Oct. 8, 1946. F. N. NELSON 2,408,871

FLOATING NAVAL BASE AND HARBOR

Filed April 5, 1943 4 Sheets-Sheet 1

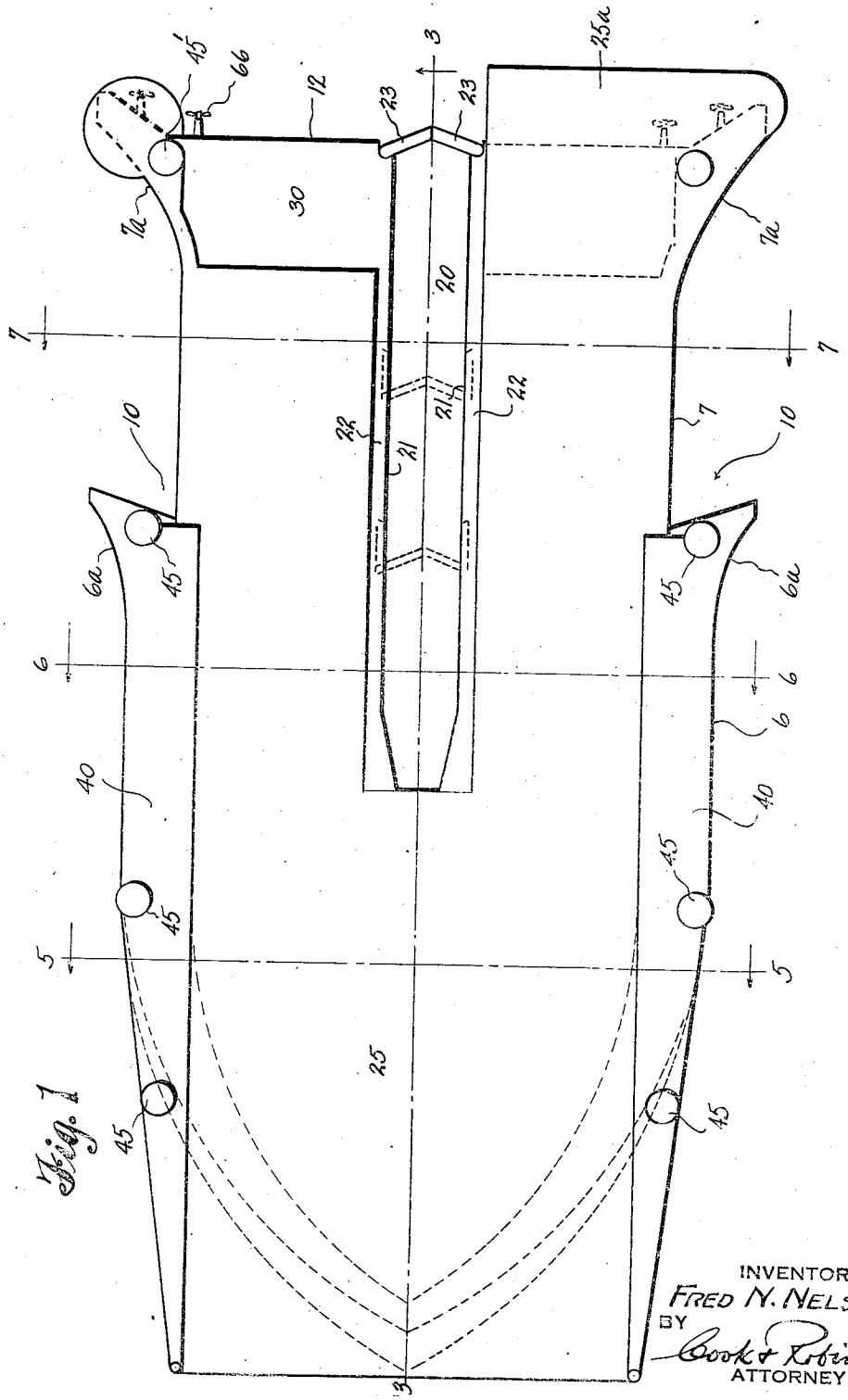


Fig. 1

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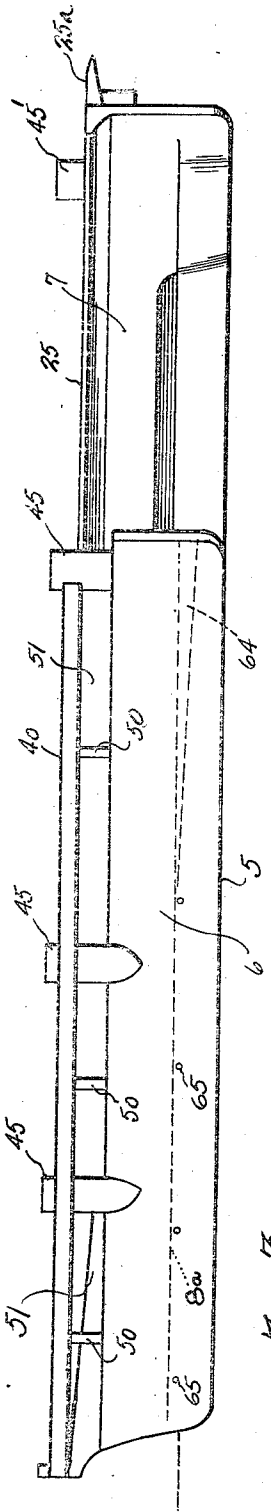


Fig. 2

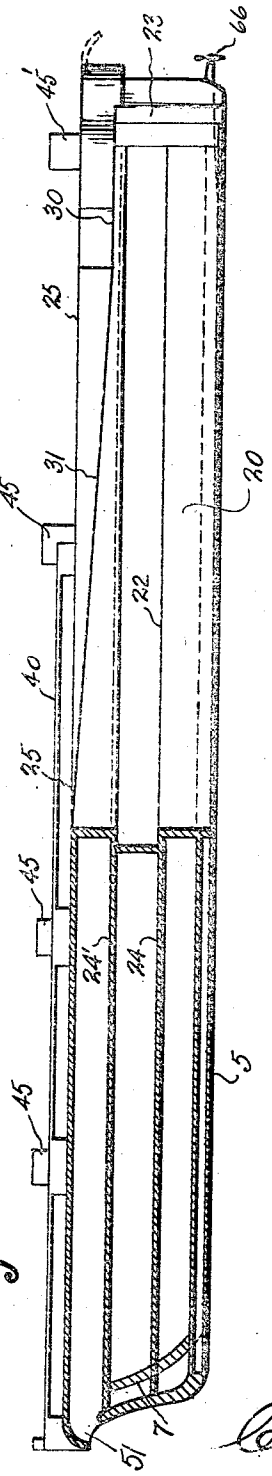


Fig. 3

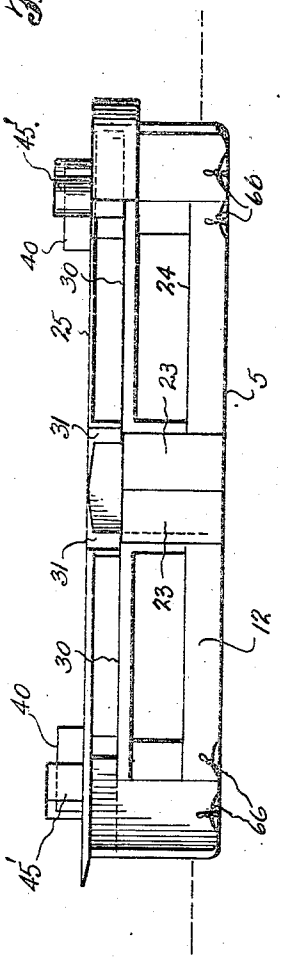


Fig. 4

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FLOATING NAVAL BASE AND HARBOR

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Fig. 5

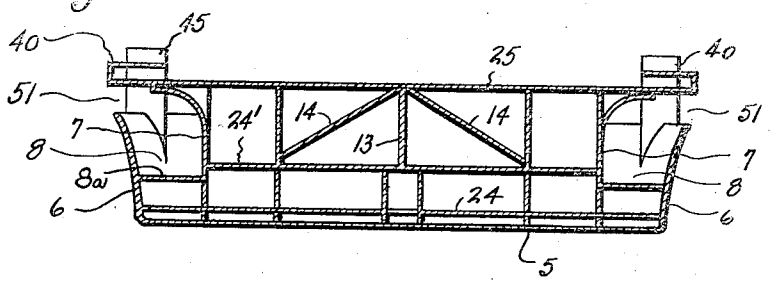


Fig. 6

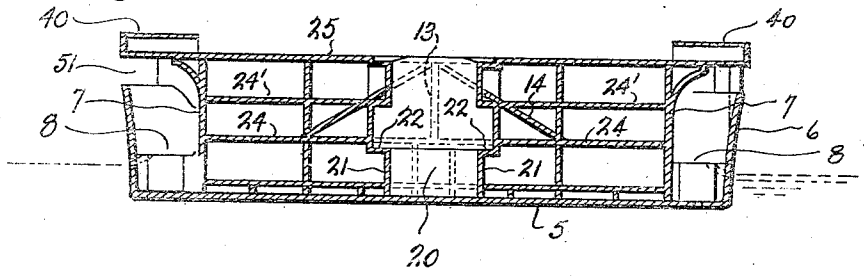
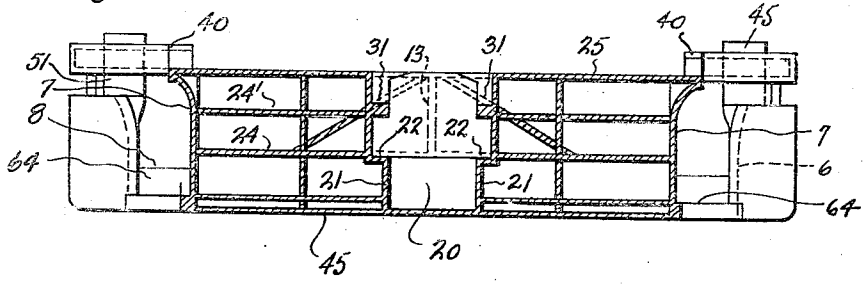


Fig. 7

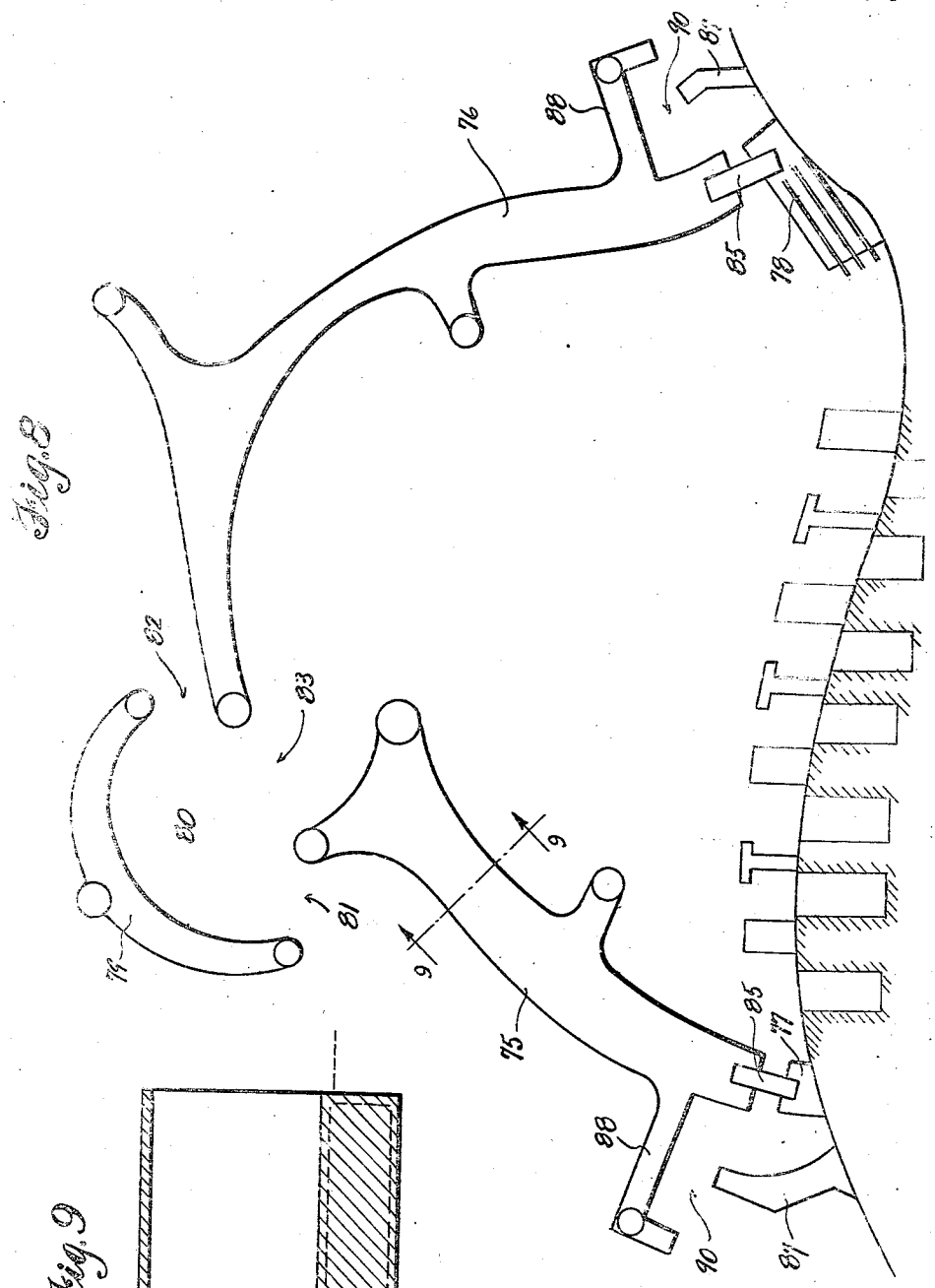


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FLOATING NAVAL BASE AND HARBOR

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UNITED STATES PATENT OFFICE

2,408,871

FLOATING NAVAL BASE AND HARBOR

Fred N. Nelson, Seattle, Wash., assignor to Safety Boat Company, Seattle, Wash., a corporation of Washington

Application April 5, 1943, Serial No. 481,833

14 Claims. (Cl. 114—43.5)

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This invention relates to the design, construction and mode of use of a floating naval base, air base, harbor and breakwater, suitable both for wartime and peacetime uses.

The principal object of this invention is to provide a floating structure for the above noted uses, that is designed and equipped to adapt it for military or wartime use; which may be moved from place to place to best serve its intended uses; which may travel, or be towed, or maneuvered, or retained at any specific location, for example, at a location out of range of attack by land forces, when such is desired.

It is also an object of the present invention to provide a floating base of the kind above stated, either as a single unit or in separable sections that for peacetime uses could be detached and towed to different places of use as landing fields, supply and repair depots, harbors, piers or wharf extensions where natural formation drops off too abruptly and no natural harbors exist; which is practically unsinkable; which is adapted to provide service for fleets of naval vessels and boats of all kinds as well as for land and sea airplanes; which provides a field on which airplanes may land or from which they may take off, and a harbor for the accommodation of seaplanes; which provides for the concentrating of great fighting power thereon to protect both itself and the craft that it serves, while being protected by them.

Another object of the invention is to provide a floating structure of the character and for the purposes stated which, by reason of special design and arrangement, provides a harbor capable of accommodating many ships, and from which harbor access is had to a marine railway system installed on the structure, and directly to a dry dock embodied in the structure and capable of accommodating ships and boats of all kinds.

Another object of the invention is to provide airplane shelters along the side of the landing field from and into which planes may move directly onto or from the field, and storage for both land and sea planes and supplies for such planes.

Still futrher objects of the invention reside in various details of construction whereby the structure is protected against damage by high seas; whereby water, waves or spray that break over the breakwater or accumulate from any source is automatically cleared from the structure; whereby the whole structure may be adequately ventilated at all times, and which can be closed instantly against inflow of gas or fire; whereby airplanes, prior to taking off and after landing,

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may be given the greatest possible protection against bombing attack; whereby vital parts of the structure, magazines, engines, control equipment and the like, may be best protected.

Other objects reside in the arrangement of ramps and passageways for the most convenient handling of materials on the structure and for the moving of materials, ships or boats from the harbors into or from ships, or storage spaces in the structure. Also, in the provision of fighting turrets having full command of the horizon for the protection of the structure against attack by naval and air forces.

Furthermore, it is an object of this invention to provide a self-contained power plant for the structure and its equipment, including means for the propulsion of the structure in moving it from place to place.

While the present drawings, for the greater part, illustrate the structure as being designed for war time uses, and consequently in the most practical shape for use as a traveling or movable structure, it is capable of being changed in design to best suit various uses and locations of use; for example, it may be used as a sea wall or as a lighthouse and breakwater.

In accomplishing these and other objects of the invention, which will be made apparent in the following description, I have provided the details of construction, the preferred forms of which are illustrated in the accompanying drawings, wherein—

Fig. 1 is a plan or top view of a floating air and naval base embodied by the present invention.

Fig. 2 is a side elevation of the structure.

Fig. 3 is a central, longitudinal section of the structure taken on line 3—3 in Fig. 1.

Fig. 4 is a stern end elevation of the structure.

Figs. 5, 6 and 7, respectively, are cross sectional views on the line 5—5, 6—6 and 7—7 in Fig. 1.

Fig. 8 is a plan view illustrating floating breakwaters, embodying features of the invention in the formation, as used to form harbors.

Fig. 9 is a cross sectional view of the breakwater, on line 9—9 in Fig. 8, showing the same as resting on a reef or the like.

In view of the various objects and uses of the floating base described, manifestly, it would be of great proportions. Therefore, in order that a better conception of the dimensions and proportions of parts may be had, it will be explained here that a practical structure for present-day uses would have an over-all length of from 1,500 feet to 2,500 feet, and a width of from 900 to 1,100 feet, approximately; or the dimensions and

arrangements may be varied to suit the specific purposes for which the structure may be designed and used.

Materials used in making such a structure, either as a unit or in separable sections, would be in accordance with best engineering practice, and since it is not my intent in this application to base any claims on structural materials, the bottoms, sides, bulkheads, decks, breakwaters and the like, have been illustrated herein as solid structures. However, it is to be understood that they may be composed of steel plates, of reinforced concrete or of any other practical form of construction consistent with the objects and spirit of the present invention.

The structure, primarily, is designed as a floating, movable, airplane and marine vessel base, and while it has been illustrated as being equipped for military uses, this is not the basis for the invention. However, the apparent advantages of such a floating base for military operations would seem to call for a disclosure of features which are of significance from the military standpoint.

Referring more in detail to the drawings—

By reference to Fig. 1, in particular, it will be understood that the structure is of the character of a large barge, here shown as of unitary or one-piece construction, but which, if desired, could be made in any number of individual sections, secured together in a manner to permit separation and independent use when such is desired.

The structure comprises a flat bottom **5** that lies in the same horizontal plane beneath the whole structure; opposite side walls **6—6** which are substantially vertical and which curve symmetrically toward each other at the forward end of the structure to form a prow and serve as a breakwater. These side walls, extending rearwardly from the prow, terminate about two-thirds of the distance from stem to stern. Other side walls **7—7** are arranged parallel with and inwardly spaced from the walls **6—6** and extend the full length of the structure.

In this spaced arrangement of outside walls **6—6**, forming the breakwater, and the inside walls, **7—7**, there is provided intermediate passageways **8—8** at opposite sides of the prow and along the sides of the structure. These will later be referred to.

The present structure, in fact, comprises a main hull portion which is outlined by the longitudinal walls **7** leading into the prow and the stern end wall, and an outside or protective hull which forms the prow of the boat and which comprises the walls **6** which terminate amidships in the out-turned wings **6***a*. The space between the walls **6** and **7** defines the work passages **8** in which there is the working deck identified by reference numeral **8***a*, shown in Fig. 5, and in dotted lines in Fig. 2.

By reference to Fig. 1, it is to be observed that, at their rear ends, the side walls **6—6** are gradually curved outwardly as at **6***a* to a substantial distance. Likewise, the rear end portions of the side walls **7—7** are curved outwardly as at **7***a*, and to a substantial distance which is shown to be approximately to the same extent as the lateral curvature of the walls **6***a*. The lateral or outward curving of the side walls **6—6**, and their termination short of the extent of the walls **7—7** provides, at each side of the structure, a sheltered or protected harbor area **10** providing entrance to the marine railways and other facilities and into which boats or ships of the smaller

types may take refuge from storm, to load or unload cargo, or for anchorage. From these harbors direct entrance is had to the passages **8** between the walls **6** and **7** at opposite sides of the structure.

The wide expanse across the stern of the structure, increased by the outward curving of the walls **7—7** provides a protected harbor of considerable size, and it will be understood that this harbor is always protected from wind and waves because, should the base be moving forward, it will operate as a wind break and breakwater, and if anchored, it will always automatically adjust itself to head into the wind and the seas.

Fig. 4 shows the structure to be closed across the stern end to a substantial distance above the waterline by a cross wall **12**. Thus the bottom **5** of the structure, together with the side walls **6—6** and **7—7**, and stern wall **12**, provides a water-tight hull for floating the structure. In this hull, or upon the various decks, bulkheads, drydocks, warehouses, magazines, power plants, shops, marine railways, control stations, quarters for personnel, hospitals, turrets, elevators, equipment and means for handling torpedo netting, and the like, are built.

Manifestly the facilities provided herein would require decks at various levels, partitions, bulkheads, bracing, reinforcing, protective and other structural details that might be varied in location and design to suit conditions.

It is to be observed that extending rearward from the stem is a longitudinal wall or bulkhead **13**, and, as noted in Fig. 5, laterally sloping protective decks **14—14** are provided.

Located in the longitudinal center of the structure and in the stern end half thereof, is the drydock, which is designated in Fig. 1 by reference numeral **20**. This drydock is enclosed by the longitudinally extending opposite side walls **21—21** which rise upwardly from the bottom **5** to a designated distance above the water line, and then, these side walls are outwardly offset, as noted best in Figs. 6 and 7, throughout the length of the drydock to provide work platforms **22** of substantial width. The side walls then continue upwardly from the work platforms to a substantial height, and are again inwardly offset, thus to provide an overhanging or protective ledge above the work platforms, and a foundation for the ramp as hereinafter described. Gates **23—23** are mounted in the stern wall **12** at the entrance to the drydock, and also at suitable distances within the drydock, permitting its use in sections. These gates extend from the bottom **5** to a satisfactory height. Thus, after a ship has entered the drydock, the gates may be closed and the water pumped out, as may be required.

Within the hull structure there are decks at various levels at opposite sides of the drydock, as will be understood by reference to Figs. 6 and 7, and these have been designated by reference numerals **24** and **24'**. It is practical, as herein shown, that the work platforms should be at the same level as the side decks **24** for direct communication with the enclosed spaces along opposite sides of the drydock.

The top or flight deck of the structure is designated by reference numeral **25** and it extends the full width and substantially the full length of the structure. This deck is perfectly flat so as to provide a field and runways for the landing and taking-off of airplanes. As noted by reference to Figs. 1 and 3, this field provides runways

lengthwise of the structure at opposite sides and forward of the drydock.

In Fig. 1, I have shown the top or flight deck 25 as terminating short of the rear or stern end at one side of the drydock. At the other side, the flight deck is extended somewhat beyond the plane of the stern wall by the provision of a structure designated at 25a in Fig. 1. At the stern end of the structure, below the level of the flight deck and at opposite sides of the drydock, as will be understood by reference to Figs. 3 and 4, are decks 30 from which the ramps 31—31 lead upwardly in an easy incline, along the opposite sides of the drydock to the flight deck, merging with the latter even with the inner end of the drydock. These ramps, it will be understood, are of substantial width and of such grade that tractors, cranes, trucks, and the like, may easily operate therealong for the conveyance of materials, equipment or the like from the lower deck to the flight deck, or/and to handle materials to and from the drydock.

Extending along the opposite sides of the landing field, or top deck 25, from the stem end to the full length of the side walls 6, are elevated decks 40, beneath which aircraft may be stored or sheltered. Openings are provided from directly beneath this deck onto the landing field. These elevated decks are useful not only for the sheltering of aircraft, men, and materials, but also will serve in wartime for the placement of anti-aircraft guns and equipment, for the mounting of field pieces or for other military uses. As here illustrated, battle turrets 45 are arranged at intervals along these decks, mounted by barbettes which extend downwardly to the lower levels for communication with the ammunition magazines and the like. Similar turrets 45' are located at the stern end of the structure on the laterally curved portions 7a which extend to the level of flight deck 25 and have direct communication therewith. These turrets provide complete command of the horizon.

It is to be understood that below the flight deck, there will be various numbers of decks for the accommodation and storage of equipment, for the housing of the armed forces, for supplies, and in fact, to accommodate all of the requirements necessary for such a floating military base. Partitions and bulkheads will divide the spaces between decks into the necessary compartments, and these should be arranged to best accommodate the structure to its intended purposes.

It is one of the features of construction that the forward edge of the flight deck extends somewhat beyond the prow of the structure, and is straight across from side to side. Thus, at its forward corners, it will overhang to considerable extent the curvature of the prow. These extended portions of the flight deck are supported by girders and stanchions, as at 50, from the walls 7—7. The elevated decks 40 along opposite sides of the prow extend from the forward end of the flight deck along the sides of the structure to the full length of the walls 6. The overhanging portions of the elevated decks 40 are spaced somewhat above the walls 6 providing the horizontal open spaces seen at 51 on Fig. 2. The walls 6, in effect, are breakwaters and preferably are somewhat outwardly curved as indicated in Fig. 5.

Between the walls 6, forming the prow and sides, and the corresponding portions of the wall 7, are the previously mentioned passageways 8. These passageways open rearwardly into the harbors 10 and there are ramps 64 provided, and marine railways on which boats and small naval vessels from these harbors, cargo, and the like, may be hauled out for repairs or stowage, or loaded onto or from the structure. Water clearing ports 65, covered with gratings at the top and with swinging traps at the outboard end, are provided at intervals along the walls 6 for a quick outflow of water that may break over the walls 6 into these passageways.

For the propulsion of the structure, I have provided multiple propellers 66 extending at the stern end at opposite corners of the structure. These propellers are to be driven by engines of suitable character within the base, but which are not illustrated herein. It is intended that for moving this floating base from place to place, tugs and other vessels could be employed. Furthermore, the separate control of propellers at the opposite sides would provide steering control and maneuverability to a certain extent.

Since it is desirable, and is a primary object of this invention to provide the necessary ventilation by means that will in no way obstruct the use of the landing field or fighting decks, and without danger of admittance of any water in storms or heavy seas, it is my intent to install ventilators of those various types disclosed in my pending applications filed under Serial Nos. 474,293 and 481,834. These would be located wherever required, and it is not thought necessary to illustrate their use herein. Vital machinery used in the operation and control of the base could be protected against drowning by water-tight housings of the type illustrated in my United States Letters Patent No. 1,694,790 and copending application Serial No. 469,872. Likewise, these have not been herein shown.

Such a structure also could be equipped with protective devices of selected kinds, including submarine nets, listening devices for both underwater and air, and any other known means of detection and communication. Furthermore, it would be desirable to employ bomb- and torpedo-proof magazines and shelters. The turrets and barbettes which have been shown at the sides of the structure, and also the stanchion shown, may be made big enough to provide an internal space for escape passages from below, and also for passing ammunition to the guns located within and on top of the decks shown as extending along the outboard edges of the flight deck. Quarters for housing troops can be provided in selected parts of the structure, and it is practical that the spaces under or above the water shed from the breakwater can be used for the installation of torpedo tubes, either for above-water or under-water operation. It is the intent that travelling cranes and trucks be provided on the structure capable of handling anything on board. Also, there would be elevators where necessary to handle planes between the flight deck and the storage deck and for other purposes. Also, cargo ports and the incidental facilities for the handling and storing of supplies, for the moving of craft being repaired or stored will be provided, and it would be desirable that a mast of an elevating or telescoping type or a solid mast should be installed on the deck, and a practical location for this would be at the forward end of the drydock.

In building such a structure, most of it can be prefabricated, the lower sections could be assembled first, and floated into place to form a floatation base on which the upper structures or

sections could be assembled or built in place. Using re-inforced concrete construction, the structure could be built quickly at a saving of time and of steel approximating 60% of what an all-steel structure would require.

As a military project, this device would, in fact, be a floating island, which would have obvious advantages over a natural island in that it would provide concentrated firing power with complete view and full coverage of the horizon, would be free of jungle or desert obstructions, hazards and other difficulties or disadvantages encountered in island warfare, would permit elasticity of military strategy, and would provide the element of surprise when floated into position for invasion or attack.

In Figs. 8 and 9, I have shown, in plan view, and rather diagrammatically, a modification of the floating structure, particularly with respect to an arrangement of special sections so positioned as to provide a breakwater and to artificially produce a harbor for the accommodation of cargo vessels, war vessels and aircraft. The drawing in Fig. 8 indicates the utilization of cliffs or ledges that are located within the artificially provided harbor and which may be modified by blasting or other methods, in the provision of shelters and bases for vessels such as submarines.

Referring more particularly to Fig. 8, I here show two elongated breakwater sections **75** and **76**, extending outwardly from the shore, with inner ends anchored in spaced relationship to shore docks **77** and **78**. The distance apart of the shore docks may be varied in accordance with the size of harbor desired and to the use of shore formations to best advantage. The sections, as they extend outwardly from the shore, are curved toward each other and spaced apart at their outer ends, forming a restricted entrance passage or gateway to the harbor. Outwardly from this entrance to the harbor, is an arcuate breakwater section **79**, here shown as providing an enclosed bay **80** with entrances thereto at **81** and **82**. From this bay, direct entry is provided through passage **83** to the harbor.

The sections **75** and **76** may be floating structures anchored in place, or they may be sections that were built and floated into position, then sunk into bottom formations; this way of fixing their position being desirable when shoals or shallow bottoms make this possible.

Natural islands, bays, promontories, shallow formations, reefs, etc., naturally will be taken advantage of, or designs for special purposes made; the main advantage being that, having provided means for breaking the waves, disposing of water that may cause damage and protecting the structure as a whole, there can be, behind the breakwater, anything needed in the way of facilities.

Each of the sections **75** and **76** is connected with its corresponding land dock by a bridge **85**. These bridges provide for passing of trucks, trains or other vehicles from land onto and from the breakwaters and compensates for rise and fall of tides. Beneath these bridges, ways are provided for passage of smaller boats, and these entrances are protected by wings **87** extended from the land and wings **88** extended from the outboard sections, so placed in relationship to each other as to provide indirect passages **90** to the bridged entrance ways and to insure against high seas washing into the harbor.

In cross section, the breakwaters are constructed as shown in Fig. 9. Such corresponds to the breakwater features of construction of the structure as shown in Figs. 5, 6 and 7; there being an outer breakwater wall **95** and an inner overhanging wall **96** forming an intermediate channel **97** from which clearing ports **98** open to the outside for outflow of water that may break over the walls **95**. The interior of the breakwater sections may be used as decks, for storage or may be put to other uses. Likewise, as a military project, the structures could be equipped with gun turrets as indicated. The top surfaces of the breakwater structures also afford excellent air fields.

It will be apparent that aside from the military and commercial value of structures of the kinds disclosed, they possess the additional advantages of providing breakwaters of novel and practically indestructible character, capable of serving in this capacity without detriment to their other uses, and adapted to be floated to and anchored in place, or to be floated to position and then sunk to rest upon sea bottom where depth is not too great or tides too high. When the structure is designed primarily as a breakwater, for example as shown in Fig. 9, it still possesses many of the advantages of the floating military and naval base, and it is the intent that those features that are common both to the structure as shown in Fig. 1 and to that shown in Fig. 9, shall be claimed per se and not necessarily confined to either.

Manifestly, proportions, sizes and modification of parts could be made without departing from the spirit of the invention.

Having thus described my invention, what I claim as new therein and desire to secure by Letters Patent is:

1. A floating, movable marine structure having a main hull and an outer protective hull portion associated directly therewith as a breakwater, and forming a prow for the structure, said main hull being extended above the said protective hull and formed with a portion overhanging the protective hull with clearance and a flight deck supported by the said main hull.

2. A floating, movable marine structure having a main hull and an outer protective hull portion associated directly therewith as a breakwater and forming a prow, said main hull being inwardly spaced from the protective hull and extended thereabove and outwardly to overhang the same with clearance between them, and said protective wall having clearing ports therein for the quick disposal to the outside of the structure, of water that may break over the protective wall.

3. A floating, movable marine structure of the character disclosed, having a main hull and a protective hull forming a prow portion for the structure terminating amidships in outwardly directed wings providing protected bays at the sides of the structure; said main hull being extended above the protective hull and formed with a portion overhanging it with clearance.

4. A floating movable structure of barge-like character having a main hull and a protective hull portion forming a prow for the structure and terminating amidships at each side in outwardly curved wings and the main hull having outwardly curved wings at each side at the stern, providing protected bays between the wings at each side of the structure and a protected bay across the stern end portion of the structure.

5. A floating, movable structure of barge-like

character, having a main hull and a protective hull portion forming a prow for the structure and providing work passages between the main hull and protective hull; said passages having clearing ports therefrom to the outside; said protective hull forming a breakwater and said main hull extending above said protective hull, and decks carried by the main hull and overhanging the protective hull portion with open space between them.

6. A floating, movable structure of barge-like character, having a main hull and a protective hull portion forming a prow and providing work passages between the hulls with a deck above water line; said protective hull terminating amidships in outwardly curved wings, thereby providing protected bays at opposite sides of the structure with ramps leading from the bays to the work decks.

7. A structure as in claim 6 wherein the structure supports a flat top deck, providing a landing field for airplanes, of substantially the full width and length of the structure, and elevated fighting decks extending along opposite sides of the field the length of the said protective hull, and overhanging it with clearance.

8. A floating, movable structure of barge-like character having a main hull and a protective hull outset therefrom and forming a prow, and setting off work passages between the hulls; said main hull being formed at opposite sides of the stern end in outwardly curved wings providing a protected bay astern of the vessel; said protective hull terminating amidships in outwardly curved wings and providing protected bays at opposite sides of the structure ramps leading from the work passages into the bays; a flight deck supported upon the main hull elevated fighting decks extended along opposite sides of the flight deck coextensive with the said protective hull and overhanging it with clearance for the breaking of water into said passageways.

9. A floating, movable structure of barge-like character, formed with a prow and having parallel side walls and a transverse stern wall, a dry dock in the structure extending in the longitudinal central line thereof and opening through the stern wall, gates applied to the drydock at the stern wall, a flat top flight deck forming a plane landing field, stern decks below the level of the flight deck and inclined ramps leading up from the stern decks along opposite sides of the drydock to the flight deck.

10. In a structure of the character described, a breakwater comprising an outer wall, an inner wall spaced therefrom and providing a closed intermediate passageway for the reception of water that may break over the outer wall; said passageway being above the normal water line and there being clearing ports to the outside from said passage; said inner wall being extended above and overhanging the outer wall, and a deck supported by said inner wall.

11. A floating movable structure of barge-like character having a main hull and a protective hull outset from the main hull about the forward portion thereof and forming a prow for the structure; said protective hull terminating amidships at each side in outwardly curved wings, providing protected bays leeward thereof and there being work passages between the main hull and the protective hull, and ramps leading into the passageways from the said bays.

12. A marine structure comprising a bottom portion, and a water and wave resisting wall formed therewith; said wall having an outer protective section of less than the full height of the wall and having an inner section spaced from the outer section and defining the full height of the wall in an outwardly directed portion thereof overhanging the top edge of the outer section with clearance and a deck supported by the inner wall at the level of that portion which overhangs the protective section.

13. A marine structure comprising a bottom portion, and a water and wave resisting wall formed therewith; said wall having an outer protective section of less than the full height of the wall and having an inner section spaced from the outer section and defining the full height of the wall in an outwardly directed portion thereof overhanging the top edge of the outer section with clearance; said wall sections providing a working passage between them on said bottom portion, and said passage having clearing ports opening to the outside of the wall for gravity disposal therefrom of water that breaks over the outer section.

14. A marine structure comprising a bottom portion and a marginal water and wave resisting wall formed therewith; said wall having an outer protective section that terminates short of the full height of the wall, and having an inner section spaced inwardly from the outer section and providing an intermediate working passage on the said bottom portion above normal water level; said inner section defining the full height of the wall in an upwardly and outwardly arched portion overhanging and extending beyond the top edge of the outer section of the wall with clearance, and there being clearing ports for gravity disposal of water from said passage.

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