

March 5, 1968

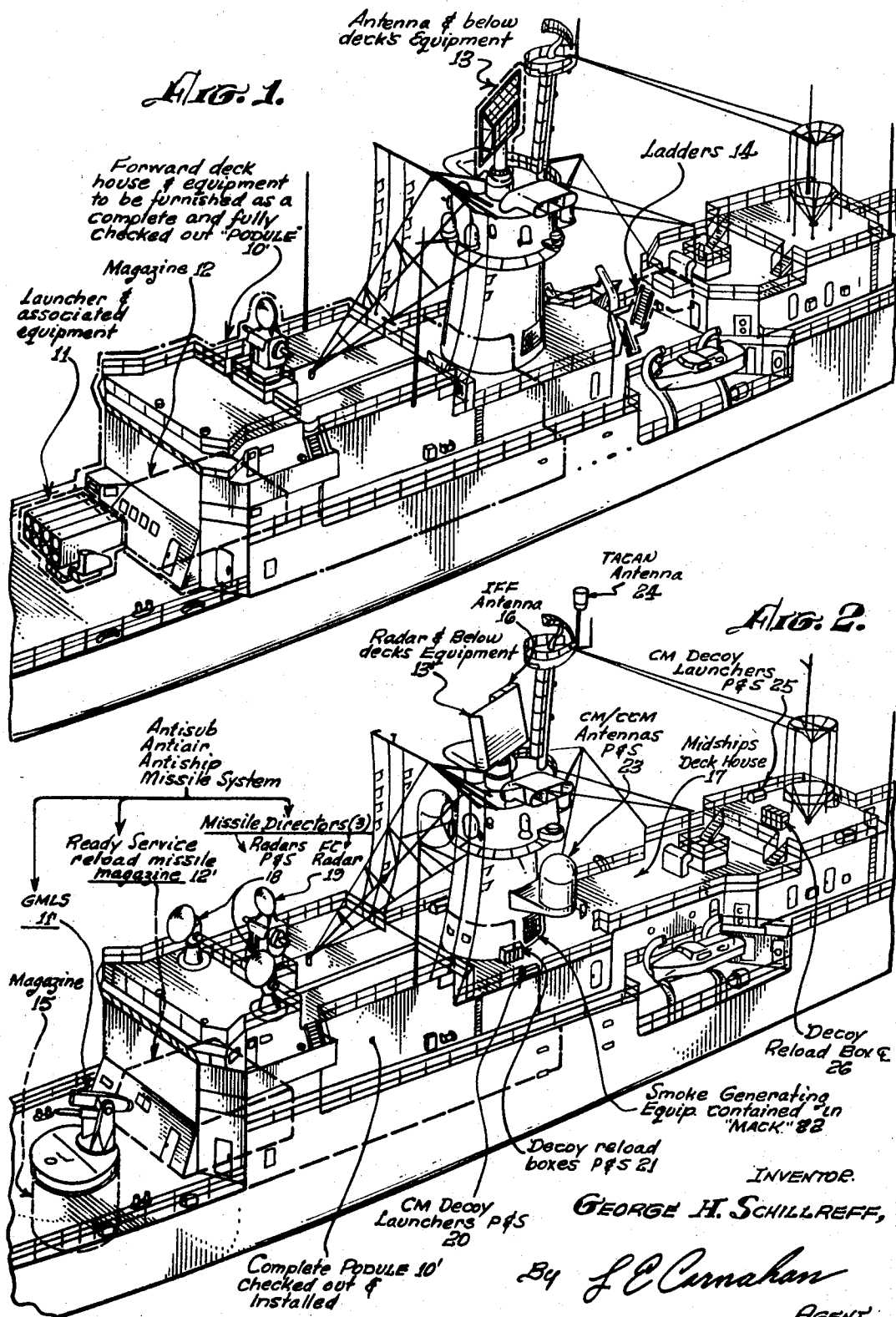
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3,371,639

MODULE ASSEMBLY METHOD FOR SHIPS

Filed Nov. 29, 1966

3 Sheets-Sheet 1



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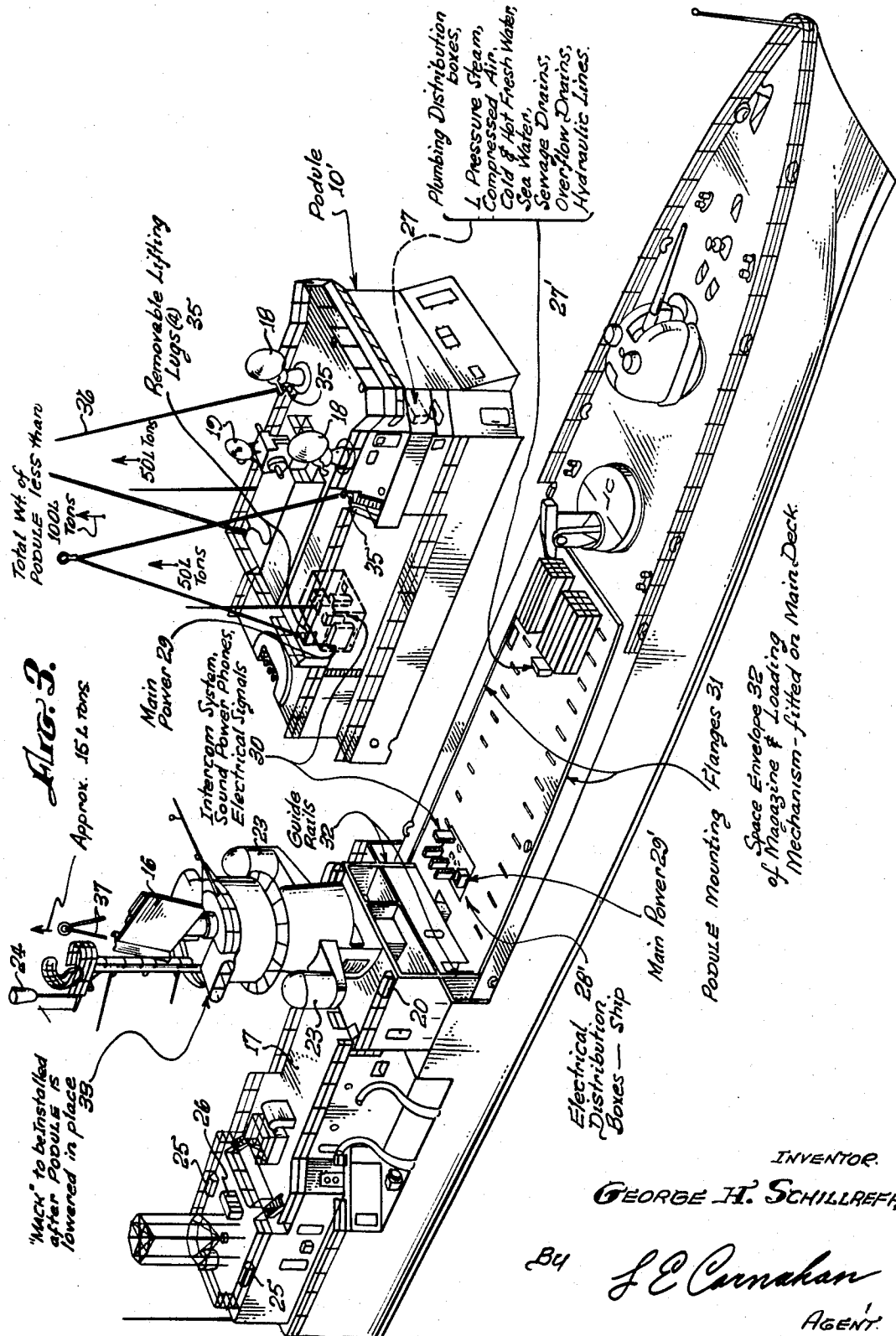
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Filed Nov. 29, 1966

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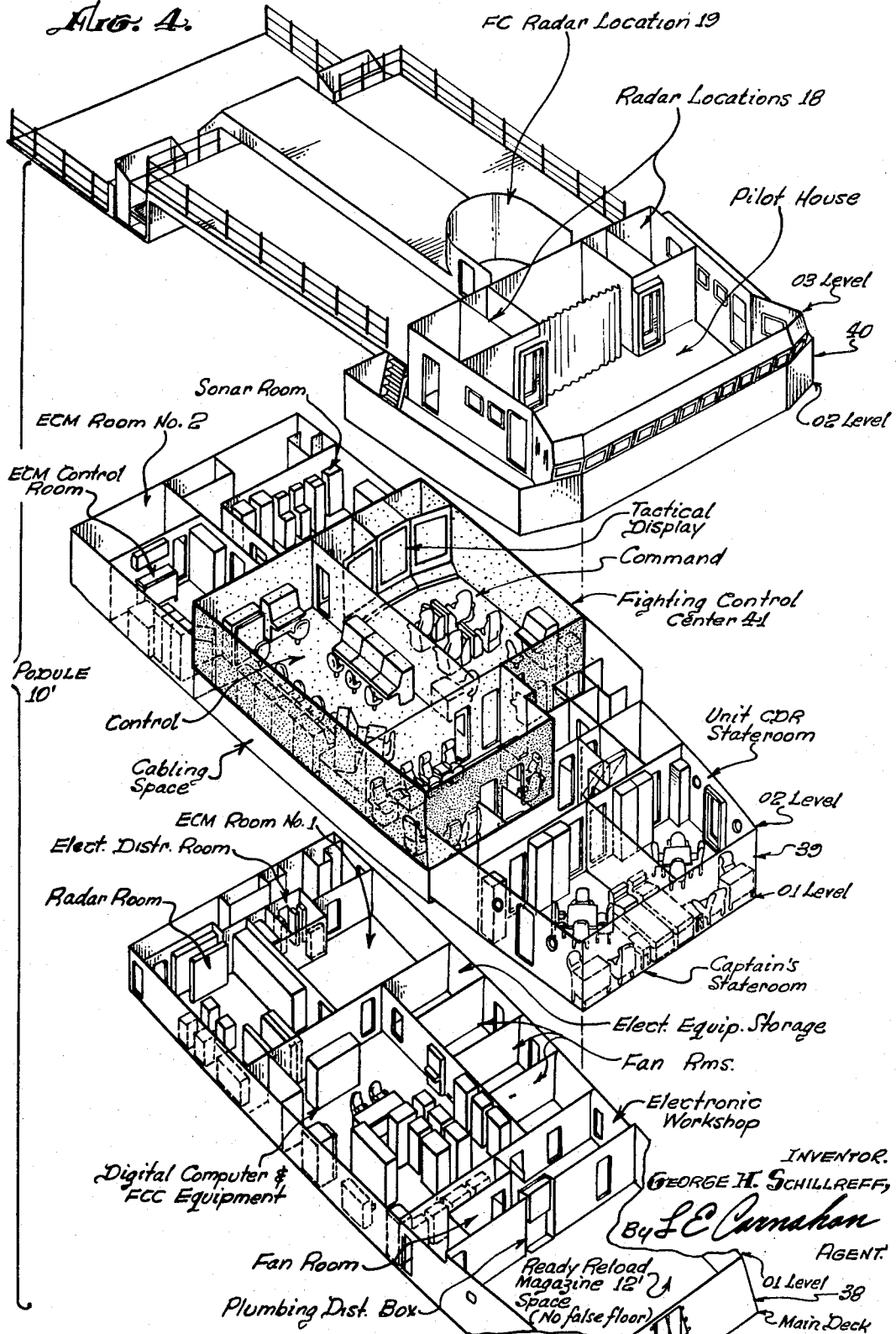
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Filed Nov. 29, 1966

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Fig. 4.



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3,371,639

MODULE ASSEMBLY METHOD FOR SHIPS
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Filed Nov. 29, 1966, Ser. No. 604,106
10 Claims. (Cl. 114-77)

ABSTRACT OF THE DISCLOSURE

A method of construction or modification of a ship wherein preassembled or prefabricated superstructure, such as that containing electronic gear for a missile weapon system, is bodily positioned on the deck. The preassembled superstructure is so constructed that the equipment therein is compatible for ready interconnection with electrical, hydraulic, water and other systems of the ship. The superstructure is then secured to the deck, and the ship is ready for operation.

This invention relates to the construction of watercraft, particularly to a "podule" type ship construction or to modification of existing ships, and more particularly to the modification of portions of existing ships with similarly configured portions which contain different types of equipment but constructed so as to mate with necessary existing equipment of the ship.

One of the primary problems in the modification of ships is in the dock time of the ship required due to modification. With the continuous improvement in missile weapon systems, many of the existing craft have been modified so as to have missile capability or have increased missile weapon capability. It is thus seen that the modification of an existing craft would require considerable dock or down time in order to remodel the existing craft so as to accommodate the new equipment.

The present invention has overcome this prior problem by providing a "podule" type construction or modification procedure wherein the portion of the ship to be reconstructed or modified, for example, is bodily removed from the ship and is replaced by a similar configured portion containing the new equipment which has been constructed ashore. The new portion is constructed so that interconnections with electrical, plumbing, hydraulic system, etc. are compatible with those existing on the ship. It is thus seen that this invention provides a procedure for modifying ships which substantially reduces the ship's time in dock.

Therefore, it is an object of this invention to provide a method for constructing or reconstructing watercraft.

A further object of the invention is to provide a method of modifying existing ships which substantially reduces the time required for such modifications.

Another object of the invention is to provide a method of modifying an existing ship by bodily removing at least portions of the superstructure and replacing same with a prefabricated and preassembled superstructure which is compatible for interconnection with the equipment on the deck of the ship.

Another object of the invention is to provide a method for modifying existing weapon systems and associated gear of a ship.

Other objects of the invention, not specifically set forth above, will become readily apparent from the following description and accompanying drawings wherein:

FIG. 1 is a partial view of a ship illustrating the existing superstructure, weapon system and other equipment requiring modification;

FIG. 2 is a partial view of the FIG. 1 ship after the modification has been completed.

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FIG. 3 is a partial view of the FIG. 2 ship showing the replacement of superstructure and other equipment and the compatibility thereof with the deck equipment; and

FIG. 4 is a partially exploded view of the superstructure being positioned on the ship in FIG. 3.

Broadly, the invention is directed to a method of construction or modification of a ship wherein preassembled or prefabricated superstructure, such as that containing electronic gear for a missile weapon system, is bodily positioned on the deck. The preassembled superstructure is so constructed that the equipment therein is compatible for ready interconnection with electrical, hydraulic, water and other systems of the ship. The superstructure is then secured to the deck, and the ship is ready for operation.

Referring now to FIG. 1, the ship illustrated may, for example, be a destroyer escort wherein the existing forward deck house and equipment indicated at 10, launcher and associated equipment 11, magazine 12, antenna and equipment indicated at 13 and ladders 14 are to be removed and replaced in accordance with the invention as indicated in FIGS. 2-4. It will be noted that each of the areas in FIG. 1 to be removed are indicated by dot and dash-dot lines.

As shown in FIG. 2, the forward deck house 10 has been replaced by a deck house or brain center "podule" 10' containing complete and fully checked out equipment ready for installation on the deck as described hereinafter with respect to FIGS. 3 and 4. The launcher 11 of FIG. 1 is replaced with a guided missile launcher system (GMLS) 11' under which is located a magazine 15 as shown in dashed lines, while the magazine 12 of FIG. 1 is replaced with a ready service reload missile magazine 12' shown in dashed lines. The antenna 13 of FIG. 1 is replaced by radar and below deck equipment indicated at 13', which includes an IFF antenna 16. The ladders 14 of FIG. 1 have been replaced with a midship deck house 17 which may also be of the "podule" type preconstruction, if desired. The launcher 11' and magazine 15 are positioned simultaneously as an ordnance module.

In addition to the portions of ship replaced as described above, as seen in FIG. 2 the forward deck house 10' is provided with a pair of radar units indicated at 18 and mounted port and starboard and a fire control (FC) radar 19 mounted intermediate and aft with respect to radars 18, all of which function to control launcher 11'. In addition to antenna 16, the mast housing (Mack) is provided with counter measure (CM) decoy launchers 20, port and starboard (P&S), decoy reload boxes 21 (P&S), smoke generating equipment 22, and counter measures/counter-counter measures (CCM) antennas 23 (P&S), while a tacan antenna 24 is positioned on the mast. The aft deck house of the ship is provided with counter measure (CM) decoy launchers 25 (P&S) and a decoy reload box 26. Since the operation of the equipment of the ship as set forth above does not constitute part of this invention a detailed description thereof is deemed unnecessary except to state that it provides an effective antisub, antiair or antiship weapon system.

Referring now to FIG. 3, the prefabricated forward deck house or brain center ("podule") 10' is also provided with plumbing distribution boxes indicated generally at 27, electrical distribution boxes 28, main power supply 29 and intercom system 30 which are adapted to cooperate with similar components 27', 28', 29', and 30' located on the deck of the ship. The deck of the ship is additionally provided with "podule" mounting flanges 31 which secure the podule 10' thereon and a space envelope 32 for magazine 12' and associated loading mechanism. The deck housing below the mast housing or "Mack" 33 is provided with guide rails 34 which cooperate with rails (not shown) on the aft of podule 10' for assisting in positioning podule 10' on the deck of the ship.

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Podule 10' is provided with four removable lifting lugs 35 on the top of the deck to which two pair of lifting cables 36 are attached, cables 36 being attached to a crane (not shown) which is of sufficient lift capability to lift at least 100 l. tons, 50 l. tons being carried by each of the pair of cables 36. The Mack 33 is removed via a pair of lift cables indicated at 37 by the same crane or another crane (not shown) capable of lifting 15 l. tons.

To accomplish the "podule" modification of an existing ship, for example, the mast housing of the FIG. 1 ship is first removed after which the forward deck house and other equipment to be replaced as described above is removed. The ordnance module (launcher 11' and magazine 15) are positioned aboard the ship, the midship deck house 17 which may also be a prefabricated podule is positioned aboard, then the podule 10' containing the brain center which controls the ordnance module is positioned via guide rails 34 and secured by mounting flanges 31, after which the Mack 33 is repositioned after having been modified as discussed above, and then other equipment such as the decoy launchers 20 and 25, and the reload boxes 21 and 26 is installed. The sequence of installation may be varied as desired except, in this embodiment, it is necessary to install the podule 10' prior to the installation of the Mack 33 due to the Mack being partially located on the aft section of the podule as shown in FIGS. 2 and 3.

FIG. 4 shows a partially exploded view of the control or brain center or podule 10' and consists of deck levels 38, 39 and 40. As pointed out above the podule 10' contains the brain or control center of the ship and controls the ordnance module (elements 11' and 15') via the fighting control center 41 located in the level 39 of the podule 10'. Since the details of the various levels of podule 10' or the fighting control center 41 do not constitute part of this invention, detailed description thereof is deemed unnecessary except as set forth by general legends in FIG. 4.

It is readily seen that this invention provides an economical and effective method for modifying or constructing a ship by the use of the prefabricated and preassembled "podule" concept. While the invention has been described with respect to modifying an existing ship it is readily apparent that the inventive concept could be utilized in the initial construction of ships wherein various portions of the ship could be fabricated and assembled other than on the hull and bodily brought aboard as described above. Thus, the dock time required for construction or modification of ships would be substantially reduced by utilizing the concept of this invention.

While specific embodiments and procedures of the invention have been illustrated and described, modifications and changes will become apparent to those skilled in the art, and it is intended to cover in the appended claims all such modifications and changes as come within the true spirit and scope of the invention.

What I claim is:

1. A method for modifying watercraft comprising the steps of: preassembling superstructure to replace existing superstructure on a watercraft to be modified, providing the preassembled superstructure with distribution equipment adapted for and compatible with electric, steam, air, water, sewage, hydraulic equipment and the like located aboard the watercraft to be modified, removing at least the existing superstructure to be modified, positioning the preassembled superstructure aboard the watercraft being modified, operatively interconnecting the distribution equipment of the preassembled superstructure with the existing equipment of the watercraft being modified, and securing the preassembled superstructure to the watercraft being modified.

2. The method defined in claim 1, additionally includ-

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ing the steps of: modifying a portion of the removed superstructure, and repositioning the modified superstructure aboard the watercraft being modified.

3. The method defined in claim 1, additionally including the steps of: removing at least a portion of the existing weapon system of the watercraft being modified, and positioning an ordnance module compatible with the components of at least a portion of the reassembled superstructure aboard the watercraft being modified.

4. The method defined in claim 1, additionally including the step of securing decoy launching equipment at advantageous locations aboard the watercraft being modified.

5. The method defined in claim 1, additionally including the steps of: removing existing equipment forward of the after deck housing of the watercraft being modified, and positioning in the place thereof a preassembled midship deck housing.

6. The method defined in claim 1, wherein the step of preassembling superstructure includes the steps of: prefabricating three deck levels, securing together the deck levels one on the other, securably locating the desired equipment in each of the deck levels, and testing the equipment.

7. The method defined in claim 6, additionally including the step of positioning electronic apparatus and operative connections thereof in the intermediate prefabricated deck level such as to serve as a fighting control center for the watercraft being modified.

8. The method defined in claim 1, additionally including the steps of: providing the watercraft being modified with means for guiding the preassembled superstructure in proper place on the deck thereof, and providing on the deck of the watercraft being modified means for securing the preassembled superstructure to the deck.

9. A preassembled structure adapted to be positioned aboard a ship for replacing existing structure of the ship for modifying the same and constructed so as to function as the control center for an associated weapon system of such a modified ship comprising: a prefabricated structure including at least one level therein, said structure being provided with plumbing distribution equipment adapted for and compatible with steam, air, water, sewage, hydraulic equipment and the like located aboard an associated ship to be modified, said structure including electronic and electrical distribution equipment adapted for and compatible with like equipment located aboard an associated ship to be modified, said structure also including radar systems and a fighting control center adapted for controlling an associated weapon system of an associated ship to be modified, and means adapted for positioning the prefabricated structure aboard an associated ship to be modified after existing structure of such an associated ship to be modified has been removed.

10. The preassembled structure defined in claim 9 in combination with a ship to be modified; said ship being provided with guide means for guiding the prefabricated structure thereaboard, and means for securing said prefabricated structure aboard said ship for modifying same.

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