Jan. 15, 1963 C. M. LAMB 3,073,274

FLOATING DOCK FOR MARINAS

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FIG. 1

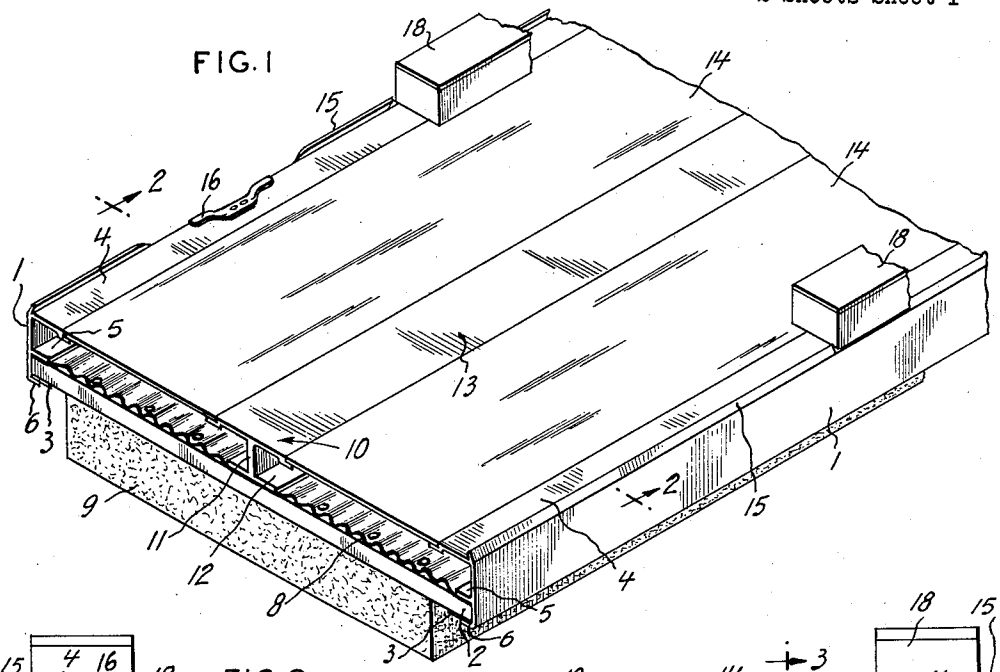


FIG. 2

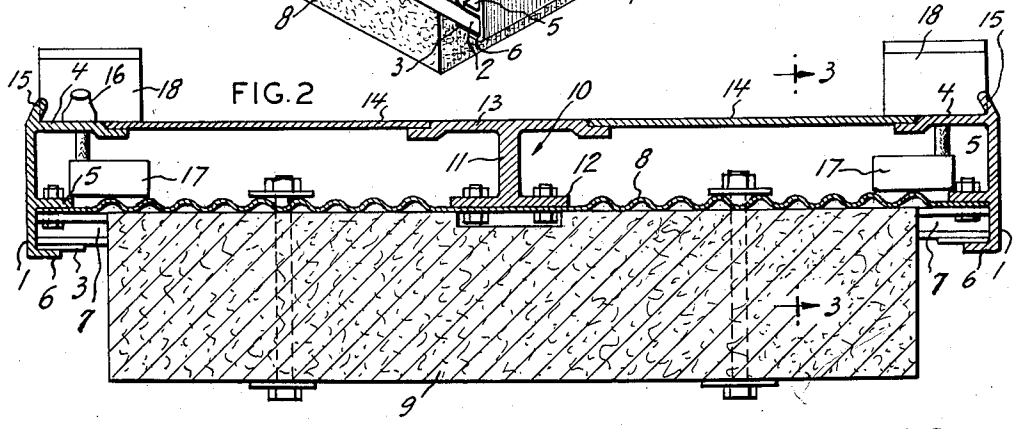


FIG. 4

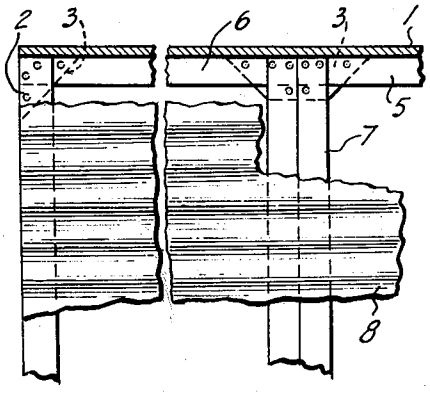
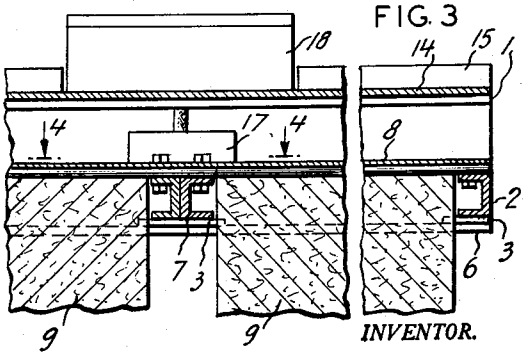


FIG. 3



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FIG. 5

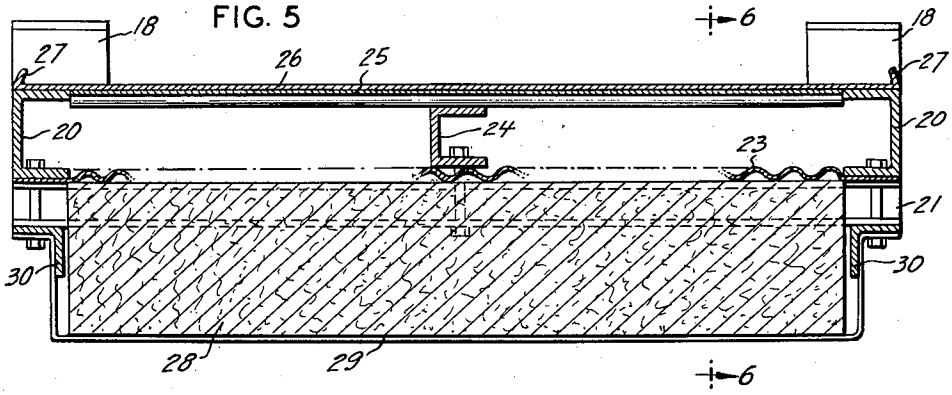


FIG. 6

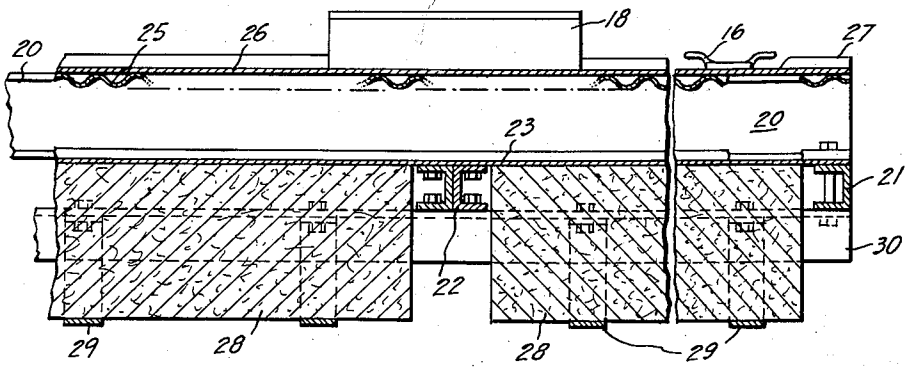
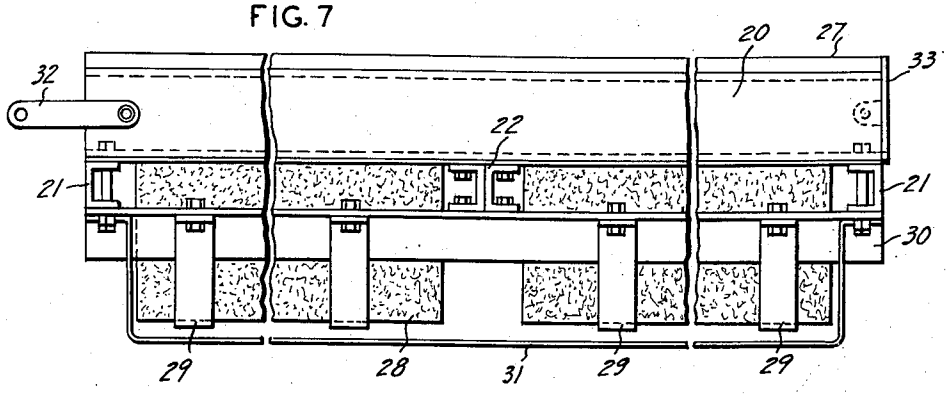


FIG. 7



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FLOATING DOCK FOR MARINAS

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15 Claims. (Cl. 114—43.5)

The present invention relates to the construction of floating dock units for marinas.

The invention provides a marina dock unit construction in which a frame has a lower deck mounting floats on the lower side and providing a support on the upper side for electric wiring, water pipes, telephone lines and other connections for supplying boats with desired services while an upper deck mounted on the top portion of the frame in spaced relation above the lower deck cooperates to form a covered compartment housing the wiring and other connections and forms the walking surface on the dock.

The ends of the compartment in the dock unit are open to register with the open ends of adjacent dock units so the wiring and other service connections for the boats may be laid on the lower deck throughout the length of the assembled dock units with the upper deck removed. This feature of the invention facilitates installation of the service connections for the boats over present methods with less labor and with protection from damage through enclosure in the compartment within the frame. These service connections are also readily accessible for repair and replacement and for installation of additional service connections from time to time by removal of the upper deck. The lower deck of the assembled dock units provides a walking surface for workmen while laying pipes and wires and completing service connections. The open ends of the compartments in the dock units eliminates obstruction to the installation of wiring, etc.

According to the invention, the dock frame is constructed with side members connected at opposite ends by end members joining the lower portions of the side members so as to leave the ends open between the lower and upper decks. The side members are formed with longitudinal flanges between the upper and lower edges for mounting the edges of the lower deck. The upper margins of the side members are formed with upper deck supporting flanges and guard flanges projecting above the upper deck to reduce the likelihood of people slipping off the dock. These guard flanges also provide a grip for those who have fallen overboard to hold onto the dock and pull themselves up onto the deck of the dock unit. The frame has an intermediate transverse frame member below the lower deck connecting the side members to provide for mounting of connection boxes and fittings for service wiring, pipes, etc. An intermediate longitudinal frame member extends above the lower deck between the end members, divides the compartment, supports both the lower and upper deck sections and cooperates in retaining the frame members and distributing stresses therebetween to the floats.

The invention also facilitates the mounting of terminal and equipment storage boxes on the top flanges of the side members of the frame and cleats for mooring boats to the dock unit.

In the drawing:

FIG. 1 shows a fragmentary view of one end of a dock unit in perspective looking from a position above and outwardly beyond one corner.

FIG. 2 is a vertical transverse cross section taken on line 2—2 of FIG. 1.

FIG. 3 is a vertical fragmentary cross section taken on line 3—3 of FIG. 2.

FIG. 4 is a fragmentary horizontal cross section taken on line 4—4 of FIG. 3 with portions broken away to show details of the frame construction.

FIG. 5 is a vertical cross section showing a slightly modified form of frame construction.

FIG. 6 is a fragmentary vertical longitudinal cross section taken on line 6—6 of FIG. 5.

FIG. 7 is a side elevation of a dock unit showing how supporting members may be applied to the lower side of the frame for supporting the dock unit on the bottom and further showing a cover member applied to one end of the dock unit.

The dock unit provided by this invention has a rectangular frame formed of side members 1 extending longitudinally from end to end and having end or connecting members 2 extending transversely and secured by rivets or the like at opposite ends to the ends of the side members. Channel shape end members 2 are shown, one at each end of the frame. Gusset plates 3 or other structural stress distributing members are used for retaining the frame in rectangular shape in conjunction with the end members and side members.

Side members 1 as shown in FIGS. 1 to 4 are of channel shape in cross section, each having an upright side wall formed with inwardly extending upper flange 4, intermediate flange 5 and lower or bottom flange 6. End members 2 have the end portions engaged at the bottom portions of side members 1 between intermediate flange 5 and lower flange 6. The end members with gusset plates 3 are riveted or otherwise suitably secured to flanges 5 and 6 in forming the rectangular frame of the dock unit. This leaves the ends of the frame open between the intermediate flange 5 and upper flange 4 for a purpose hereinafter described. An intermediate transverse member 7 extends between side members 1 with each end secured to one side member between intermediate flange 5 and lower flange 6. Transverse member 7 is formed of two channel members mounted in back to back relation, as shown in FIG. 3, with the flanges on the channels arranged at the top and bottom to engage intermediate and bottom flanges 5 and 6 respectively to which they are rigidly attached with gusset plates 3.

A lower deck 8 formed of sheet material may have longitudinally extending corrugations formed to provide channels on the upper surface for receiving pipes and electrical wires therein so the pipes and wires will lie in the corrugations and to be held in spaced relation. Lower deck 8 is mounted in the frame to extend between side members 1 throughout the length thereof with marginal portions overlapping inwardly extending intermediate flanges 5. The side margins of lower deck 8 are secured to the under side of intermediate flanges 5 by bolts or other suitable attaching means. The ends of lower deck 8 extend to and overlap the upper portions of end members 2 to which the marginal portions are attached by bolts, rivets or similar attaching elements. The central portion of lower deck 8 is supported by intermediate transverse member 7 and may be fastened thereto in any suitable manner. Lower deck 8 closes the opening through the frame and has stress distributing cooperation with the frame members in transmitting stresses applied to the dock unit to float means or members 9 positioned under deck 8 and extending under substantially the entire dock unit for floating said unit on the surface of the water in a marina harbor. Float members 9 may be made of any suitable buoyant or floating material. It has been found that a cellular plastic material known by the trademark Styrofoam is well suited for supporting the dock units on and above the surface of the water. Blocks of this material are used of a size substantially filling the area under lower deck 8 within the side and end frames. Any suitable means, such as bolts, may be used to attach floats 9 to lower deck 8, as shown in FIG. 2.

A deck supporting member 10, shown in FIGS. 1 to 4, extends longitudinally of the frame in the central

portion, is engaged on top of the lower deck and has the end portions attached to the central portion of the end members at opposite ends. The upper portion of deck supporting member 10 terminates and lies in substantially coplanar relation with the horizontal plane of the upper edges of side members 1. Deck supporting member 10 may be of any desired construction, FIGS. 1 to 4 showing a construction in cross section in which a vertical web portion 11 is formed with a bottom flange 12 and a top flange 13. Lower deck 8 is secured by bolts or other suitable attaching means to bottom flange 12. Deck supporting member 10 and lower deck 8 are also suitably attached to transverse frame member 7.

Top flange 13 has the marginal portions offset downwardly to provide a seat for cooperation with downwardly offset marginal portions on upper flanges 4 to receive and detachably support upper or top deck sections 14. Top deck sections 14 cooperate with flanges 4 and 13 to form an upper deck on the frame providing a surface for walking and transportation of equipment to the boats moored at the dock. Top deck sections 14 provide a cover for the compartment between side members 1 above lower deck 8. Removal of upper deck sections 14 provides full access to the compartment formed between side members 1 above lower deck 8. Removable decks 14 may be formed of any suitable material for providing a rigid walk along the top of the dock. For example, a sheet metal top plate of flat form may have a corrugated plate combined therewith to form a rigid upper deck as shown in FIG. 6.

The several frame members, such as side and end members 1 and 2, transverse member 7, lower deck 8 and upper deck sections 14 are all preferably formed of some light weight sheet metal such as aluminum. This will provide a rigid frame structure of light weight that will be floated on the water so the top deck will be supported above the water surface to provide a floating dock for mooring boats and provide a dock running from the shore of a suitable harbor location to the boats for convenient and direct access to the boats for boarding and loading of supplies and passengers.

The dock units as above described are used in constructing a marina dock installation by lining up a plurality of dock units in end to end relation extending outwardly from the shore to the location where the water has a depth convenient for mooring boats alongside the dock units. Adjacent dock units are secured together by attaching connecting links, to the side members of each adjacent end of adjacent units in pivotal relation to hold the ends in close adjacent relation.

The side members 1 are formed with guard flanges 15 extending upwardly above the upper deck. The guard flanges provide a means of preventing people using the dock from slipping overboard off of the sides of the dock. The guard flanges also provide a grip for those who have fallen overboard to hold to so they can pull themselves up onto the dock or use while being assisted by others. The guard flanges have portions cut away at intervals where cleats 16 may be attached to upper flanges 4 to provide for attachment of a painter or mooring line from a boat moored to the dock.

This dock unit construction facilitates installation of a dock for mooring and servicing boats. In locations having tide water it is customary to retain a floating dock in position by a plurality of piles arranged in rows so a plurality of dock units are floated between two rows of piles spaced to provide clearance between the dock units and the piles at both sides. The dock units may be secured to the piles in a well known manner to allow free movement of the dock units up and down relative to the piles with rising and falling tides. Movement of the dock units relative to the piles with wave motion is also provided by the arrangement of the piles to the dock while the dock is held in position extending outwardly from the shore.

To install a dock using the dock units of this invention, a plurality of units are floated out in the water from the location on the shore from which the dock is to extend. Starting with the shore, the units are added one at a time extending outwardly from the first unit anchored at the shore. The top deck sections 14 are removed from the units during installation. The links are attached to the adjacent ends of the side walls of adjacent units to secure them together in aligned relation one at a time until the desired number are assembled in aligned relation between the rows of piles to form the dock.

In pleasure boat marinas it is desirable to install electric wiring for lighting the dock, supplying electricity to boats moored to the dock for lighting, cooking, battery charging and the operation of many types of equipment now used by boats moored at a dock. It is also desired to supply fresh water for use aboard moored boats for drinking, washing and other purposes. Telephone service is also desirable as well as fuel supply. The present dock unit structure facilitates the installation of these various services to the boats. All of the electrical wiring, piping, etc., can be quickly and readily laid on the lower deck of the several assembled dock units by merely unrolling wiring from coils or spools along the top surface of the lower decks of the units. Since the ends of the frames are open above the lower deck, there is no obstruction of any kind to the laying of wiring throughout the length of a dock. Water and other piping may also be quickly and conveniently laid. The workmen may walk back and forth on the lower deck in making these installations.

It will be understood that waterproof electrical wiring and connections of a character well known in the art will be used in making the installation. Connection boxes will be used in each dock unit as indicated at 17 in providing for electric supply connections for boats moored to the dock unit. Connections from boxes 17 will be extended up into receptacle boxes 18 where outlet terminals of conventional construction are mounted. Terminal boxes 18 have hinged covers providing a watertight receptacle when the covers are closed. Water, telephone and other connections also are provided with conventional terminal connections in boxes 18.

When a boat is moored adjacent a dock unit having the various service connections above described, flexible connections from the boat may be strung to the dock unit and fittings or plugs on the ends attached to the complementary outlet terminals and connections in the receptacle boxes 18. Suitable switches and valves in boxes 18 may be provided for controlling the supply of the services provided in the boxes 18 along with meters for measuring the amount of services used.

Receptacle boxes 18 may also be used for storing some small gear used in mooring the boats and in the supply of service when the boats leave the mooring.

After the various service installations are made, the upper deck sections 14 are put in place so the dock is ready for use by boats, their owners, guests and others. The wiring, piping and other service connections are housed in the aligned compartments in the assembled dock units. Whenever repairs or inspection of the service connections is required, the removal of one or more top deck sections provides immediate access to any part of the installation.. These various service connections are also protected by the decks from damage. The corrugated lower deck enables the spacing of wiring and pipe connections so that each installation can be easily traced in case repair service is required. Suitable clamps or retaining members may be used in holding the various wires and pipe lines in desired positions.

A slightly modified form of construction is shown in FIGS. 5 and 6 for illustrating how the dock unit may be made without using specially formed side members as previously described. The side members 20 are formed of plain channel sections secured together at the ends and central portion by end and intermediate members 21 and

22 respectively, similar to those shown in FIGS. 1 to 4. End members and intermediate member 22 are secured to the bottom flange of side members 20 and extend below so as to leave the compartment between side members 20 open at the ends. A lower deck 23 is mounted on the underside of side members 20 and end and intermediate members 21 and 22 engage and retain the lower deck in place. The deck supporting member 24 may be formed of channel shape as shown in FIG. 5 and is attached to the lower deck and supports the upper deck in the longitudinal central portion.

The upper deck 25 is formed in a manner similar to upper deck 14 with a top plate 26 and a corrugated plate to provide a rigid deck structure. As shown in FIG. 5, upper deck 25 extends completely across the upper flanges of side members 20 and deck supporting member 24. At the side edges deck plate 26 is formed with upstanding guard flanges 27, similar to guard flanges 15 for preventing people from slipping off of the dock and providing a grip for those who may swim up to the dock or have fallen overboard. The corrugated deck plate terminates inwardly of the edges of top plate 26, in order to fit inside of the inner edges of the flanges on side members 20 for retaining upper deck 25 in position. Upper deck 25 may be cut away to accommodate receptacle boxes 18 and cleats 16 which are mounted on the upper flanges of side members 20. The ends of the dock frame are open above lower deck 23 so the service installations as above described may be made when a series of the dock units are assembled together. Suitable floats 28 are mounted under lower deck 23. Floats 28 may be retained in position as shown in FIGS. 5 and 7 by straps 29 extending around the bottom portions and having the ends secured to side retaining rails 30. Side retaining rails 30 extend longitudinally at the lower sides of side members 20 in spaced relation below members 20. The ends of retaining rails 30 are secured to the lower sides of end members 21. Retaining rails 30 cooperate with straps 29 in retaining floats 28 in position under the lower deck as shown.

Where dock units are used adjacent the shore in tide water areas some of the units will rest on the bottom at low tide. These units next to the shore may have runners 31 as shown in FIG. 7, applied to the bottom of the units under the side members. The intermediate portions of the runners will extend in spaced parallel relation below side members 20 and below the bottom of floats 28. The ends of runners 31 are extended upwardly and have terminal portions secured to the underside of side retaining rails 30 and end rails 21. Runners are mounted at each side of the dock unit and will rest on the bottom when the tide is low and support the dock unit on the bottom. Runners 31 also provide protection for the floats to prevent damage thereto when the dock units rest on the bottom and also provide a means for firmly supporting the dock units on the bottom so they may be conveniently used in going to and from moored boats.

The dock units have been described as being assembled in aligned relation to form a dock extending outwardly from shore in which the dock units are secured together by links attached at opposite sides to adjacent ends of the side members. Such a link connection is shown at the left hand end in FIG. 7, a link being shown as extending from the side member and indicated by numeral 32. At the right hand end of FIG. 7 is shown a cover plate 33 extending across the end of a dock unit to close the open end of the compartment between the upper and lower decks and also provide a guard flange across the end of the dock.

It will be understood that in building marinas the dock units will be used to form docks extending outwardly from the shore. Dock units will also be used at intervals along the main dock which will extend laterally between boats moored adjacent the dock to provide a convenient deck surface along side a boat for convenience in loading supplies, boarding, etc. These laterally extending dock units are usually called finger floats and are secured to the side members of the main dock by suitable links, hinges or brackets. These finger floats do not carry the traffic that is carried by the floats forming the main dock and may be made of less width than the main dock units. Such narrow finger floats will of course use the same structure for the dock units as herein described. These smaller units may also be used with a main dock or in place of the main dock for small boats such as row boats, runabouts and other open boats.

The dock units provided by this invention are constructed to meet and comply with the requirements of the Code for Marinas made by the National Board of Fire Underwriters.

The invention claimed is:

1. A marina dock unit comprising a frame having side members forming upright walls, connecting members secured to and connecting the lower ends of the upright walls of said side members forming a rectangular frame having open end portions between said upright walls of said side members, a lower deck extending between and closing the opening between the side and connecting members at the lower portion of said frame and having the marginal portions secured to said side and connecting members, and an upper deck covering the opening in the top portion of said frame, supported by the upper edges of the upright walls of said side members and cooperating with said lower deck and side members to form an unobstructed open ended compartment for housing electric wiring and other service connections for boats moored adjacent said dock whereby a plurality of said units may be attached together in end to end relation with the open ended compartments in aligned relation so lengths of wiring and piping may be laid on said lower deck without obstruction when said upper deck is removed.

2. A marina dock unit comprising a rectangular frame having spaced parallel side wall members secured together by transversely extending end members attached to the lower ends of said side wall members at opposite ends thereof with the ends of said frame open between the upper ends of said side wall members, a lower deck closing the open lower end of said frame, extending between the side wall and end members and rigidly attached to said frame, float means located under said lower deck within said frame for supporting said frame in horizontal position on and above the surface of water at a marina, means for attaching the dock unit to said float means, an upper deck formed to extend between the sides and ends of said frame, means detachably mounting said upper deck on the upper edges of the side walls of said frame to form a compartment in said frame between said decks with unobstructed open ends and extending between said side wall members for receiving and supporting lengths of wire, pipes and other service connections so they may be accessible by removing said upper deck and so they may be applied or removed from said compartment without obstruction with opposite ends extending outwardly beyond the ends of said frame.

3. A marina dock unit of the character claimed in claim 1, wherein a transverse member connects the lower intermediate portions of the side members under the lower deck between said connecting members to form a support for terminal units of said service connections.

4. A marina dock unit of the character claimed in claim 3, wherein a longitudinal deck supporting member is mounted at opposite ends on intermediate portions of said connecting members and extends between opposite ends of said unit and supports the intermediate portions of said upper and lower decks on said frame.

5. A marina dock unit of the character claimed in claim 2, wherein a longitudinal deck supporting member extends in substantially parallel relation between said side members and has the bottom marginal portions attached to the lower deck and opposite ends attached to said end

members and the upper marginal portions formed to engage under and detachably support portions of said upper deck intermediate the sides of said frame.

6. A marina dock unit of the character claimed in claim 1, wherein guard flanges are carried by said frame at the side of said upper deck and extend upwardly above said upper deck.

7. A marina dock unit comprising a frame having a pair of spaced side members each formed with an upright side wall, inwardly extending upper, lower and intermediate flanges on each side wall, end members extending between said side members one at each end of said side members and secured at opposite ends to the lower flanges of said side members for cooperation to form a rectangular frame, said end members terminating below said intermediate flanges, a lower deck extending between said side and end members and having a marginal portions secured to said end members and said intermediate flanges and cooperating with said frame to form a compartment above said lower deck between said side walls open at opposite ends of said frame, and an upper deck extending between the ends of said frame and having the side margins supported on said upper flanges of said side members, said upper deck closing the upper portion of said compartment and said compartment providing a housing for electrical wiring and other service connections extending through the compartment and the compartments of similar aligned dock units for servicing boats moored adjacent each dock unit.

8. A marina dock unit as claimed in claim 7, having a deck supporting member extending longitudinally between said side members and having opposite ends mounted on said end members at opposite ends of the frame, said deck supporting member extending between and supporting said upper and lower decks.

9. A marina dock unit as claimed in claim 8, wherein said deck supporting member has flanges extending outwardly in opposite directions at the top thereof, aligned with the top flanges on said side members, and each of said flanges having downwardly offset marginal portions forming seats for receiving and supporting opposite marginal portions of said top deck with the top surface of said top deck lying in substantially coplanar relation with the top surfaces of said flanges.

10. A marina dock unit as claimed in claim 7, wherein said side walls carry guard flanges extending upwardly above said upper deck.

11. A marina dock unit as claimed in claim 7, having the lower deck provided with a plurality of longitudinally extending channels on the upper side for receiving and spacing wires, cables and pipes supported by said lower deck.

12. A marina dock unit as claimed in claim 7, having supporting floats engaged within the lower portion of the frame between said side and end members and having the top portions engaging said lower deck in supporting said frame thereon, and means for attaching said floats to said lower deck.

13. A marina dock unit as claimed in claim 1, wherein the lower deck is formed of corrugated sheet material having the corrugations extending longitudinally of the frame and providing a plurality of channels for receiving and holding wires, pipes and other service connections in spaced relation to one another.

14. A marina dock unit as claimed in claim 1, having runners mounted on the frame and extending below the lower portions of floats located under said lower deck for supporting said dock unit on the bottom when the water level is low and protecting said floats.

15. A marina dock unit as claimed in claim 1, having a cover member detachably mounted on one end of said frame for closing the open end of the compartment of an end dock unit of a series attached together to form a dock.

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