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A CONNECTOR SYSTEM FOR A MODULAR FLOATING PLATFORM

FIELD OF THE INVENTION

This present invention relates to a pontoon assembly for a modular floating platform which comprises a series of modular pontoon units (modules) that can be linked together to form an integrated pontoon.

BACKGROUND OF THE INVENTION

Many marine applications make use of modular components that are similarly shaped to form a larger assembly. In such assemblies, each module is provided with a mating face surface profile to facilitate assembly of the modules in an interlocked relationship at the mating faces. One of such assemblies may be designed to form a pontoon that can be advantageously assembled from similar modular units in a speedy and efficient manner. An additional advantage of such modular pontoons is that they allow for fast and speedy replacement of any part of the pontoon assembly which might be damaged during use.

When joining floating modules together most conventional connectors allow the modules to flex in relation to each other preventing many activities or uses that require a rigid base. In order to achieve sufficient rigidity, previous designs used large structural strength members on top of the pontoons. Whilst these could keep the structure rigid they require large lifting devices to move and make the reconfiguration onerous and costly. Often the structure had to be completely disassembled on land before being moved.

The present invention contemplates elimination of drawbacks associated with conventional connector assemblies and provision of a connector system for modular platforms that can be used for attaching buoyant modules into a rigid platform capable of supporting a variety of commercial, industrial and recreational purposes.



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SUMMARY OF THE INVENTION

The object of the present invention is to provide a connector system for modular floating platforms that may be used for rigidly connecting buoyant modules in the construction of pontoons, barges, and other floating structures.

The pontoon modules are each formed as hollow buoyant hulls that may have parallelepiped configuration. It will be understood that modules having other shapes can be also connected to form floating platforms using the connector system of the present invention. The connector system comprises a locking bar mounted in a lower part of a recess formed in a sidewall of the hull. The locking bar carries a pair of guiding members to facilitate engagement of the locking bar by a locking key.

An engagement plate is secured in the recess above the locking bar. The engagement plate is provided with a slot extending from a front edge thereof a distance toward a central wall of the recess. A locking key comprises a main body operable to frictionally engage within the engagement plate slot and a lower portion operable to matingly engage locking bars of adjacent ones of the modular pontoons. An upper plate secured transversely on the main body engages with the engagement plate top surface and can be secured thereto by bolts, studs and other such means. A corner locking member connects the corners of the adjacent modular pontoons to further ensure rigid connection between the adjacent modular pontoons.

As a result, both lower and upper portions of the hulls are secured together allowing to form a floatable structure made up of several modules.

Further objects and benefits of the invention will be apparent from review of the disclosure and description of the invention below.

BRIEF DESCRIPTION OF THE DRAWINGS

In order that the invention may be readily understood, one preferred embodiment of the invention will be described by way of example, with reference to the accompanying drawings wherein:

Figure 1 is a perspective view of the side locking assembly showing two pontoon sides and a locking key for rigidly connecting the pontoon sides.

Figure 2 is a perspective view of the side locking assembly built into the side of the pontoon.

Figure 3 is an isometric view of the locking key.

Figure 4 is a perspective view of a corner locking member adapted for engaging corners of adjacent pontoon modules.

Figure 5 is a schematic view illustrating engagement of the corner locking member with the pontoon modules and locking pins for mating and locking corner of the pontoon modules.

Figure 6 is a schematic view illustrating position of the corner locking member in relation to the pontoon corners.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

Referring now to the drawings in more detail, a buoyant pontoon module 10 is shown having a generally parallelepiped configuration with a rectangular cross-section. Each pontoon module 10 has a generally planar top plate 12, a generally planar bottom plate 14, and vertically extending sidewalls. The sidewalls can be a continuous wall or, when the modular pontoon hulls have a generally parallelepiped configuration, as shown in the drawings, can comprise a pair of generally parallel end walls 16, 18 and a pair of generally parallel side walls 20, 22. It will be understood that the designation "sidewall" refers to that portion of the hull that extends between the top plate 12 and the bottom plate 14. The vertically-extending end walls 16, 18 and the side walls 20, 22 connect the top plate 12 with the bottom plate 14 to form the hollow buoyant body or module 10.

The side walls 20, 22 and the end walls 16, 18 are each provided with one or more side locking assemblies 30 for connection with and locking to adjacent modules. Each side wall 20, 22 and the end wall 16, 18 is formed with at least one recess 32 to accommodate

the at least one locking assembly 30. The recess 32 can be defined by the vertical side walls and end walls of the pontoon, as shown in Figure 1, or alternatively by a trough-shaped insert 33 shown in Figure 2. Each recess 30 has a recess central wall 34 and a pair of recess side walls 36, 38 extending at an angle to the recess central wall 34.

The recess central wall 34 can be reinforced with a back plate 40 secured to an inner surface 42 of the recess central wall 34, as shown in Figure 1. Reinforcing angular plates 46 and transverse brackets 48, 49 are positioned in the back of the recess side walls 36, 38, engaging adjacent pontoon wall 16.

A side locking assembly 50 is adapted and configured to fit in each recess 30. The side locking assembly 50 comprises a locking key 60 lockable with two adjacent pontoon modules 10. For better understanding, the modules 10 will be identified as modules 10a, 10b, 10c, and 10d. Fitted in the recess 30 is an upper engagement plate 52, which extends between the recess side walls 36, 38 transversely to the vertical axes of the recess side walls 36, 38. The engagement plate 52 is rigidly attached to the central wall 34 and the recess side walls 36, 38. A centrally-located slot 54 is formed in the upper plate 52 extending from a front edge 55 of the upper plate 52 toward the recess central wall 34. An opening 56 and an opening 58 are formed in the upper plate 52 equidistantly from the central slot 54. Supporting members 61, 62 support the upper plate 52 from the bottom.

A locking bar 70 is fitted in the lower part of the recess 30, extending between the recess side walls 36, 38 a distance from the bottom of the pontoon module below the engagement plate 52 and in a generally parallel relationship thereto. The locking bar 70 carries a pair of generally parallel guide plates 72, 74, which extend from the recess central wall 34 into the space defined by the recess to engage the locking bar 70. The locking key 60 is adapted to engage the locking bars 70 and the engagement plate 52 of adjacent modules 10, as will be explained below.

The locking key 60 comprises a generally narrow main body 80 configured and sized to frictionally engage with the central slot 54. A part of the main body 80 fits in the central slot of one modular pontoon, while another part – in a central slot of an adjacent modular pontoon.

The locking key 60 also comprises an upper securing plate 82 fixedly attached at a right angle to the body 80 and a lower portion 84 adapted for engagement with the locking bars 70 of the modules 10. The lower portion 84 is formed with two cutouts 86, 88, each of which is configured and shaped to mate with the locking bars 70 when the key 60 is lowered for engagement with the locking bar 70. The cutout 86 fits over a locking bar 70 of the module 10a, while the cutout 88 fits over the locking bar 70 of an adjacent module 10b. The phantom lines in Figure 1 illustrate positioning of the locking key in engaging relationship with adjacent modules' locking bars 70.

The lower portion 84 fits between the guide plates 72, 74, while the securing plate 82 is placed on the upper plate 52. A plurality of securing devices 90, for instance bolts, pins and the like attach the securing plate 82 to the upper plate 52. The openings 92 formed in the securing plate 82 are aligned with the openings 56, 58 of the upper plates 52 of adjacent modules 10a and 10b for locking the locking key 60 with the pontoons 10a and 10b. When the locking key 60 is engaged with the adjacent modular pontoons 10, the pontoon hulls become rigidly connected. If effect, several pontoon modules when rigidly connected together become a larger buoyant floating structure with the use of the connector system of the present invention.

A corner locking member 100 forms a part of the locking system of the present invention. The corner locking member 100 defines a buoyancy chamber within its body. The corner locking member 100 is adapted and configured to fit between corners of adjacent four modules 10a, 10b, 10c and 10d. As can be seen in the drawings, each pontoon module has corners 15, 17, 19, and 21, which are truncated and cut at an angle to define a vertical surface that can carry a male connector member 104. The corner locking member 100 has complimentary slots 106 for receiving the male connector members 104 therein.

When the corner locking member 100 is engaged with four male connectors 104 of the modules 10a, 10b, 10c and 10d the corner locking member 100 is centrally located between the pontoon modules, while the side locking assemblies engage side walls and end walls of the modules 10. The corner locking member 100 is secured to the pontoon modules with securing devices 112, which can be pins or studs and other such means.

The vertical dimensions of the corner locking member 100 are generally similar to the vertical dimensions of the modules 10. In the embodiment shown in the drawings, the upper surface 108 of the corner connector extends in a substantially co-planar relationship to the top plate of the modules 10, while the bottom surface 110 extends in a substantially coplanar relationship to the bottom plate of the modules 10.

The design of the side and corner locking assemblies makes it possible to connect and disconnect the pontoons with minimal additional equipment. The only tools required are those needed to connect and disconnect the fasteners and, if required due to size and weight, lifting assists for the locking bars.

The connection works by attaching the corner connection members, or floats to the corners of the pontoon on the side where the next pontoon module is to be connected. The shape of the corner connector float helps guide the next pontoon module into place. When aligned, the corner connector float 100 is secured to the new pontoon module and the locking keys are lowered in the slots on the tow pontoons. They engage the locking bars in the lower hull, pulling the two pontoons into place. The upper plate of the locking key is then secured in place, providing a secure attachment at both the top and bottom of the pontoon hulls.

Although the above description and accompanying drawings relate to a specific preferred embodiment as presently contemplated by the inventor, it will be understood that the invention in its broad aspect includes mechanical and functional equivalents of the elements described and illustrated.

CLAIM

We Claim:

1. A connector system for a plurality of modular pontoons, each of said plurality of modular pontoons having a hull with vertically extending sidewalls, the connector assembly comprising a locking bar carried by the hull and a locking key adapted for releasable engagement with the locking bar, characterized in that said locking key is configured for engagement with the locking bars of adjacent modular pontoons, said locking key being provided with a pair of spaced-apart cutouts formed in a lower portion thereof, one of such cutouts being configured for engagement with a locking bar of one of the adjacent pontoons, while another cutout is configured for engagement with a locking bar of another of said adjacent pontoons.
2. The apparatus of Claim 1, wherein said locking bar is fitted in a recess formed in a lower part of the sidewall of the hull.
3. The apparatus of Claim 1, wherein said locking bar carries a pair of spaced-apart guiding plates to facilitate engagement of the locking bar by the locking key such that the lower portion of the locking key fits between the guiding plates.
4. The apparatus of Claim 2, further comprising a locking key engagement plate mounted in the sidewall recess a distance above said locking bar, said engagement plate extending in a substantially parallel relationship to said locking bar.
5. The apparatus of Claim 4, wherein said locking key comprises a main body carrying an upper securing plate, said upper securing plate being adapted for positioning on top of and engagement with, the locking key engagement plate.
6. The apparatus of Claim 5, wherein said upper securing plate is configured to fit within the sidewall recess.
7. The apparatus of Claim 4, wherein said locking key engagement plate is provided with a slot for receiving at least a part of the locking key main body therein.
8. The apparatus of Claim 7, wherein said locking key main body is frictionally engaged in said slot formed in the engagement plate.

9. The apparatus of Claim 7, wherein said locking key main body is adapted for engagement within slots formed in locking key engagement plates of adjacent modular pontoons.
10. The apparatus of Claim 1, wherein said connector system further comprises a corner locking member for releasable securing of corners of adjacent pontoons.
11. The apparatus of Claim 10, wherein said corner locking member is provided with slots formed in sidewalls thereof for frictionally receiving connector members extending from corners of adjacent modular pontoons.
12. The apparatus of Claim 10, wherein said corner locking member has an upper surface that is oriented to extend in a substantially co-planar relationship with top surfaces of the modular pontoons and a bottom surface that is oriented to extend in a substantially co-planar relationship with bottom surfaces of the modular pontoons when the corner locking member is secured to the modular pontoons.
13. The apparatus of Claim 12, wherein said slots formed in the corner locking member extend between the upper surface and the bottom surface of the corner locking member.
14. The apparatus of Claim 10, wherein said corner locking member comprises a buoyant floatable body.
15. The apparatus of Claim 10, further comprising a means for fixedly securing said corner locking member between adjacent ones of said modular pontoons.
16. A connector system for a plurality of modular pontoons, each of said plurality of modular pontoons having a hull with vertically extending sidewalls, the connector assembly comprising: a locking bar mounted in a lower portion of the hull and a locking key, characterized in that the locking key is operable to matingly fittingly releasably engage locking bars of fitted in sidewall recesses of adjacent ones of said modular pontoons and said connector system further comprises a buoyant corner locking member for connecting corners of the adjacent ones of the modular pontoons, said connector system rigidly connecting the adjacent modular pontoons.
17. The apparatus of Claim 16, wherein said locking bar is fitted in a recess formed in a lower part of the sidewall of the hull.

18. The apparatus of Claim 16, wherein said locking bar carries a pair of spaced-apart guiding plates oriented transversely to a longitudinal axis of the locking bar to facilitate engagement of the locking bar by the locking key.

19. The apparatus of Claim 16, wherein said locking key comprises a substantially narrow main body having a lower portion with a pair of spaced-apart cutouts, one of such cutouts being configured for engagement with a locking bar of one of the adjacent pontoons, while another cutout is configured for engagement with a locking bar of another of said adjacent pontoons.

20. The apparatus of Claim 16, wherein a locking key engagement plate is mounted in said recess a distance above said locking bar, said engagement plate being provided with a slot for receiving at least a part of the main body of the locking key therein.

21. The apparatus of Claim 20, wherein said locking key is provided with an upper securing plate, said upper securing plate operable to rest on and engage with, the locking key engagement plate.

22. The apparatus of Claim 19, wherein said locking key main body is adapted for engagement with slots formed in the locking key engagement plates of adjacent modular pontoons.

23. The apparatus of Claim 16, wherein said corner locking member is provided with slots formed in sidewalls thereof for frictionally receiving connector members extending from corners of adjacent modular pontoons.

24. The apparatus of Claim 23, wherein said modular pontoons have a generally parallelepiped configuration with angularly truncated corners, and wherein said connector members extend outwardly from the truncated corners for frictionally engaging with the corner locking member.

25. The apparatus of Claim 16, wherein said corner locking member has an upper surface that is oriented to extend in a substantially co-planar relationship with top surfaces of the modular pontoons and a bottom surface that is oriented to extend in a substantially co-planar relationship with bottom surfaces of the modular pontoons when the corner locking member is secured to the modular pontoons.