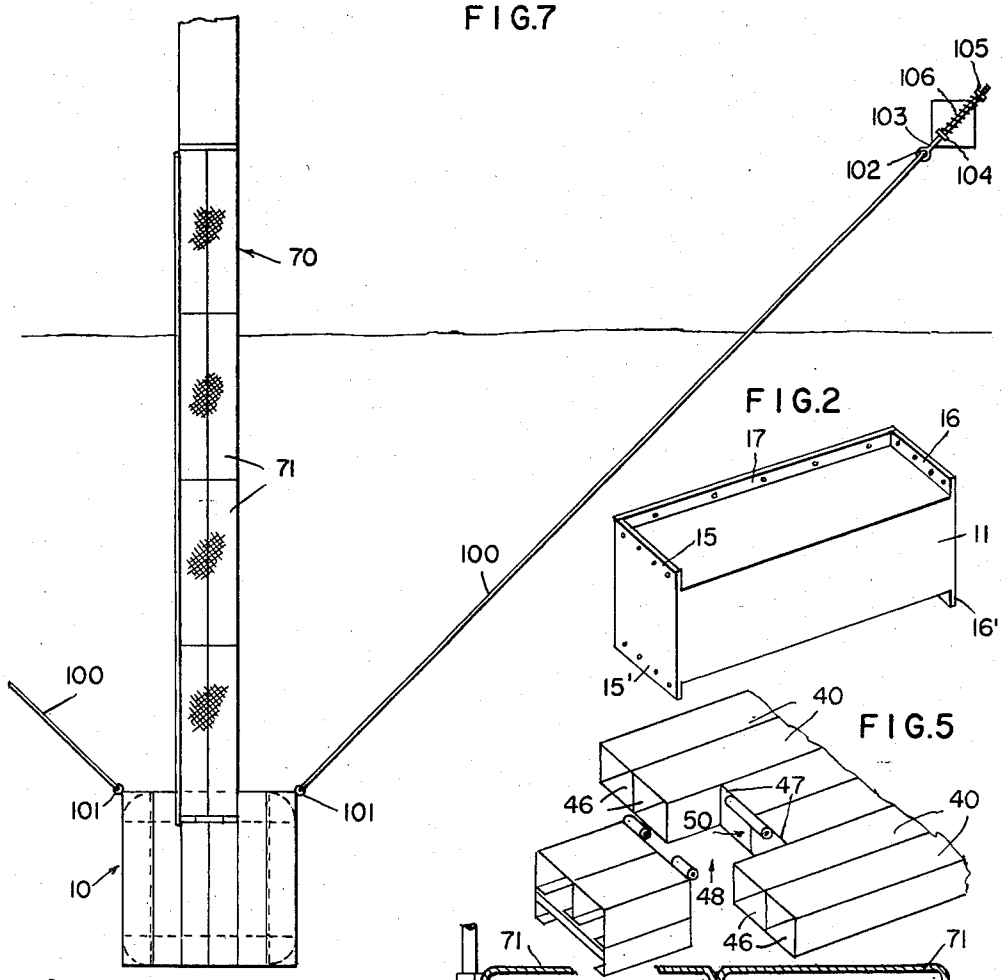


FIG.2

FIG.5

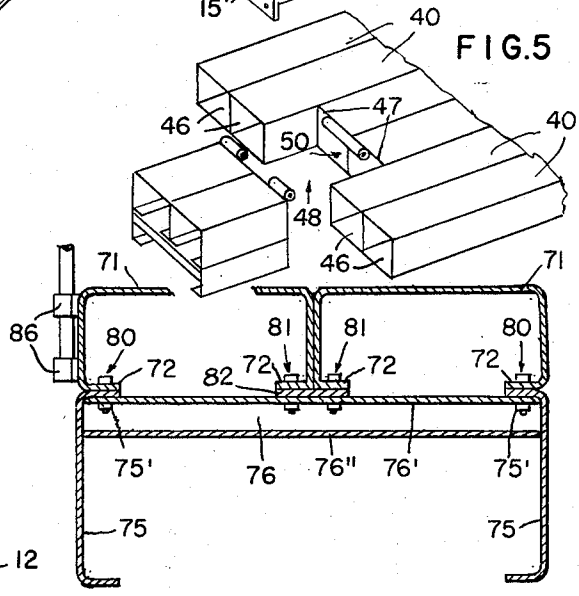


FIG.4

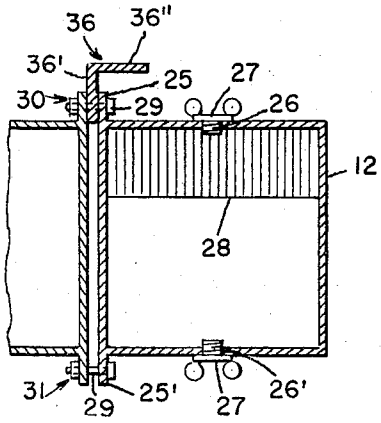


FIG.9

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FLOAT APPARATUS

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Application February 12, 1959, Serial No. 792,908

12 Claims. (Cl. 114—.5)

The present invention relates to a float apparatus and more particularly to a float apparatus which is especially adapted for use with a ramp or the like to provide a floating dock.

The present invention provides a float apparatus which can be utilized for a number of different purposes, and it is especially useful as a component of a floating dock wherein it may be pivotally connected to a ramp which is in turn pivotally connected to a fixed portion on land whereby the overall arrangement provides a very effective floating dock which can be utilized in connection with boats in the customary manner.

A primary purpose of the present invention is to provide a float apparatus assembly composed of a plurality of separate members which can be shipped to any desired location wherein it is desired to erect a float, and the various components can be quickly and easily assembled so as to provide the finished assembly. The various components employed in the present invention are quite light-weight, and are very adaptable such that they can be interconnected in various manners to provide floats of varying size and shape.

It is additionally desirable to provide a structural arrangement wherein the various components are reversible whereby they may be assembled in alternate positions such that any given component may be utilized in at least two different positions. Furthermore, the structure according to the present invention is so constructed and arranged that even the most unskilled person can assemble the apparatus with ease, and the construction is such that it is virtually impossible for a person to assemble the apparatus in a manner other than the proper one.

The apparatus according to the present invention incorporates a plurality of float members which are of very light-weight, thin-walled construction, the float members being hermetically and permanently sealed and filled with a suitable buoyant substance, which is preferably urethane foam according to the present invention. Each of the float members is provided with flanges along the upper and lower edges thereof, each of these flanges being provided with suitable openings therethrough.

While the various float members can be sealed to one another so as to provide a rigid framework, a plurality of ballast members are also preferably employed for connecting the float members in a rigid framework, and for balancing the float apparatus as is often desirable in practice.

Each of the ballast members according to the present invention comprises a closed hollow member having means formed in the upper and lower surfaces for adding to or removing ballast material from the ballast members. The ballast members also include flanges formed along the upper and lower edges thereof, and having suitable openings formed therein.

The flanges of the float members and ballast members are suitably interconnected to one another by preferably nut and bolt assemblies to provide a rigid framework.

A pair of spaced angle members are also attached to the flanges of the members, these angle members being provided with a substantially horizontally disposed surface upon which a plurality of deck members are disposed in spanning relationship.

Each of the deck members according to the present invention is preferably of channel shape to provide a maximum degree of strength, and these deck members are supported upon and secured to the horizontal support surfaces of the angle members. Certain ones of the deck members have end portions which are recessed inwardly of the end portions of the other deck members, and a hinge means is secured to these recessed end portions. This hinge means is adapted to cooperate with a complementary hinge means formed on another member for pivotally securing the float assembly to another member.

As mentioned previously, the float apparatus according to the present invention is especially adapted to be connected to a ramp for forming a float dock, and the end of such a ramp being provided with hinge means adapted to be secured to the hinge means of the float apparatus. The ramp according to the present invention is of a very compact and simple design, and provides a light-weight ramp of high strength.

An object of the present invention is to provide a float apparatus which is particularly adapted for use with a ramp to provide a floating dock arrangement.

Another object is the provision of a new and novel float assembly composed of a number of separate light-weight components.

A further object of the invention is to provide a float apparatus comprising a number of components which may be quickly and easily assembled or disassembled to provide float apparatus of various sizes and shapes.

Yet another object of the invention is the provision of float apparatus wherein the different components thereof are reversible, and wherein a completely inexperienced person can not fail to properly assemble the apparatus.

Yet another object of the invention is the provision of a float apparatus including means for effectively balancing the float assembly.

A still further object of the invention is the provision of float apparatus which is simple and inexpensive in construction, and yet which is sturdy and reliable in operation.

Other objects and many attendant advantages of the invention will become more apparent when considered in connection with the specificatio and accompanying drawings, wherein:

Fig. 1 is a perspective view of the rigid framework of the float apparatus according to the present invention;

Fig. 2 is a perspective view of one of the float members employed in the float assembly;

Fig. 3 is a sectional view taken along line 3—3 of Fig. 1 looking in the direction of the arrows;

Fig. 4 is a sectional view taken along line 4—4 of Fig. 1 looking in the direction of the arrows;

Fig. 5 is a perspective view illustrating a portion of the deck structure and an adjacent ramp;

Fig. 6 is a perspective view of a portion of the hinge structure;

Fig. 7 is a top view of a floating dock according to the present invention;

Fig. 8 is a side view of the apparatus shown in Fig. 7;

Fig. 9 is a sectional view taken along line 9—9 of Fig. 8 looking in the direction of the arrows; and

Fig. 10 is a perspective view of another portion of the hinge structure.

Referring now to the drawings wherein like reference characters designate corresponding parts throughout the several views, the rigid framework of the float assembly

indicated generally by reference numeral **10** in Fig. 1 of the drawings includes four float members **11** disposed substantially normally to one another, and four ballast members **12** are disposed at the four corners of the framework shown in Fig. 1. It should be noted at this time that the ballast members may be eliminated in certain instances and the float members **11** may be connected directly to one another or the ballast members may be employed at the corners of the apparatus as shown. In addition, while the float apparatus shown is substantially square, various other configurations and sizes may be provided by interconnecting the various components of the apparatus as desired.

As seen in Fig. 2, each of float members **11** includes flanges **15** and **16** at opposite ends of the float member, flanges **15** and **16** being formed along edges of the upper surface thereof. Similar flanges **15'** and **16'** are provided along the edges of the lower surface of the float member. A flange **17** is formed along one of the longitudinally extending edges of the upper surface and is in spanning relationship between flanges **15** and **16**. In a like manner a lower flange **17'** as seen in Fig. 3 is disposed along a longitudinally extending edge portion of the lower surface of each of the float members in spanning relationship with the end flanges **15'** and **16'**. This particular arrangement including the flanges formed at the edges of both the upper and lower surfaces of the float members permits the float members to be reversed such that it can be utilized either in the position shown in Fig. 3 or upside down from this position without affecting the structure.

Each of flanges **15**, **16**, **17**, **15'**, **16'** and **17'** are provided with suitable openings **18** therethrough for receiving nut and bolt assemblies as hereinafter described. As seen in Fig. 3, each of float members **11** is of a thin-walled, light-weight construction, the float members being preferably formed of light material such as aluminum which resists the corrosive action of water and the float members being permanently hermetically sealed. A suitable buoyant substance indicated by reference numeral **20** is disposed within each of the float members, and according to the present invention this buoyant substance preferably comprises urethane foam.

As seen most clearly in Fig. 4 of the drawings, each of the ballast members comprises a closed hollow, thin-walled, light-weight member preferably also formed of aluminum, each of the ballast members having a pair of upper flanges **25** disposed along the two inner edges thereof disposed substantially normally to one another, and in a like manner a pair of flanges **25'** is provided along the lower inner edges of each of the ballast members. Similar openings **26** and **26'** are provided in the upper and lower surfaces of each of the ballast members, and closure members **27** and **27'** are threadedly received within openings **26** and **26'** respectively which are provided with complementary threads for securing the closure means in sealing relationship. It is evident that the ballast members can be filled with a suitable ballast material such as water utilizing the two closure members **27** and **27'** for filling and emptying the ballast members as desired. The water level within the ballast members shown in Fig. 4 is indicated at **28** by way of example.

In the arrangement shown, each of the upper end flanges **15** and **16** of the various float members is secured to the adjacent one of a pair of flanges **25** on an adjacent ballast member. These flanges are interconnected as described by means of nut and bolt assemblies indicated generally by reference numeral **30** and extend through cooperating openings **18** formed in the flanges on the float members and openings **29** formed through the flanges **25** of the ballast members. The lower flanges on the float members and ballast members also are similarly secured to one another by means of nut and bolt assemblies indicated generally by reference numerals **31**. A pair of similar angle or support members indicated generally by reference numerals **35** and **36** are clamped between the flanges of the float members and ballast members as

seen in Figs. 3 and 4. Angle members **35** and **36** are provided with first leg portions **35'** and **36'** respectively which are substantially vertically disposed and extend between adjacent flanges on the associated float and ballast members. These vertical leg portions are provided with a plurality of openings corresponding to the openings formed in the adjacent flanges such that the angle members are rigidly clamped in position not only between adjacent portions of the float and ballast members, but also throughout the length of the associated flanges **17** of an opposite pair of float members. Angle members **35** and **36** also include substantially horizontally extending leg portions **35''** and **36''** respectively which are provided with a plurality of openings therethrough, and which have an upper surface serving as a support surface. A plurality of deck members **40** are of channel configuration as seen in Fig. 1, each of the deck members **40** having a pair of spaced facing lower leg portions **41**, the under surface of which is adapted to rest upon the upper surface of leg portions **35''** and **36''** of the angle members. Each of leg portions **41** of the deck members is provided with openings **42** therethrough which are adapted to be aligned with the openings provided in the leg portions **35''** and **36''** of the angle members for securing the deck members in operative position by means of suitable nut and bolt assemblies indicated generally by reference numeral **45** as seen in Fig. 3, these nut and bolt assemblies extending through the aligned openings in the legs of the deck members and the horizontal legs of the angle members.

The various deck members are disposed in abutting relationship as seen most clearly in Fig. 5, and the end portions **46** thereof are folded over to provide closed ends. The end portions **47** of the central deck members as seen in Fig. 5 are recessed inwardly of the end portions of the remainder of the deck members, and provide a recess **48** within which the end portion of a ramp or the like is adapted to be received. As seen in Figs. 5 and 6 a hinge means indicated generally by reference numeral **50** is secured to the recessed end portions **47**.

Referring now more particularly to Fig. 6, hinge means **50** comprises an elongate plate **51** having four cut-outs **52** formed therein and a plurality of openings **53** for receiving attaching means such as bolts or the like. Gussets **55** are formed at opposite ends of the plate for strengthening the plate and horizontally extending flanges **56** are disposed adjacent the gussets for providing additional rigidity. An upwardly projecting flange **60** has a forwardly extending portion **61**, the outer end of which is turned under to define a cylindrical opening **62** therewithin for receiving a hinge bolt.

Referring now to Figs. 7 and 8, a ramp is indicated generally by reference numeral **70**, one end of the ramp being pivotally secured to a fixed portion on the shore, and the opposite end of the ramp being pivotally connected to a float apparatus to provide a floating dock. Ramp **70** consists of a plurality of support members **71** which as seen most clearly in Fig. 9 are disposed in abutting relationship to one another and are provided with inwardly extending leg portions **72** at the lower surfaces thereof for providing the desired degree of rigidity. The uppper surfaces of support members **71** are preferably provided with a nonskid surface such that persons walking along the ramp will not accidentally slip on the support members. A pair of elongated channel members **75** are disposed along opposite side portions of the lower part of the ramp, channel members **75** being of varying depth as seen most clearly in Fig. 8. As seen in Fig. 9, leg portions **75'** of channel member **75** abut the lower surface of the outer leg portions **72** of support members **71**.

Channel members **76** extend laterally between channel members **75** at spaced portions along the length of the ramp, each of channel members **76** including upper and lower leg portions **76'** and **76''**. Nut and bolt assemblies indicated generally by reference numeral **80** extend through aligned openings in leg portions **72**, **75'** and **76'**

for securing the structure in assembled position. Similar nut and bolt assemblies **81** extend through the central legs **72** of support members **71** and through a spacer plate **82** and aligned openings in leg portions **76'** of channel members **76**. In this manner a very lightweight rigid ramp structure is provided having a high degree of strength. A railing structure indicated generally by reference numeral **85** is mounted within support brackets **86** secured to the side portion of support members **71** as by welding or the like.

Referring now to Fig. 10, one of the hinge means secured to the end portion of the ramp is illustrated, it being understood that another similar hinge means is also secured in spaced relationship, but being the reverse arrangement of the member shown in Fig. 10. Member **90** comprises a flat plate-like portion **91** having a plurality of openings **92** for receiving bolts by which the member is secured to the end of the ramp. A gusset **93** is formed along one edge of the member and the upper portion **95** of the member is turned over to provide a cylindrical opening **96**. Portion **95** and opening **96** of each of the members **90** secured to the end of the ramp are disposed at opposite ends of the portion **61** of the hinge member secured to the float apparatus such that the opening **62** in the hinge means **50** of the float apparatus is aligned with openings **96** in members **90** secured to the ramp and a hinge pin is mounted and secured within these aligned openings for providing a pivotal inter-connection between the ramp and the float apparatus.

Referring again to Fig. 7, a pair of similar anchor cables **100** are pivotally secured at **101** to edge portions of the floating apparatus, the opposite ends of the cables being pivotally connected at **102** to anchor members **103**, only one of which is shown in Fig. 7. Anchor members **103** are slidably mounted within support members **104** which are fixed in position, a nut member **105** being threadedly mounted on the outer end of anchor member **103**, and a compression spring member **106** disposed between nut **105** and support member **104**. It is apparent that the spring provides a resilient force on the end of the cables for maintaining the float apparatus in proper operative position.

It is apparent from the foregoing that there is provided a new and novel float apparatus which is especially suited for use with a ramp or the like to provide a floating dock. The float assembly according to the present invention comprises a plurality of separate light-weight components which may be quickly and easily assembled and disassembled to provide float assemblies of a variety of sizes and shapes. The components are reversible such that they may be employed in a plurality of positions, and the structure is such that an inexperienced person can easily assemble the apparatus with virtually no possibility of assembling the components in an improved manner. Means is provided for effectively and easily balancing the float apparatus and the construction is simple and inexpensive, and yet sturdy and reliable in operation.

As this invention may be embodied in several forms without departing from the spirit or essential characteristics thereof, the present embodiment is therefore illustrative and not restrictive, and since the scope of the invention is defined by the appended claims, all changes that fall within the metes and bounds of the claims or that form their functional as well as conjointly cooperative equivalents are therefore intended to be embraced by those claims.

We claim:

1. Float apparatus comprising a plurality of light-weight float members, ballast means for balancing the float apparatus, means interconnecting said float members and said ballast means to provide a float assembly of desired size and shape, a plurality of deck members, and means supporting said plurality of deck members at the upper portions of said float members and said ballast members thereby providing a support deck means at the top portion of the float apparatus.

2. Apparatus as defined in claim 1, wherein said ballast means comprises at least one closed hollow member, and closure means providing access to the interior of said hollow member to permit selective filling of the ballast means with suitable ballast.

3. Float apparatus comprising a plurality of light-weight float members, each of which is permanently sealed and has a buoyant substance disposed therein, a plurality of closed hollow ballast members, means interconnecting said float members and said ballast members to provide a rigid framework, support members mounted at the upper portions of said float members and ballast members, and a plurality of deck members supported upon and secured to said support members for providing a deck on the upper portion of the float apparatus.

4. Apparatus as defined in claim 3, wherein said buoyant substance comprises urethane foam.

5. Apparatus as defined in claim 3, wherein the interconnecting means between said float members and said ballast members includes cooperating flanges formed on the respective members, and bolt means securing said flanges to one another.

6. Float apparatus comprising a plurality of light-weight float members being hermetically sealed and having a buoyant substance disposed therein, a plurality of closed hollow ballast members secured to the end portions of adjacent float members for providing a rigid framework, each of said ballast members including means for selectively filling the interior of the ballast members with ballast material, support members attached to and supported by said float members and said ballast members, said support members including support surfaces, a plurality of deck members supported upon said support surfaces, and means securing said deck members in position on said support members for providing a flat deck surface at the upper portion of the float apparatus.

7. Apparatus as defined in claim 6, wherein said deck members are disposed in abutting relationship with one another, certain ones of said deck members having the end portions thereof recessed inwardly of the end portions of the other deck members, and hinge means supported upon said recessed end portions for attaching the float apparatus to a ramp or the like.

8. Apparatus as defined in claim 6, wherein each of said float members comprises a thin-walled permanently sealed member, said buoyant substance comprising urethane foam.

9. Float apparatus comprising a plurality of buoyant float members, each of said float members having flange means formed on the upper and lower surfaces thereof, a plurality of closed hollow ballast members, each of said ballast members having flange means formed on the upper and lower surfaces thereof, said ballast members being disposed adjacent end portions of adjacent pairs of float members, means securing adjacent flanges of the float members and ballast members to one another, means formed in said ballast members for selectively filling or emptying said ballast members, a pair of angle members attached to said flange means at the upper portion of the float apparatus, and a plurality of deck members supported upon and secured to said angle members for providing a flat deck at the top of the float apparatus.

10. Apparatus as defined in claim 9, wherein the end portions of certain ones of said deck members are provided with hinge means adapted to cooperate with another hinge means for hingedly attaching the float apparatus to another means.

11. Float apparatus comprising a plurality of closed thin-walled, light-weight float members having a buoyant substance therein, each of said float members having flanges formed along the top and bottom edges thereof, a plurality of closed hollow ballast members having flanges formed along the upper and lower edges thereof,

means formed in the upper and lower surfaces of said ballast members for selectively filling or emptying the ballast members, each of said flanges having openings formed therein, and bolt means extending through the openings in said flanges for securing certain ones of the flanges to one another for providing a rigid framework, a pair of angle members attached to certain ones of said flanges at the upper portion of the apparatus, each of said angle members having a substantially horizontally disposed leg portion, and a plurality of deck members supported upon said leg portion and secured thereto.

12. Apparatus as defined in claim 11, wherein the end

portions of certain ones of said deck members are recessed with respect to the end portions of others of said deck members, and hinge means secured to said recessed end portions for pivotally attaching the float apparatus to a ramp or the like.

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