

Nov. 7, 1961

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3,007,316

SEPARABLE SUBMERGIBLE PORTABLE PLATFORM

Filed March 3, 1955

5 Sheets-Sheet 1

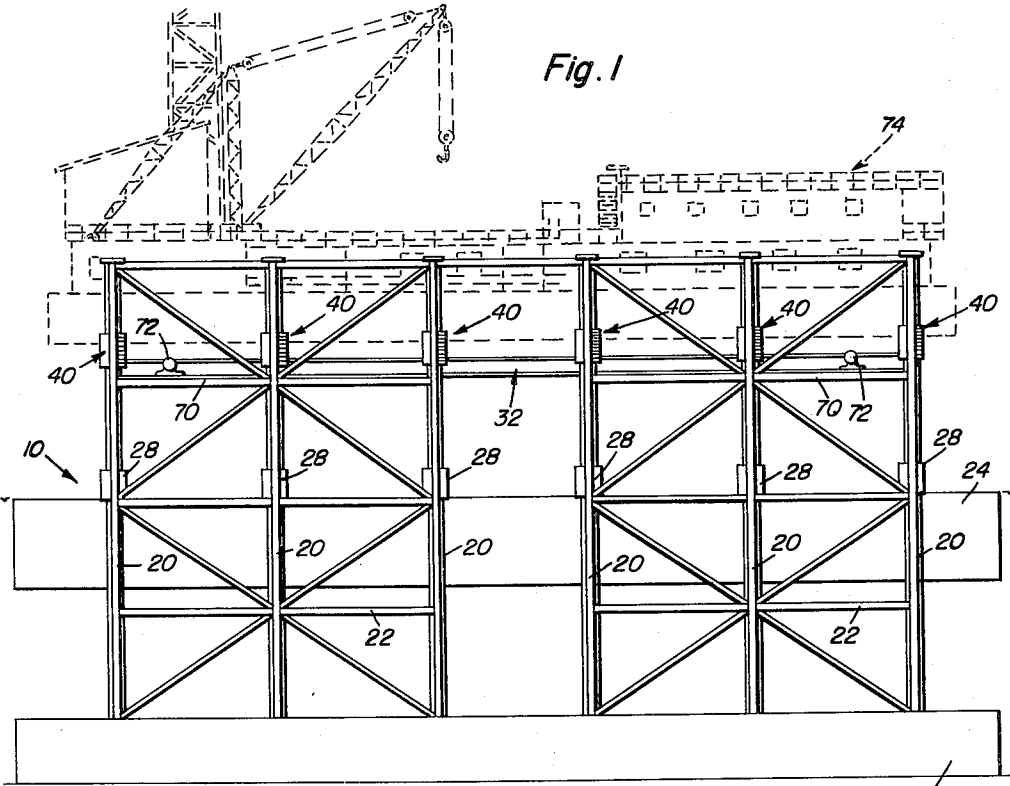


Fig. 1

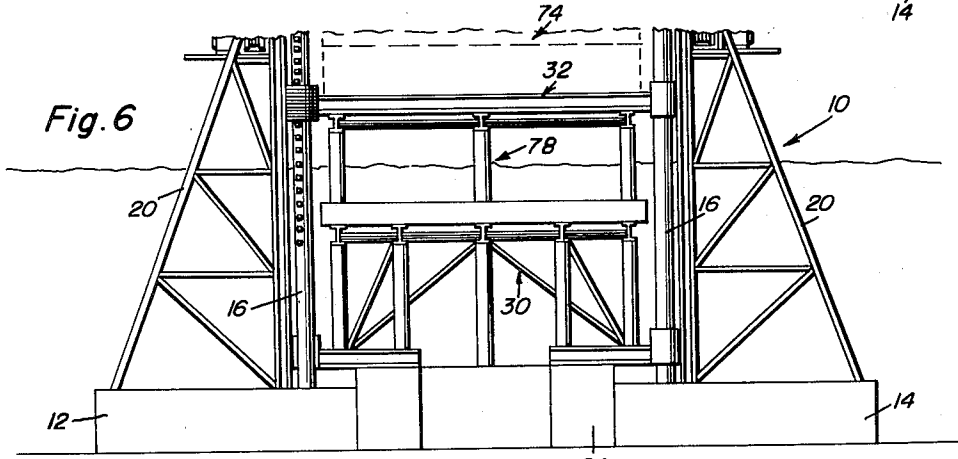


Fig. 6

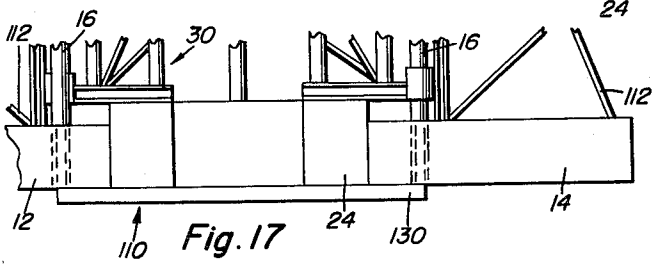


Fig. 17

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Fig. 2

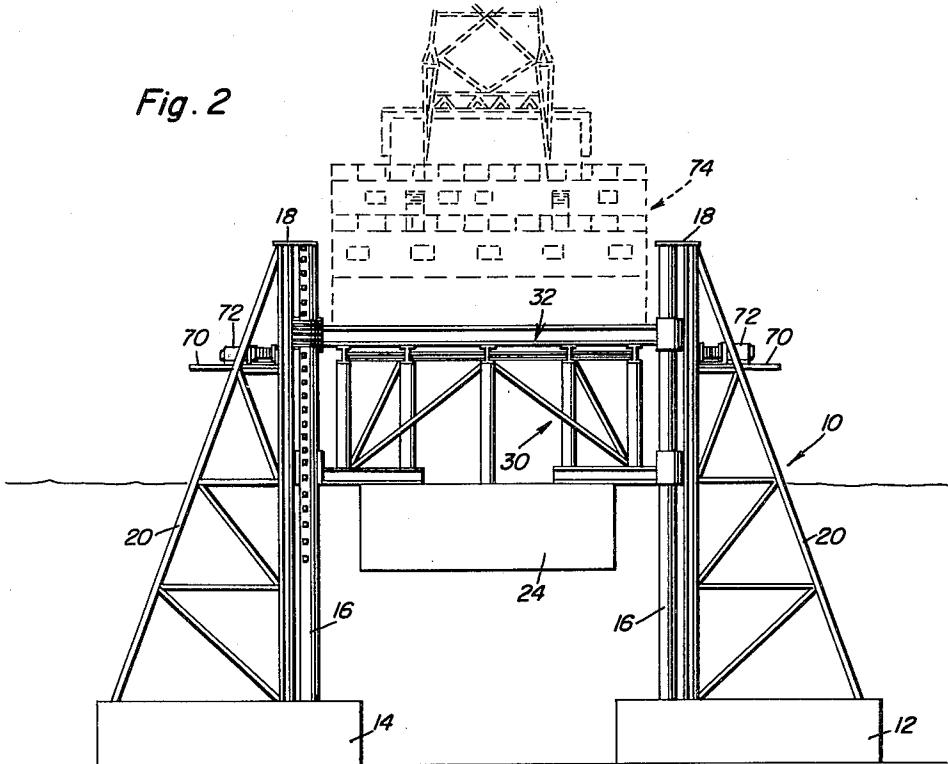


Fig. 4

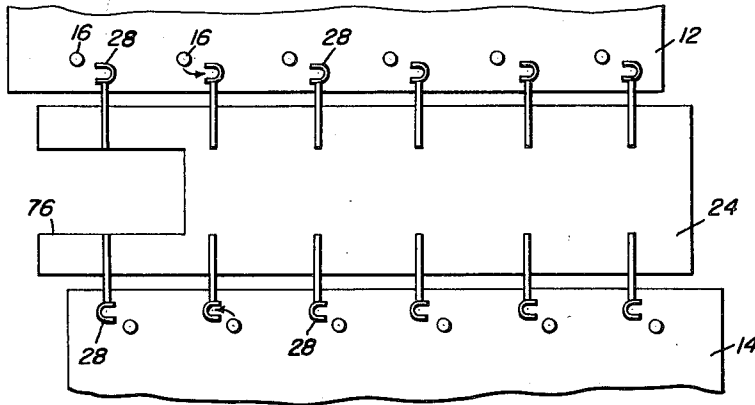
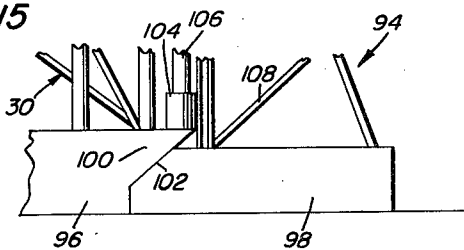


Fig. 15



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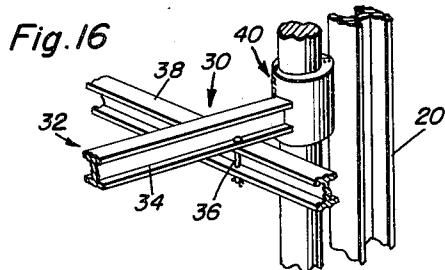
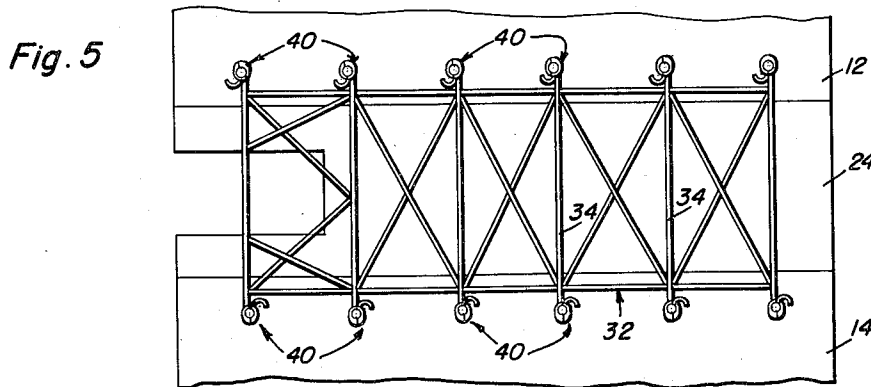
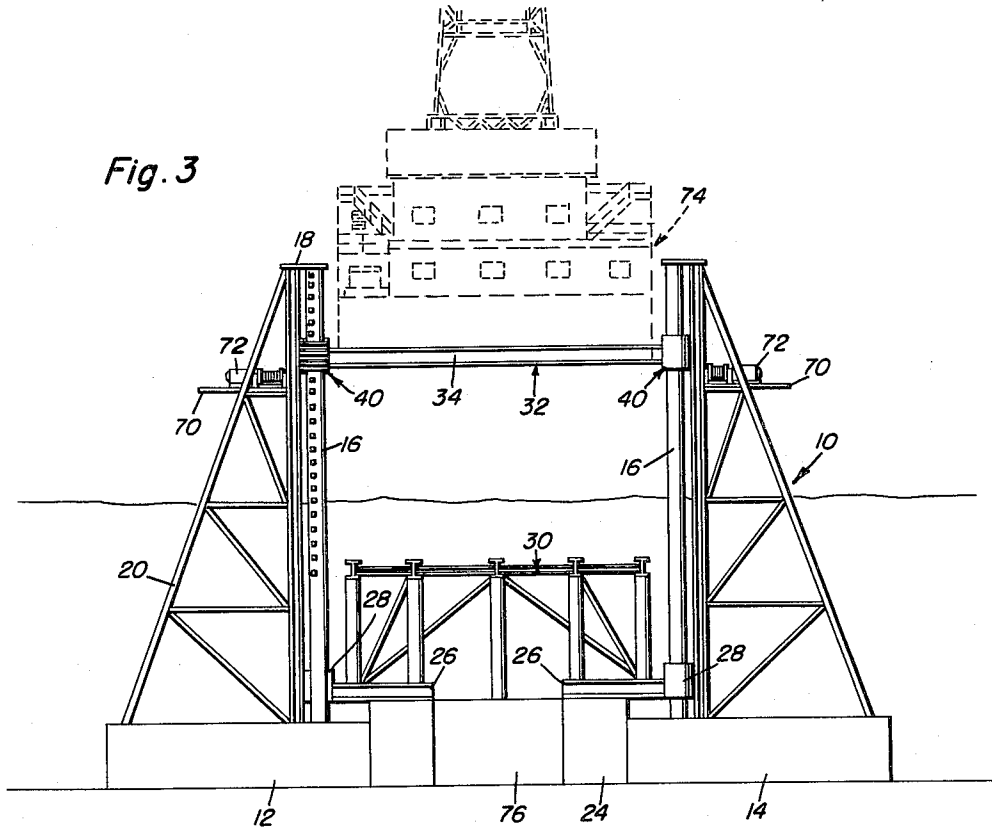
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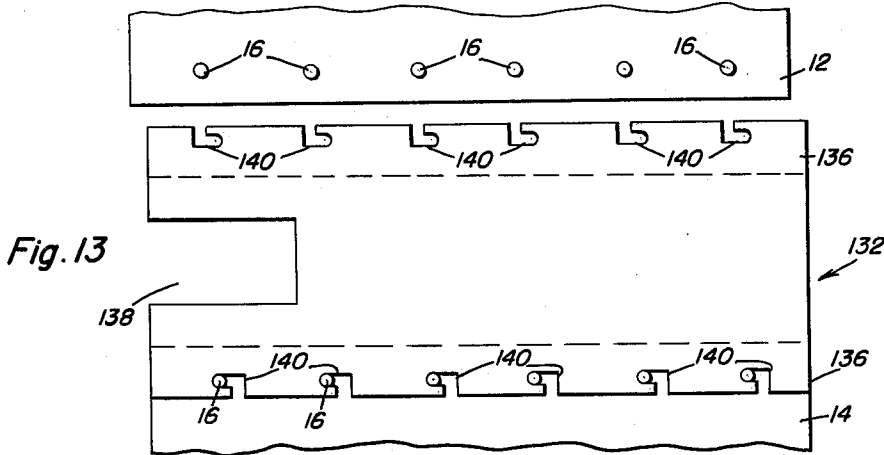


Fig. 13

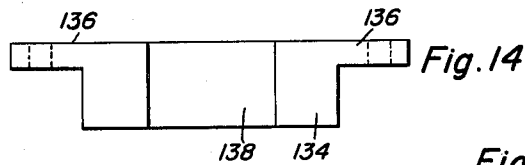


Fig. 14

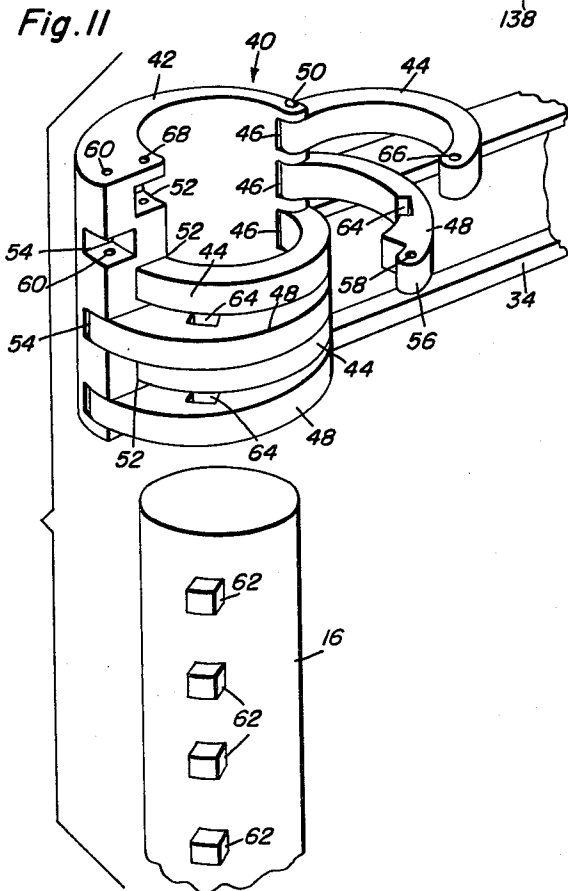


Fig. 11

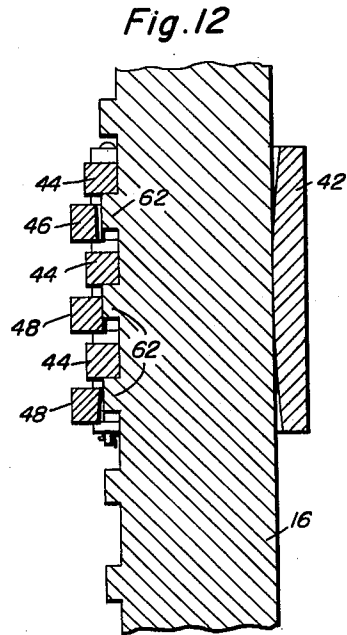


Fig. 12

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3,007,316  
**SEPARABLE SUBMERGIBLE PORTABLE  
PLATFORM**

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Filed Mar. 3, 1955, Ser. No. 491,956  
12 Claims. (Cl. 61-46.5)

This invention relates to new and useful improvements in submergible platforms, and more specifically to a portable submergible platform which is separable.

The oil well drilling companies have now found it advisable to attempt to drill oil wells off-shore in relatively deep water. In order to accomplish this, other than using a "jacket" type structure commonly built of pipe, it has been found preferable to provide suitable platforms for the drilling rig which may be floated onto position and then firmly anchored on the bottom so as to prevent shifting of the drilling rig. While such platforms have been devised, they are relatively expensive inasmuch as they must have built thereinto a complete drilling rig, and they are relatively complicated inasmuch as lowering or raising them properly on or from the bottom is concerned. Due to controlling widths such as locks, channels, and drydock repair facilities, the width of floating submergible platforms are usually restricted to such a degree that they do not afford an immovable or stable platform under severe weather conditions.

It is therefore the primary object of this invention to provide a submergible platform for oil well drilling rigs which is so constructed, whereby a plurality of barges may be individually formed and singly floated to a predetermined water location after which they may be readily assembled to form a large bottom contacting area so that an oil well drilling rig supported thereby may be properly stabilized with respect to the bottom to overcome any wave action thereon.

Another object of this invention is to provide an improved submergible platform which is formed in independent sections, the sections being independently floatable and being so constructed whereby they may be connected together with a minimum effort and through the use of one or more winches mounted thereon.

Still another object of this invention is to provide an improved submergible platform for oil well drilling rigs mounted on submergible barges of the type commonly referred to in the industry as shallow water drilling barge, the platform being of such nature whereby it may conveniently support an existing shallow water drilling barge so that its utilization and field of operation can be extended to drilling in relatively deep water. Thus the cost of providing a deep water drill rig by a company owning a shallow water drilling barge is limited to the cost of the submergible platform, which is relatively low as compared to special deep water drilling rigs now in existence.

A further object of this invention is to provide an improved separable submergible platform for off-shore drilling rigs, the platform being so constructed whereby with a minimum of variation, it may be adapted to waters of various depths including depths not permissible with existing drilling rigs at this time.

Yet another object of this invention is to provide an improved separable submergible platform which is so constructed whereby through minor alterations it may be utilized for supporting off-shore oil well drilling rigs, may be used as a dry dock, or may form a suitable pier structure.

A still further object of this invention is to provide an improved method of raising, transporting and positioning, as well as supporting, a shallow water drilling rig in rela-

tively deep water to function as a deep water drilling rig.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIGURE 1 is a side elevational view of the separable submergible portable platform which is the subject of this invention and shows the same supporting a shallow water drilling barge, the shallow water drilling barge being shown in dotted lines;

FIGURE 2 is an elevational view of the platform structure of FIGURE 1 as viewed from the right end thereof and shows the manner in which a central barge supports a platform which in turn carries the oil well drilling barge during an intermediate stage of submerging the platform structure;

FIGURE 3 is an elevational view of the platform structure of FIGURE 1 as viewed from the left and shows the central barge being submerged and cooperating with the outer barges of the platform structure to provide a suitable base for the platform carrying the oil well drilling barge;

FIGURE 4 is a schematic fragmentary plan view showing the manner in which the outer barges are interlocked with the central barge;

FIGURE 5 is a schematic plan view similar to FIGURE 4 and shows the manner in which the platform carried by the central barge is interlocked with the standards carried by the outer barges;

FIGURE 6 is an elevational view similar to FIGURE 3 and shows the central barge provided with a removable extension framework for supporting the platform whereby the platform may be positioned at a greater height above the water level;

FIGURE 7 is an elevational view of the same general platform structure with the same being utilized as a dry dock for small vessels, the upper portion of the bracing for the standards carried by the outer barges being in the form of living quarters and storage areas;

FIGURE 8 is an elevational view showing the platform structure, with a slight modification, being utilized as a portable dock;

FIGURE 9 is a fragmentary elevational view similar to FIGURE 3 and shows a modified form of standard construction carried by one of the outer barges;

FIGURE 10 is a fragmentary elevational view similar to FIGURE 3 showing a special platform structure intended to use in very deep water, that portion of the platform structure being shown in dotted lines being added to the platform structure after the barges have been assembled as a unit;

FIGURE 11 is an enlarged fragmentary exploded perspective view showing the connection between a sleeve of the platform with one of the standards;

FIGURE 12 is a vertical sectional view on an enlarged scale taken through one of the sleeves of FIGURE 11 when mounted on its associated standard and showing the interlocked connection therebetween;

FIGURE 13 is a schematic fragmentary plan view similar to FIGURE 4 and shows the manner in which a modified form of central barge is connected with the outer barges;

FIGURE 14 is an end elevational view, taken from the left of FIGURE 13, of the barge and shows the details of the construction thereof;

FIGURE 15 is a fragmentary elevational view showing still another modified form of barge construction;

FIGURE 16 is an enlarged fragmentary perspective view showing the manner in which the platform is tem-

porarily secured to the supporting framework of the central barge to prevent relative shifting; and

FIGURE 17 is a fragmentary elevational view of the barges and showing a yoke interconnecting the outer barges so as to prevent separation of the outer barges as they are being submerged.

Referring now to FIGURES 1, 2 and 3, of the drawings in particular, it will be seen that there is illustrated the separable submergible portable platform structure which is the subject of this invention, the platform structure being referred to in general by the reference numeral 10. The platform structure 10 includes a pair of outer barges 12 and 14 which are preferably identical with the exception of being right and left hand barges. Carried by the barges 12 and 14 are a plurality of longitudinally spaced, aligned standards 16. The standards 16 are braced at their upper ends through means of a cap plate 18 by truss-like frame 20. The frames 20 are longitudinally spaced and extend transversely of the barges 12 and 14. As is best illustrated in FIGURE 1, the frames 20 are braced by suitable diagonal braces which interconnect adjacent frames 20, the braces being referred to by the reference numeral 22. It is to be understood that the structure of the frames 20 and their associated brace 22 will be varied as is found necessary to properly reinforce the standards 16.

It is pointed out at this time that the standards 16, the frames 20 and the braces 22 are preferably so positioned on the barges 12 and 14 that the barges 12 and 14 float on even keel. However, at times it may be necessary to utilize counterweights or ballasts (not shown) in order to properly balance the barges 12 and 14 and permit the positioning of the standards 16 adjacent the inner side edges of the barges 12 and 14.

The platform structure 10 also includes a central barge 24. The central barge 24 differs from the outer barge 14 in that it is of a greater capacity. The central barge 24 will have a greater depth than the outer barges 12 and 14 and in many instances may have a greater width.

The central barge 24 is provided with a plurality of inwardly extending arms 26. The arms 26 preferably overlie the deck of the barge 24 and are suitably secured to the framework thereof. There is one arm 26 for each of the standards 16 and the outer end of each of the arms 26 is provided with a sleeve 28.

Referring now to FIGURE 4 in particular, it will be seen that the sleeves 28 are horseshoe-shaped in plan. The sleeves 28 are so shaped that they may receive the standards 16.

Each of the outer barges 12 and 14 is connected to the central barge 24 by slightly longitudinally offsetting the particular outer barge to be connected to the central barge 24 and moving the standard 16 into longitudinal alignment with the sleeves 28. The outer barge being connected is then shifted longitudinally with respect to the central barge 24 so that the standards 16 move into the sleeves 28. It is to be noted that the sleeves 28 at opposite sides of the central barge 24 face in opposite directions so that when the barges 12, 14 and 24 are properly connected together, longitudinal shifting thereof is prevented, particularly longitudinal shifting of the central barge 24 with respect to the outer barges 12 and 14.

Carried by the central barge 24 and projecting upwardly therefrom is a suitable framework which is referred to in general by the reference numeral 30. The framework may be of any structural design to support the intended load to be placed on the framework 30 and the central barge 24. However, it must present a flat upper surface so that a platform structure, such as the platform structure 32 may suitably seat thereon. The platform structure 32 includes a plurality of transverse beams 34 which may be connected together in any suitable manner, including that illustrated in FIGURE 5.

When the central barge 24 is elevated, the platform structure 32 rests upon the framework 30, as is best illustrated in FIGURE 2. In order to prevent longitudinal

shifting of the platform structure 32 with respect to the framework 30, it is connected thereto by a suitable connection, such as a removable bolt 36 which may pass through one of the beams 34 and a beam 38 of the framework 30, as is best illustrated in FIGURE 16.

It is pointed out that the platform 32 is provided with one transverse beam 34 for each pair of standards 16 carried by the outer barges 12 and 14. The transverse beams 34 are of lengths to extend between the standards 16 and are provided at their outer ends with sleeves which are referred to in general by the reference numeral 40. The sleeves 40 are telescoped on the standards 16 and serve to both support the platform 32 in a vertically adjusted position on the standard 16 and then to interconnect upper portions of the standards 16.

Referring now to FIGURE 5 in particular, it will be seen that the sleeves 40 at one side of the platform 32 open in one direction and that the sleeves 40 at the opposite side of the platform 32 opens in an opposite direction. Further, by comparing FIGURES 4 and 5, it will be seen that the sleeves 40 and 28 are in like position. Because of this arrangement, the platform 32 may be connected to the standards 16 at the same time the central barge 24 is connected to the standards 16 and by the same operation.

Referring now to FIGURES 11 and 12 in particular, it will be seen that each sleeve 40 includes a solid half 42 which is rigidly secured to an outer end of the associated beam 34 and extends vertically therefrom. That portion of the half 42 adjacent the beam 34 is provided with a plurality of vertically spaced sockets 46 in which are inserted inner ends of vertically spaced sleeve portions 44 and 48, the sleeve portions 44 and 48 being vertically alternated. The sleeve portions 44 and 48 are hingedly retained in their sockets 46 by a vertical hinge pin 50.

It is to be noted that the portion of the sleeve half 42 remote from the beam 34 is relatively thick as compared to the inner portion thereof. Formed in the free end of the outer portion of the sleeve half 42 is a plurality of vertically spaced sockets 52 and 54, the sockets 52 and 54 being alternated with the sockets being disposed inwardly of the sockets 54.

The sleeve portions 48 are provided with reduced end portions 56 which are received in the sockets 54 to partially complete the sleeve 40. The end portions 56 are provided with vertical bores 58 alignable with vertical bores 60 in the sleeve half 42 and are adapted to have a locking pin (not shown) received therethrough.

In order that the sleeves 40 may be retained in vertically adjusted position on the standards 16, each of the standards 16 is provided with a vertically disposed row of vertically spaced lugs 62 which project outwardly therefrom. In order that the sleeves 40 may be free to slide upon the standards 16 when the sleeve portions 48 are in their closed positions, the sleeve portions 48 are provided with suitable notches 64 which are so aligned with the lugs 62 to permit passage thereof. Thus, the platform 32 may be locked to the standards 16 for guided vertical sliding movement as desired.

The free end portions of the sleeve portions 44 are selectively receivable in the sockets 52 to complete the sleeve 40. The free end of each sleeve portion 44 is provided with a vertical bore 66 which is alignable with a vertical bore 68 in the outer part of the sleeve half 42. A locking pin (not shown) is passed down through the bores 66 and 68 to lock the sleeve portions in their closed positions. As is best illustrated in FIGURE 12, the sleeve portions 44 are so spaced whereby when in their closed positions they will overlie and rest upon one of the lugs 62. In this manner the sleeves 40 are retained on the standards 16 against vertical movement.

With further reference to FIGURE 12, it is pointed out that the inner surface of the sleeve half 42 is bowed outwardly from its center toward its upper and lower ends in order that only the central portion of the sleeve half

42 will engage the standards 16. In this manner slight misalignment of the various parts of the platform structure 10 will be permitted without binding.

In the construction of the platform structure 10, the barges 12, 14 and 24 will be built in the shipyard as individual units. Then the framework 30 will be built upon the central barge 24 and the standards 16 and their bracing frames 20 will be built on the outer barges 12 and 14. Further, the platform 32 will be rested upon and temporarily secured to the framework 30 in the manner illustrated in FIGURE 16. This having been accomplished, the barges 12, 14 and 24 will be floated from the shipyard through the necessary inland waterways and out into the deep water. It is to be understood that the widths of the barges 12, 14 and 24 will be limited by the widths of the locks through which they must pass in their journey to the sea.

Once the barges 12, 14 and 24 have been towed to their desired general location, they are connected together in the manner illustrated in FIGURES 4 and 5. In order that the barges 12, 14 and 24 may be connected without the use of any outside equipment, other than perhaps the tug used in positioning the barges, there is carried by the frames 20 adjacent the upper part thereof suitable catwalks 70. The catwalks 70 have positioned thereon small hand winches 72 which may be conveniently operated for moving the barges 12 and 14 with respect to the central barge 24. The hand winches 72 may also be used for opening and closing the sleeve portions 44 and 48. While the winches 72 may be mechanized, it is preferred that they be in the form of hand winches inasmuch as the maintenance thereof will be appreciably less.

When the barges 12, 14 and 24 are connected together, they will have that relationship generally illustrated in FIGURE 3, but the barges 12, 14 and 24 will be floating. Also, the platform 32 will be resting upon the framework 30. It is pointed out that at this time the sleeve portions 44 are in their open position so that guided vertical sliding of the platform 32 relative to the standards 16 is permitted.

Illustrated by dotted lines in FIGURES 1, 2 and 3 is a conventional shallow water drilling barge which is referred to in general by the reference numeral 74. Assuming that the shallow water drilling barge 74 has just completed a drilling operation near the land, it is then moved to relatively deep, yet calm water. At the same time, the platform structure 10 is being submerged. When the platform structure 10 is submerged, the outer barges 12 and 14 are filled with water and permitted to either singularly or simultaneously submerge. Due to the spacing of the sleeves 28 and 40, it will be seen that the descent of the barges 12 and 14 is guided by the central barge 24. After the outer barges 12 and 14 have come to rest on the bottom, the central barge 24 is then filled with water and it is permitted to sink, it being guided in its descent by the standards 16 which are now stabilized by the outer barges 12 and 14. Inasmuch as the platform 32 is not locked to the standards 16 it will descend with the central barge 24.

After the platform structure 10 has been submerged, the shallow water drilling barge 74 is floated into position overlying the platform 32. When the shallow water drilling barge 74 is properly positioned, air is pumped into the central barge 24 by suitable means to be described in more detail hereinafter, and the platform 32 is elevated so that it lifts the shallow water drilling barge 74 to the position illustrated in FIGURE 2. This having been accomplished, the water is suitably forced out of the outer barges 12 and 14 and they are elevated so that they float and they together with the central barge 24 will form a suitable hull once again. The entire platform structure 10 with the shallow water drilling barge rig 74 carried thereby in an elevated position is then towed to a desired drilling position in water of a depth in excess of that for which the shallow water drilling barge 74 is intended. During such towing, if desired, the sleeve portions 44 may

be locked with respect to the standards 16 to prevent any possible movement of the platform 32 and more firmly interconnect the barges 12, 14 and 24.

When the platform structure 10 has reached the desired drilling position, it is positioned relative to a suitable frame structure usually referred to as a well protector jacket, which has been placed into the bottom. In order to permit proper positioning of the drilling barge 74 with such frame structure, there is formed in the central barge 24 at one end thereof, a well 76 of suitable size, the well being best illustrated in FIGURES 3 and 4.

After the platform structure 10 and the drilling barge 74 has been suitably positioned with respect to the frame driven to the bottom of the Gulf or other drilling water, the barges 12 and 14 are first submerged and then the barge 24 is submerged after the platform 32 has been locked with respect to the standards 16. The platform structure 10 then assumes the position illustrated in FIGURE 3 with the drilling barge 74 supported above the water a sufficient distance to prevent wave contact and the barges 12, 14 and 24 forming a stabilizing base for the drilling barge 74 of such a nature so as to prevent movement due to wave action currents, wind forces, etc., on the platform structure 10.

While it has not been so illustrated, it is to be understood that the frames 20 may have incorporated therein, well above the water-line, suitable building structures for housing crews for the drilling rig. Or, if desired, the crews' quarters may be mounted on small barges supported by platform structures similar to the platform structure 10.

It is pointed out at this time that once a drilling operation has been completed utilizing the drilling barge 74 mounted on the platform structure 10, it is merely necessary to raise the barges 12, 14 and 24, the procedure being the reverse of lowering, so that they once again are floating and the entire unit may be shifted to the next drilling position with a minimum of effort. The platform structure 10 may be provided with suitable machinery for pumping air into the barges 12, 14 and 24 so that the water therein may be forced thereout. However, in order to reduce the cost of the platform structure and since the drilling barge 74 will be provided with suitable air compressors and pumps, arrangements can be made to utilize the equivalent of the drilling barge 74 in the raising and submerging operation of the barges 12, 14 and 24.

Referring now to FIGURE 6 in particular, it will be seen that there is provided an auxiliary framework which is referred to in general by the reference numeral 78. The auxiliary framework 78 rests upon the framework 30 and is suitably secured thereto. Seated on the auxiliary framework 78 is the platform 32.

It should be noted that the distance which the platform 32 may be positioned above the water-line when the platform structure 10 is in its submerged position is determined by the height which the platform 32 is normally supported above the barge 24. Thus, when it is desired to position the platform 32 a greater distance above the water level, it is necessary to use an auxiliary framework 78 so that the platform 32 may be supported a greater distance above the central barge 24.

Referring now to FIGURE 9 in particular, it will be seen that there is illustrated a slightly modified form of platform structure which is referred to in general by the reference numeral 80. The platform structure 80 will be identical with that of the platform structure 10 with the exceptions of the differences to be listed below. A platform structure 80 includes a central barge 82 and a pair of outer barges, only one of the outer barges being illustrated and being referred to by the reference numeral 84. Extending upwardly from the outer barge 84 is a pair of longitudinal rows of standards 86. Individual standards 86 of each pair of rows are arranged in transversely aligned pairs and, if desired, may be connected together at their tops. By separating the standards 86



of each pair, it will be seen that suitable stability may be obtained without using a frame such as the frame 20 for the platform structure 10.

Carried by the central barge 84 at each side thereof and for each pair of standards 86 is an elongated arm 88. Each arm 88 is provided at its outer end with a sleeve 90 and intermediate its ends with a second sleeve 92, the sleeves 90 and 92 being engageable with the standards 86. In view of the length of the arms 88, it will be readily apparent that in the event it is necessary to float the central barge 82 through narrow locks and the like, the arms 88 will have to be installed after the central barge 82 is in open water.

Carried by the central barge 82 is the framework 30. Referring now to FIGURE 15 in particular, it will be seen that there is illustrated a slightly modified form of the platform structure which is referred to in general by the reference numeral 94. The platform structure 94 differs from the platform structure 10 only in the configuration of the central and outer barges thereof. The platform structure 94 includes a central barge 96 and a pair of outer barges 98, only one of the barges 98 being illustrated.

The central barge 98 includes an outwardly directed projection 100 which has the underside thereof sloping upwardly and outwardly. The projection 100 overhangs the inner side edge of the outer barge 98 and in order that there may be a mating between the barges 96 and 98, the barge 98 is cutaway as at 102 to form an upper surface complementary to the undersurface of the projection 100. By so constructing the mating side edge portions of the barges 96 and 98, it will be readily apparent that the barges may be easily slid together and that after the barges 96 and 98 have been slid together and retained against longitudinal movement by connections similar to that of the platform structure 10, the barges 96 and 98 will also be locked against relative vertical movement.

It is pointed out that the barge 96 has carried by the projecting portion 100 longitudinally spaced sleeves 104 which are identical with the sleeves 28. The sleeves 104 engage with standards 106 which are braced by suitable frames 108. Supported on the central barge 96 is the framework 30.

Referring now to FIGURE 10 in particular, it will be seen that there is illustrated still another modified form of platform structure which is referred to in general by the reference numeral 110. The platform structure 110 will include a central barge 24 and outer barges 12 and 14. Carried by the central barge 24 will be the framework 30 and secured thereto will be a plurality of the arms 26. Disposed at the outer ends of the arms 26 will be sleeves 28 which are engaged with standards 16. The only differences in the actual structure of the platform structure 110 as compared with the platform structure 10 will be that the frames 20 have been replaced by modified form of frames 112. It is to be noted that the frames 112 are generally trapezoidal in elevation as compared to the triangular elevation as in the case of frames 20.

The platform structure 110 is intended for use in relatively deep water, water in the vicinity of 125 ft. or more. Because of this, it is necessary that the standards carried by the outer barges 12 and 14 be in the vicinity of 165 ft. or greater. Such standards and their associated bracing frames would extend too high from the outer barges 12 to permit them to float in upright position. Accordingly, the barges 12 and 14 are built in the manner shown in solid lines in FIGURE 10.

After the barges 12, 14 and 24 of the platform structure 110 have been towed into deep water, they are assembled together in the normal manner disclosed above with respect to the platform structure 10. Then through the use of a floating crane or other suitable hoisting mechanism, there will be secured to the standards 16

an extension 114. Also, there will be secured to each of the frames 112 an extension 116. The extension standard 114 will be connected to its associated extension frame at its upper end by a cover plate 118.

After the extensions have been placed upon the standards 16 and the frames 112, the platform structure 110 may then be operated in the same manner as set forth above with respect to the platform structure 10. However, due to the great distance between the platform 32 and the central barge 24 when the barges 12, 14 and 24 are sunk, it has been deemed advisable to provide suitable braces between the standards 16 and their extensions 114 at vertically spaced intervals. In order to accomplish this, there is provided a pair of brace frames 120 and 122. The brace frames 120 and 122 are connected to the platform 32 by suitable cables 124 and 126, respectively. The brace frames 120 and 122 include a plurality of sleeves 128 which are identical with the sleeves 40 and which are telescoped over the standards 16 and their extensions 114.

Normally the brace frames 120 and 122 rest upon the framework beneath the platform 32. However, after the platform 32 has been secured to the upper portions of the extensions 114, and the barge 24 is being submerged, the brace frames 120 and 122 will move downwardly with the barge 24 to the limits of their respective cables 124 and 126. They will then be suspended below the water level and will form suitable braces for intermediate portions of the standards 16 and their extensions 114. It is to be understood that the platform 32 will support the same type of shallow water drilling barge 74 when the platform structure 110 is utilized even though it is used in extremely deep water for off-shore drilling.

Referring now to FIGURE 17 in particular, it will be seen that there is illustrated an adaptation for the platform structure 110. Inasmuch as the outer barges 12 and 14 are guided by the sleeves 28 and 40 as the outer barges 12 and 14 is submerged, and in view of the great lengths of the standards 16 and their extensions 114, a tendency may develop for the outer barges 12 and 14 to spread apart as they are being lowered. If necessary in order to overcome, there is provided a plurality of yokes 130. The yokes 130, as illustrated in FIGURE 17, pass upwardly through the bottom of the outer barges 12 and 14 and are preferably formed in sockets formed by extensions of the standards 16 down into the outer barges 12 and 14. The yokes 130 will have connections with the outer barges 12 and 14 whereby they may be readily positioned after the barges 12, 14 and 24 have been assembled.

It is pointed out that the yokes 130 have portions thereof which lie below the bottoms of the outer barges 12 and 14. Also, the central portion of the yokes 130 will underlie the central barge 24. However, due to the general softness of the bottom on which the barges 12, 14 and 24 rest, the yokes 130 will settle into the bottom and will in no way affect the seating of the barges 12, 14 and 24 on such bottom. It is also pointed out that the particular connection between the individual yokes 130 and the barges 12 and 14 may be varied as desired in order to facilitate the positioning of the yokes 130.

Referring now to FIGURES 13 and 14, it will be seen that there is illustrated a modified form of central barge construction which is referred to in general by the reference numeral 132. The barge 132 will include a central barge 134 which is substantially identical with the central barge 24. However, the upper part of the central portion 134 will have extending outwardly therefrom projections 136. The depth of the central portion 134 will be such that the projections 136 will overlie adjacent side edge portions of the barges 14 and 12. The central barge 132 is also provided with a suitable well 138 to facilitate passage of the drilling equipment.

In order that the central barge 132 may be connected to the standards 16 of the outer barges 12 and 14, there

is provided a plurality of sleeves 140. The sleeves 140 extend vertically through the projections 136 and are generally L-shaped in plan, as is best illustrated in FIGURE 13. The sleeves 140 open through the side edges of the projections 136 to permit the entry of the standards 16.

When it is desired to connect the central barge 132 to one of the outer barges, the central barge 132 is slightly disaligned with respect to the outer barge and the standards 16 are aligned up with the entrance part of the sleeves 140. The outer barge is then moved toward the central barge 132 so that the standards 16 enter into the sleeves 140. Then the two barges are shifted longitudinally with respect to each other so that the standards 16 completely seat in the inner parts of the sleeves 140. It is pointed out that the sleeves 140 at opposite sides of the central barge 132 face in opposite directions to provide a suitable interlock between the central barge 132 and the outer barges 12 and 14.

From the foregoing description of the barges 24 and 132, it will be readily apparent that the sleeves 28 and 140 do not completely surround the standards 16, but only engage them through approximately 180° arc. It is believed that this will be sufficient contact because of the sleeves 40. However, in the event it is found necessary to provide additional bearing between the sleeves 28 and 140, and the standards 16, suitable sleeve portions, similar to the sleeve portions of the sleeves 40, may be provided.

Referring now to FIGURE 7 in particular, it will be seen that there is illustrated a dry dock which is referred to in general by the reference numeral 142. The dry dock 142, while intended for a different purpose than the platform structure 10 remains a platform structure.

The dry dock 142 includes a central barge 144 and outer barges 146 and 148. The barges 144, 146 and 148 corresponding to the barges 24, 12 and 14, respectively, and will be identical therewith. Carried by the central barge 144 is a framework 30. The central barge 144 also includes suitable arms 26 and sleeves 28 at the outer ends thereof.

Extending upwardly from the outer barges 146 and 148 are standards 16. The standards 16 are supported by suitable frames 150, the frames 150 distinguishing from the frames 20 inasmuch as they are rectangular in lieu of the triangular outline of the frames 20. The upper portions of the frames 150 are closed to form a suitable storage area 152 and a living quarters 154.

Connected to the upper portions of the standards 16 is a platform 156. The platform 156 may be identical with the platform 32, or may be in the form of a covered frame so as to form a suitable flooring. The platform 156 is intended to support a small vessel 158 which may be docked in the dry dock 142. The platform 156 and the vessel 158 will be raised and lowered through the use of the central barge 144 in the customary manner set forth in respect to the platform structure 10.

It is pointed out at this time that the frames 150 may be substituted for the frames 20 in the platform structure 10. By doing so and providing quarters, such as the crews' quarters 154, in the frames, it will be readily apparent that suitable living quarters for the operating crew of the drilling barge 74 may be provided.

Referring now to FIGURE 8 in particular, it will be seen that there is illustrated a dock structure which is referred to in general by the reference numeral 160. The dock structure 160 includes a central barge 162 and outer barges 164 and 166. The barges 162, 164 and 166 correspond to the barges 24, 12 and 14, respectively.

Carried by the outer barges 164, preferably centrally thereof, is a longitudinal row of standards 168. The standards 168 are in the form of relatively large diameter columns and need no bracing. Carried by the upper part of the central barge 162 and extending outwardly therefrom are arms 170. The arms 170 have carried at

the outer ends thereof sleeves 172. The sleeves 172 are identical sleeves 28 with the exception of their increase in size to accommodate the standards 168.

Extending between and connected to the upper parts of the standards 168 is a suitable deck structure 174. The deck structure 174 is provided at opposite sides thereof with sleeves 176 which are so spaced as to telescopically receive the standards 168. It is to be understood that the sleeves 176 will be identical with the sleeves 40, with the exception of size, and will interlock with suitable lugs 178 formed on the standards 168.

Inasmuch as the deck 174 need not be a relatively high distance above the water level, there is normally no need for a framework, such as the framework 30. However, in certain areas it may be desirable to place the deck 174 a considerable distance above the water. In such event, a suitable framework, such as the framework 30, will be provided.

Inasmuch as the standards 168 are self-bracing, it will be readily apparent that the pier 160 has no projections, and that a vessel, such as the ship 180 may closely approach the pier 160 in the conventional manner.

The pier 160 is to be considered a platform structure of the same type as the platform structure 10 and the dry dock 142. Its construction, mode of assembly, and its method of operation, including transportation will be identical with that of the platform structure 10. It will be readily apparent that the pier 160 will be extremely useful by the Armed Services in amphibian operations, it will be apparent that there will be numerous commercial applications for such a dock.

It is pointed out at this time that while the invention is primarily devoted to a platform structure for supporting oil well drilling rigs and that there has been shown only two of the uses for such platform structure, that is the dry dock 142 and the pier 160, the platform structure, which is the subject of this invention, is unlimited in its adaptations. Accordingly, the term "platform structure" has been applied to mean any type of structure which may be formed by components including at least one central barge and two outer barges which are interconnected together in a manner clearly set forth in respect to the platform structure 10. Such platform structure will also include the guided relationship between the barges as well as the particular interconnection.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the appended claims.

What is claimed as new is as follows:

1. A separable submergible portable structure comprising at least one central barge and a pair of outer barges, standards extending upwardly from said outer barges, means connecting said central barge to said standards for relative vertical sliding movement, a platform adapted to be temporarily supported by said central barge, means on said platform for selectively connecting the same to said standards, the last mentioned means including sleeves telescoped over said standards for vertical sliding movement, means selectively interlocking said sleeves with said standards whereby said platform may be vertically positioned by said standards.

2. A separable submergible portable structure comprising at least one central barge and a pair of outer barges, standards extending upwardly from said outer barges, means connecting said central barge to said standards for relative vertical sliding movement, a platform adapted to be supported by said central barge, means on said platform for selectively connecting the same to said standards, the last mentioned means includ-

ing sleeves telescoped over said standards for vertical sliding movement, said sleeves having openable portions whereby said sleeves may be disengaged from said standards by relative longitudinal shifting of said platform with respect to said standards.

3. A separable submergible portable support comprising at least one central barge and a pair of outer barges, standards extending upwardly from said outer barges, means connecting said central barge to said standards for relative vertical sliding movement, a platform adapted to be supported by said central barge, means on said platform for selectively connecting the same to said standards, the last mentioned means including sleeves telescoped over said standards for vertical sliding movement, said sleeves having hinged portions whereby said sleeves may be disengaged from said standards by relative shifting of said platform with respect to said standards, said portions including independently operable first and second sets, said first set being freely slidable on said standards whereby said platform may be guidedly vertically adjusted on said standards when said second set are released, cooperating means on said second set and said standards for interlocking said sleeves with said standards to vertically position said platform.

4. A separable submergible portable structure comprising at least one central barge and a pair of outer barges, said central barge having a water line width substantially equal to the spacing of said outer barges, standards extending upwardly from said outer barges, means connecting said central barge to said standards for relative vertical sliding movement, a platform adapted to be supported by said central barge, means on said platform for selectively connecting the same to said standards, said central barge being of a greater depth than said outer barges and having outwardly projecting portions overlying and resting upon portions of said outer barges, said projecting portions and said portions of said outer barges being complementary to permit proper interconnecting of said barges.

5. A separable submergible portable structure comprising at least one central barge and a pair of outer barges, standards extending upwardly from said outer barges, means connecting said central barge to said standards for relative vertical sliding movement, a platform adapted to be supported by said central barge, means on said platform for selectively connecting the same to said standards, both of said means being in the form of sleeves slidably engaging said standards, said sleeves being generally horseshoe-shaped, and sleeves at opposite sides of said central barge and platform facing in longitudinally opposite directions to permit connecting of said barges by a longitudinal shifting movement.

6. A separable submergible portable structure comprising at least one central barge and a pair of outer barges, standards extending upwardly from said outer barges, means connecting said central barge to said standards for relative vertical sliding movement, a platform adapted to be supported by said central barge, means on said platform for selectively connecting the same to said standards, the first mentioned means including a plurality of horseshoe-shaped sleeves carried by said central barge engaged with said standard, sleeves at opposite sides of said central barge facing in longitudinally opposite directions whereby said barges may be interconnected by longitudinal shifting.

7. A separable submergible portable structure comprising at least one central barge and a pair of outer barges, standards extending upwardly from said outer barges, means connecting said central barge to said standards for relative vertical sliding movement, a platform adapted to be supported by said central barge, means on said platform for selectively connecting the same to said standards, said central barge being of a greater depth than said outer barges and having outwardly projecting portions overlying and resting upon said outer barges, the first mentioned means being in the form of sleeves formed in

said projecting portions, said sleeves receiving said standards, L-shaped in plan entry slots for said sleeves to permit entry of said standards at the same time to provide an interlock.

8. A separable submergible portable structure comprising at least one central barge and a pair of outer barges, standards extending upwardly from said outer barges, means connecting said central barge to said standards for relative vertical sliding movement, a platform supported by said central barge, means connecting said platform to said standards for relative vertical sliding movement therebetween as said outer barges are submerged while said central barge remains afloat, and means for rigidly affixing said platform to said standards after said outer barges are completely submerged whereby said central barge may be submerged and said platform is supported by said standards independently of said central barge.

9. A separable submergible portable structure comprising at least one central barge and a pair of outer barges, standards extending upwardly from said outer barges, means connecting said central barge to said standards for relative vertical sliding movement, a platform supported by said central barge, means connecting said platform to said standards for relative vertical sliding movement therebetween as said outer barges are submerged while said central barge remains afloat, and means for rigidly affixing said platform to said standards after said outer barges are completely submerged whereby said central barge may be submerged and said platform is supported by said standards independently of said central barge, a framework carried by said central barge for movement therewith, said framework supporting said platform when said central barge is in a raised position.

10. A separable submergible portable structure comprising at least one central barge and a pair of outer barges, standards extending upwardly from said outer barges, means connecting said central barge to said standards for relative vertical sliding movement, a platform supported by said central barge, means connecting said platform to said standards for relative vertical sliding movement therebetween as said outer barges are submerged while said central barge remains afloat, and means for rigidly affixing said platform to said standards after said outer barges are completely submerged whereby said central barge may be submerged and said platform is supported by said standards independently of said central barge, a framework carried by said central barge for movement therewith, said framework supporting said platform when said central barge is in a raised position, said framework including brace structures suspended from said platform and bracing said standards intermediate said central barge and said platform when said outer barges and said central barge are submerged.

11. A separable submergible portable structure comprising at least one central barge and a pair of outer barges, standards extending upwardly from said outer barges, means connecting said central barge to said standards for relative vertical sliding movement, a platform supported by said central barge, means connecting said platform to said standards for relative vertical sliding movement therebetween as said outer barges are submerged while said central barge remains afloat, and means for rigidly affixing said platform to said standards after said outer barges are completely submerged whereby said central barge may be submerged and said platform is supported by said standards independently of said central barge, a yoke connecting together said outer barges whereby spreading action of said outer barges and lower ends of said standards is prevented as said outer barges are being sunk.

12. A separable submergible portable structure comprising at least one central barge and a pair of outer barges, standards extending upwardly from said outer

barges, means connecting said central barge to said standards for relative vertical sliding movement, a platform supported by said central barge, means connecting said platform to said standards for relative vertical sliding movement therebetween as said outer barges are submerged while said central barge remains afloat, and means for rigidly affixing said platform to said standards after said outer barges are completely submerged whereby said central barge may be submerged and said platform is supported by said standards independently of said central barge, all of said means being in the form of sleeves slidably engaging said standards.

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