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SECTIONAL BARGE CONNECTION

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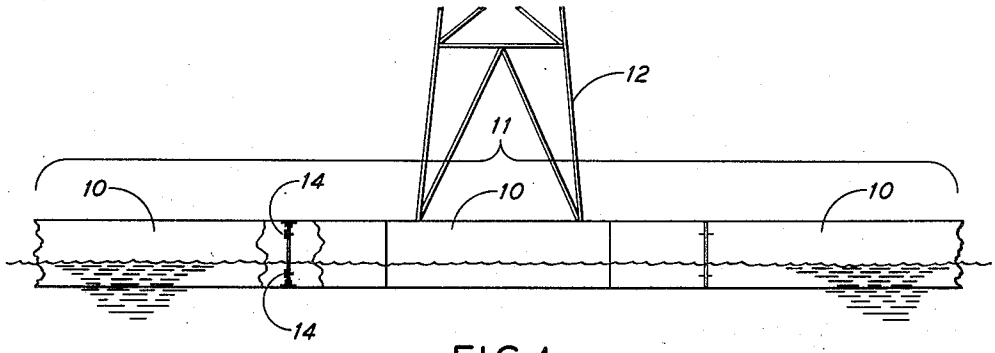


FIG. 1

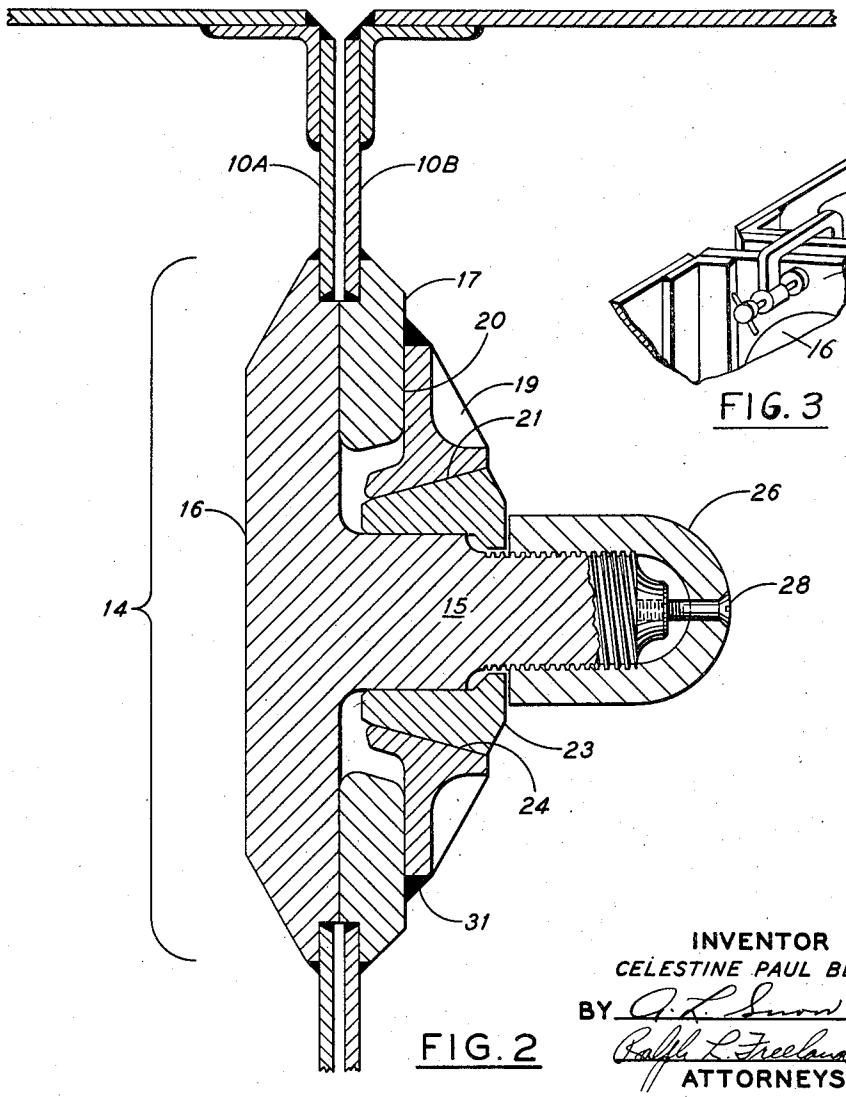


FIG. 2

FIG. 3

INVENTOR
CELESTINE PAUL BESSE
BY A. L. Simon
Ralph L. Freeland Jr.
ATTORNEYS

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SECTIONAL BARGE CONNECTION

Celestine Paul Besse, New Orleans, La., assignor, by mesne assignments, to California Research Corporation, San Francisco, Calif., a corporation of Delaware

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1 Claim. (Cl. 114—77)

The present invention relates to apparatus for constructing floatable work platforms as small elements and assembling while said elements are afloat, more particularly to an arrangement for constructing an enlarged floatable platform from a plurality of sectionalized floating members, barge hulls, or the like, and has for an object the provision of an improved method of connecting together a plurality of floating sections by providing a plurality of mating pins and pin openings in opposed walls of the hull sections to permit rapid initial assembly and subsequent disassembly, or assembly afloat.

It has long been appreciated that in the establishment of a working platform, such as those required for supporting a drilling structure for an underwater drilling location, that it is desirable from the standpoint of navigation in narrow waters to be able to construct the working platform from a plurality of sectional barges, hulls, or the like.

Heretofore, it has been necessary to construct the interconnecting portions of sectionalized hulls, or floating segments, by accurately machining and carefully controlling the location of the pins and pin holes in the mating sections. Ordinarily, this has required the assembly and disassembly of the hull sections of the completed working platform on dry land or in dry docks. Such practice is, of course, time consuming and expensive due to both the accuracy of machining required and dry dock expense.

In accordance with the present invention, an improved method of assembling a plurality of sections, such as barge hulls, into an enlarged working platform is made possible by providing a plurality of pin members secured to one section and adapted to pass freely through greatly enlarged corresponding openings in an adjacent section, said openings being of such dimensions to permit the free passage of the mating pins therethrough while both mating sections are afloat, thereby permitting said pair of mating sections to be brought into engagement and roughly aligned. The sections are then temporarily secured together independently of the pin members and pin openings, but with said members and openings in rough registration. Further, in accordance with the invention, each of said pins is then brought into engagement more closely with the pin openings by a tapered collar member adapted to pass freely over the end of the pin from the inboard side of said pin opening. Said tapered collar member is then secured to said pin by a tapered slip member adapted to slidably engage the shank of said pin and further slidably engage the outwardly diverging tapered surface formed in said tapered collar member. A cap member threadably secured to the outer end of said pin member is adapted to force said slip member and said collar member into firmer sealing engagement with each other and through said collar, firmer sealing engagement is made between the pin and the wall surrounding the enlarged pin-receiving opening in the barge or hull section.

In accordance with the preferred method of assembling a plurality of hull sections afloat, after each of the collar

members is assembled initially on its pin in the foregoing manner, the collar member is welded to the wall of the hull surrounding the pin-receiving opening. Thus, upon subsequent disassembly of the barge sections, only the cap nut and the tapered slip member need be removed from the pin in order for the pin to be withdrawn from the collar to permit separation of the mating barge sections. In this manner, each subsequent assembly or disassembly of the barge sections thereafter, required in moving the work site from one location to another, or for barge repairs, may be made readily with the same accuracy of fit between the mating hull sections as that achieved in the initial assembly of the hull sections.

Further objects and advantages of the present invention will become apparent from the following detailed description taken in conjunction with the accompanying drawing which forms an integral part of the present specification.

In the drawing:

Fig. 1 is a schematic representation of a floatable work platform constructed from a plurality of barge or hull sections and connected together in accordance with the method of the present invention.

Fig. 2 is a cross-sectional view through an individual connecting pin constructed in accordance with a preferred embodiment of the present invention, illustrating in detail the manner of assembling mating sides of the sectional hulls.

Fig. 3 is a perspective view of the corners of the sectional hull showing the temporary clamping used in preliminary assembly.

Referring now to the drawing, and particularly to Fig. 1, it will be noted that a plurality of individual barge hull sections **10**, each adapted to be towed or floated to an underwater work site, have been assembled into a working platform **11**. In the present instance, work platform **11** is illustrated as being adapted to support directly upon its upper deck a drill derrick **12**. Alternatively, at the underwater drilling location the work deck may be supported by the hulls **10** at any given height thereabove. The required working area, or weight-supporting area, of the enlarged work platform **11** heretofore has required that the entire assembly be preassembled as a unit on dry land or in a dry dock and then floated to the work site. For reasons set forth above, it is advantageous to float the individual sections **10** to the work site independently and then assemble them into the work platform, provided, of course, that the cost of final assembly of said sections into platform **11** at the work site, is not greater than the large cost either of preassembly or waiting for favorable navigating conditions to float the entire structure to the work site. However, whether sections **10** are assembled at the work site, or in protected waters and then floated to the work location as an assembled unit, it is desirable to be able to readily assemble the platform while all sections **10** are afloat.

In accordance with the present invention, the economical assembly of sections **10** into platform **11** while afloat, either at the work site or in protected waters, is made possible by the provision of a plurality of pins **14**, each of which passes from one section, such as **10A**, through the enlarged openings formed in the walls of the adjacent section, such as **10B**. Pins **14**, constructed in accordance with the present invention, facilitating the afloat assembly of work platform **11**, are particularly shown in Fig. 2. As there illustrated, pin **14**, including an elongated connecting pin section **15**, and an enlarged circular base **16**, extends outboard from one of the barge hulls, such as **10A**, and then passes through an enlarged opening in the mating hull **10B**. As shown, said enlarged opening is formed by a first or reinforcing collar member

17 secured within a larger opening in the wall of mating hull 10B.

It will be understood that the dimensions of the barge hull sections may be large. Accordingly, mating of the pins and openings within less than a few inches tolerance in the barge sections is quite difficult and expensive. However, in accordance with the present invention, the pins 15 need only be positioned to align roughly with the openings in the collars 17. Following arrival at the working site, the opposed barge sections 10A and 10B are easily brought into mating engagement by introduction of the several pin members 15 through the corresponding openings in the collars 17. The barge sections may then be temporarily clamped or tied together in any desired manner, such as by cables or clamps, or the like. For example, as shown in Fig. 3, walls 10A and 10B may be held together by clamps, such as C-clamp 40. After the sides of the barge hull 10 are secured together temporarily, a second collar member 19 having a face 20 adapted to engage the inboard face of first collar 17 is slipped over the end of pin 15. As shown in Fig. 2, collar 19 is provided with an outwardly-diverging tapered surface 21, adapted to pass freely over the end of pin 15.

In accordance with the present invention, tapered surface 21 of collar 19 is centered relative to the pin 15 by a tapered slip member 23 which is adapted to engage closely the shank end of pin 15 with the outer tapered surface 24 of slip 23 sliding into engagement with the tapered surface 21. Thus, the slip member 23 and the collar member 19 are adapted to lock pin member 15 within the openings in first collar 17 and the side plate of barge hull 10B. Final locking of slip member 23 with tapered collar 19 is accomplished by a cap nut member 26, which threadably engages the outer end of pin 15. By the application of torque to cap member 26, it will be seen that the outer surface slip member 23 may be firmly forced into engagement with tapered surface 21 of collar 19 to center said collar and thereby firmly secure the entire assembly, including the opposed hulls.

Cap member 26 is desirably locked in position by a set screw 28 which passes through the center of the cap and threads into the outer end of pin 15.

After initial assembly at a work site in the foregoing manner, the mating sections 10A and 10B may be made more readily assemblable at a succeeding work site by permanently securing face 20 of tapered collar 19 to the inboard face of first collar 17, as by the bead weld 31, indicated in Fig. 2. Such permanent connection of tapered collar 19 to pin-receiving collar 17 will permit more rapid assembly of the barge hulls 10 after the initial assembly, since, under these circumstances, the hulls 10A and 10B on initial assembly are fitted so that the tolerances permitted in manufacture are compensated. Thus, only the tapered slip 23 and the cap nut 26 need be removed and replaced to disassemble or assemble the barge hulls thereafter.

Under certain circumstances, where a large plurality of hulls are all to be interchangeable at any work site, it is desirable to leave collars 17 and 19 as individual elements in the connecting pin assembly.

Various modifications and changes in the structural details of the pin assembly may be made without departing from the scope of the invention, as well as in the method of its assembly. However, all such modifications and changes falling within the scope of the appended claim are intended to be included therein.

I claim:

In apparatus for assembling a work structure from a plurality of barge hull sections while said sections are afloat wherein a plurality of pin members project outboard from the side of one of said hulls, and pin-receiving openings are formed in corresponding wall portions of an opposed hull, the combination comprising a pin member having a shank portion, a threaded end portion and an enlarged head portion adapted to be secured to the side wall of one of said hulls, a backing ring surrounding the pin-receiving opening in the opposing hull side wall, said backing ring having an opening substantially larger in diameter than the shank of said pin to permit free passage of said pin therethrough and to permit rough registration of said opposed hulls while said hulls are afloat, a tapered collar member of appreciably larger size than said threaded portion to pass freely over the threaded end of said pin to bring its flange portion into flush engagement with the inboard face of said backing ring, said collar member having a tapered surface adapted to surround the shank portion of said pin and radially diverging from the base of said pin toward the inboard side of said collar member, a slip member having a tapered outer surface of lesser size than the tapered collar member and an inner surface of generally the same size as said shank to closely engage said shank of said pin and adapted to have its tapered surface substantially fully received within the tapered surface of said collar member, and cap means for threadably engaging the outer end of said pin to force said slip member into seating engagement within said collar member and to center said pin within said backing ring and thereby seal said opposed barge hulls together as an enlarged working structure.

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