Aug. 26, 1947. R. W. WALTON 2,426,477

PIER CONSTRUCTION

Filed Nov. 28, 1945 2 Sheets-Sheet 1

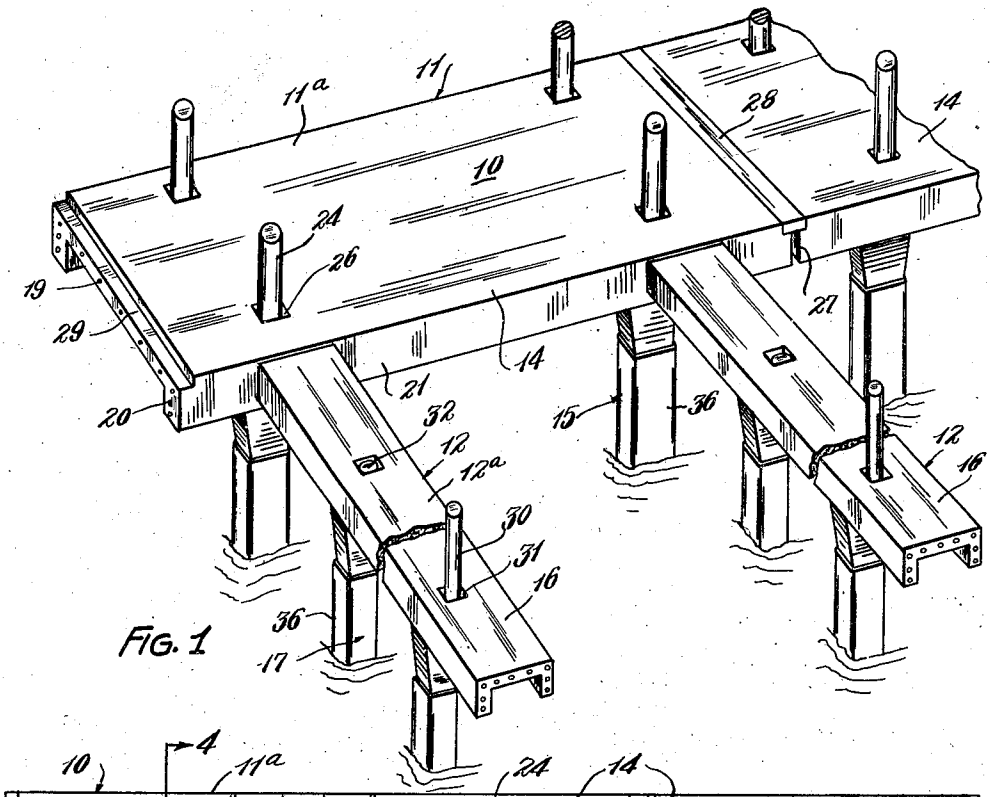


FIG. 1

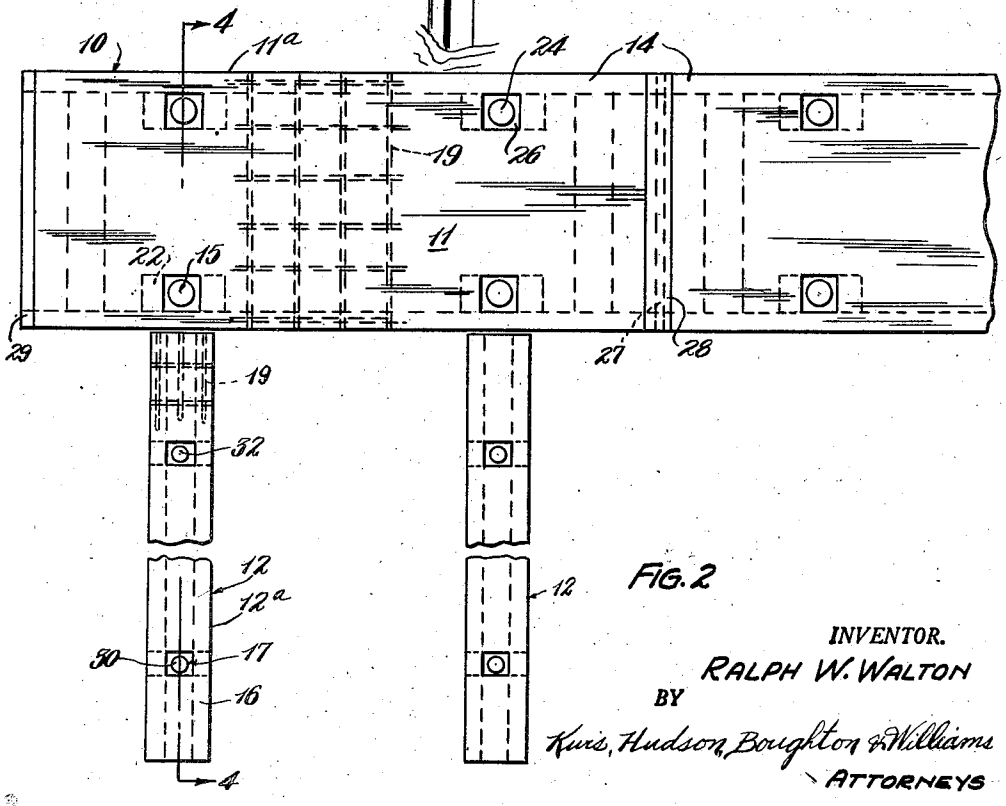


FIG. 2

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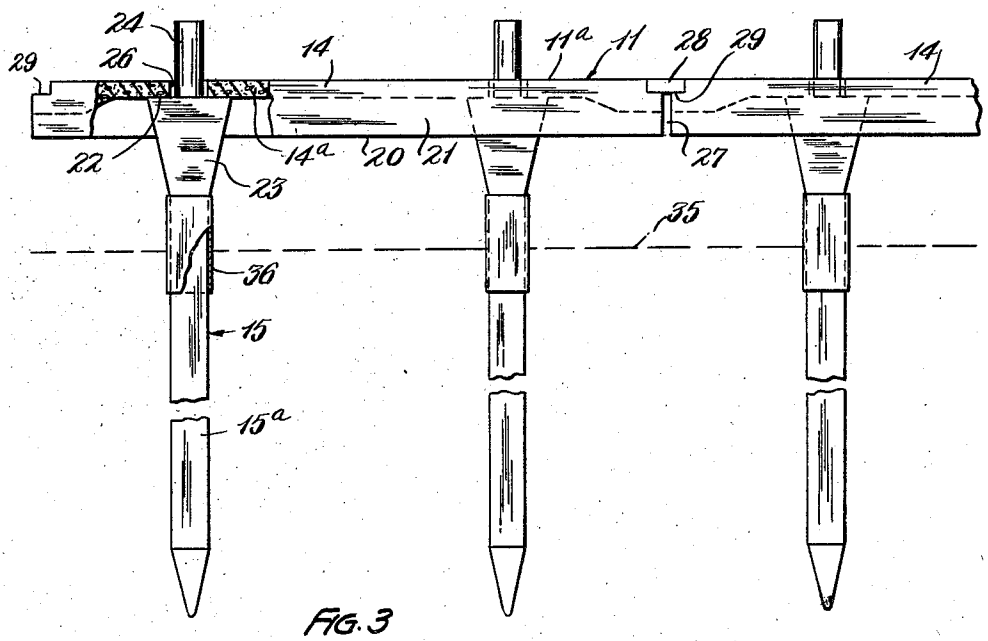


FIG. 3

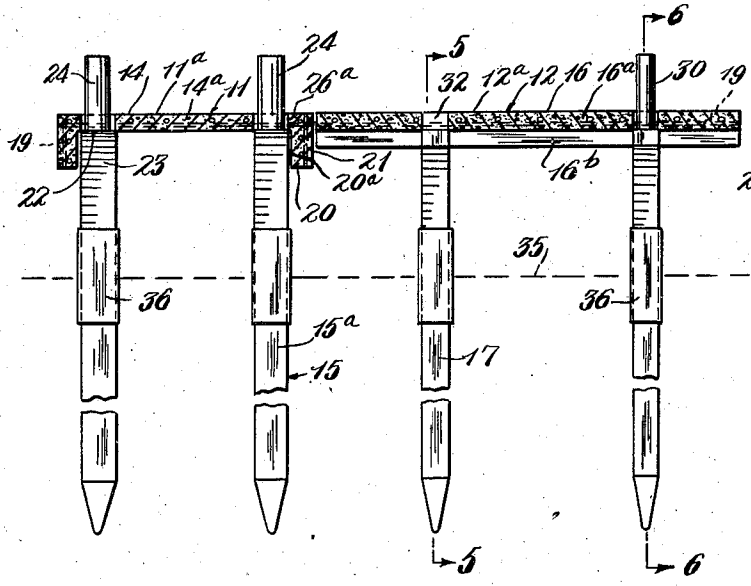


FIG. 4

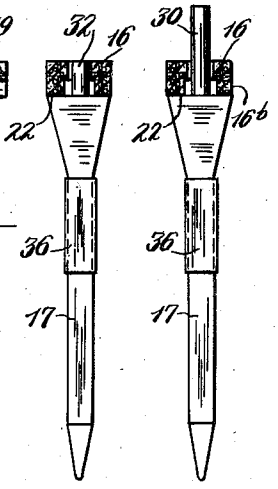


FIG. 5

FIG. 6

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PIER CONSTRUCTION

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Application November 28, 1945, Serial No. 631,269

7 Claims. (Cl. 61—48)

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This invention relates to piers of the kind used for docks, boat landings and other purposes and as one of its objects aims to provide improved construction for piers of this character.

Another object of the present invention is to provide an improved construction for piers of the kind mentioned, which will enable such piers to be erected or fabricated at the desired point of use from preformed concrete members.

A further object of this invention is to provide an improved pier of this character, in which piles driven into the earth at spaced points have lateral shoulders thereon and a deck structure supported on such shoulders has spaced openings into which relatively reduced portions of the piles extend.

Still another object of the invention is to provide an improved pier construction of the character mentioned, in which a main deck structure is supported by a group of such shouldered piles and an auxiliary deck structure is supported by other shouldered piles disposed in a row extending outwardly from the main deck structure.

The invention can be further briefly summarized as consisting in certain novel combinations and arrangements of parts hereinafter described and particularly set out in the appended claims.

In the accompanying sheets of drawings,

Fig. 1 is a perspective view showing a pier constructed according to the present invention and which embodies a main dock and a plurality of auxiliary docks.

Fig. 2 is a top plan view of the pier.

Fig. 3 is a side elevation of the portion of the pier which forms the main dock, certain portions of the pier being broken away to better illustrate the construction thereof.

Fig. 4 is a traverse sectional elevation taken through the pier as indicated by line 4—4 of Fig. 2.

Fig. 5 is a vertical sectional view taken through one of the auxiliary docks and substantially on line 5—5 of Fig. 4; and

Fig. 6 is another vertical sectional view taken through one of the auxiliary docks and substantially on line 6—6 of Fig. 4.

The invention will now be described in greater detail by referring to the pier 10 which is illustrated in the drawings as representing one embodiment of the invention. As here shown, the pier 10 comprises a main dock 11 which may extend substantially parallel to an adjacent bank or shore line and a plurality of auxiliary docks 12 which extend outwardly into the adjacent body of water and away from the main dock in angular relation to the latter. It is not necessary that the main dock 11 always extend in parallel relation to a bank or shore line since, in some cases, it may extend outwardly into a body of water and away from the bank or shore

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line. The pier 10 can be used for any desired purpose and when intended for use as a mooring for small boats it preferably includes the auxiliary docks 12 although, if desired, the auxiliary docks can be omitted. When the auxiliary docks 12 are used they provide slips for pleasure craft or various other small boats.

The main dock 11 comprises a deck structure 11a in the form of one or more sections or slabs 14 and a plurality of piles 15 which support the deck structure and are driven into the earth at spaced points. Each of the auxiliary docks 12 also comprises a deck structure 12a in the form of a section or slab 16 which is supported by other piles 17 driven into the earth at spaced points and located in a row extending outwardly or away from the main dock 11. The main dock preferably comprises a plurality of the deck sections 14 disposed in an aligned edge-to-edge relation but the number of such sections employed will depend upon the desired length which the dock is to have. The deck sections 14 are preferably rectangular in shape, as here shown, and are of a size which is suitable for the particular pier in which they are to be used. Usually these sections will be of a size which will permit them to be constructed in a factory and then transported to the point of use and assembled on the driven piles 15.

The deck sections 14 of the main dock 11 are similar or identical to each other and each of these sections comprises a preformed concrete slab which can be manufactured in any suitable manner such as by being cast or molded in a suitable form or mold. A concrete mixture of appropriate characteristics is used in forming the sections 14 and preferably a vibrated concrete is employed so as to produce a strong and durable structure. The deck sections 14 preferably also embody steel reinforcing 19 which is suitably distributed throughout the structure. As here shown, each of the deck sections 14 has a flat intermediate or web portion 14a of an appropriate thickness which provides a substantially smooth, flat top surface for the pier. Each of these deck sections is also provided with portions of increased depth or thickness along its side edges which form longitudinally extending continuous reinforcing beams or flanges 20. The outer surfaces of these depending beams or flanges form longitudinally extending rubbing or buffer surfaces 21 adapted to be engaged by some portion of a boat lying alongside the pier.

The deck structure 11a of the main dock 11 is supported by a plurality of the piles 15 which, as mentioned above, are driven into the earth at spaced points. In this instance, the piles 15 are spaced apart in two directions and constitutes two longitudinally extending rows. Each of the piles 15 comprises a stem or shaft portion 15a, of appropriate length and pointed at its lower end, and which is driven into the earth for a suitable

distance by any appropriate driving apparatus. Adjacent their upper ends the piles 15 are provided with lateral shoulders 22 on which the deck structure 11a is supported. The shoulders 22 can be formed on the piles by providing the latter with a tapered upwardly enlarging integral head portion 23 whose upper end is considerably wider than the stem portion 15a.

For a purpose to be presently explained, the piles 15 are also provided with an integral extension or timber head 24, which extends above the shoulders 22 in substantial coaxial relation to the shaft portion 15a. The extension 24 is of a relatively reduced size, preferably being somewhat smaller in cross section than the stem portion 15a. In this instance the extension 24 is shown as being round although it can be quadrangular or of any other desired shape. The shoulders 22 are formed at the junction of the extension 24 with the tapered integral head 23 and the upper end of the head is usually of a size such that the lateral shoulders extend for the full distance around the extension. The piles 15 are preferably constructed of concrete by being molded or cast in a suitable form or mold. As in the case of the sections 14 of the deck structure 11a, the piles 15 can be made of vibrated concrete and may have suitable reinforcing steel embodied therein.

Each of the deck sections 14 of the main dock 11 is supported by a group of the piles 15, in this instance, the group comprises four such piles. In constructing the pier 10, the piles 15 are driven into the earth in the desired spaced relation after which the deck section 14 is lowered into position on the piles so as to be supported by the shoulders 22 of the latter. To accommodate the extensions 24 of the piles, the deck section 14 is provided with openings 26 which are located therein to corresponding with the desired spacing for the piles. The openings 26 extend through the web portion 14a of the deck section and are of a size and shape to freely accommodate the pile extensions 24. In this instance the openings 26 are shown as being square or quadrangular and usually these openings are made sufficiently larger than the extensions 24 so that some relative movement will be permitted to facilitate the assembly of the deck section on the piles in the event that the latter are displaced somewhat from their exact location during the driving thereof. The extensions 24 of the piles are preferably of a length such that they will project a substantial distance above the upper surface of the deck structure, as shown in the drawings, and will serve as a means to which the retaining lines or ropes can be secured for a boat lying alongside the pier.

The openings 26 of the deck structure 11a are preferably located so that the outer side edges 26a of these openings are substantially flush with the inner faces 20a of the depending reinforcing beams or flanges 20 (see Fig. 4). When these edges of the opening 26 are in this location, it will be seen that the inner faces 20a of the depending beams or flanges will be engageable with the outer faces of the relatively wide head portions 23 of the piles 15 and this engagement will assist in preventing lateral shifting of the deck structure. It will be understood, of course, that lateral shifting of the deck structure is also prevented by the cooperation of the pile extensions 24 with the edges of the openings 26 through which they extend.

In driving the piles 15 in the desired spaced relation it will usually not be possible to locate the piles with sufficient accuracy to bring the deck section 14 exactly into abutting edge-to-edge relation when they are assembled on the piles. the adjacent or meeting edges of the deck sections 14 will, therefore, usually be separated by an intervening space 27 which will be of variable width depending upon the accuracy with which the piles have been located. To complete the flat upper surface of the deck structure 11a and close or cover the intervening spaces 27, the pier is provided with filler slabs 28 of an appropriate width and thickness and which can be supported on ledges or shoulders 29 which are rabbeted or otherwise formed on the adjacent edges of the deck sections 14.

As shown in the drawings, the deck structure 12a of the auxiliary docks 12 comprises one or more sections 16 which are of a construction similar to that of the main deck section 14 but are of a relatively narrower width. Usually the deck sections 16 for the auxiliary docks are of a width which will enable these deck sections to serve merely as walkways or catwalks affording access to the boats which are located in the slips between the pairs of auxiliary docks. The deck section 16, as here shown, can be a preformed slab of reinforced concrete of a substantially channel-shaped cross-section. The web portion 16a forms a substantially flat top surface for the auxiliary dock and the depending longitudinal edge flanges or beams 16b form buffer surfaces for the boats lying adjacent thereto.

In this instance each of the deck sections 16 of the auxiliary docks 12 is supported by two of the piles 17. The piles 17 can be somewhat smaller than the piles 15 for the main dock 11 but in other respects they are similar to or identical with the piles 15. Usually, however, the outermost pile 17 has an extension 30 at its upper end corresponding with the extension 24 of the piles 15 and which extends through one of the openings 31 of the deck section 16 whereas the inner pile 17, that is to say the one nearest the main dock 11, has a relatively short extension 32 which extends into but not through the corresponding opening of the deck section. The extension 30 of the outermost pile 17 serves as a means to which can be secured the lines or ropes of a boat lying adjacent the auxiliary dock 12. The extension 32 of the inner pile 17 can, of course, also be of a length to extend above the deck structure, if this should be desirable.

As shown in Figs. 5 and 6 of the drawings, the piles 17 for the auxiliary docks 12 also have the same lateral shoulders 22 as the main piles 15 and on which the deck sections 16 are supported. Because of the relatively narrower width of the deck sections 16 of the auxiliary docks, these deck sections will usually be supported on the shoulders 22 by the engagement of the lower faces of the depending flanges or beams 16b with these shoulders.

It is usually desirable to shield and protect the piles 15 and 17 at or adjacent the water level 35 and this can be accomplished by providing each pile with a metal sleeve or shroud 36. This shroud is located immediately below the head portion 23 and is of a length to extend for some distance above and below the water line 35. These metal shrouds can be mounted on the piles during the casting or molding thereof and when the piles have been driven into the earth for the proper distance, they will protect the piles against damage by ice and also against corrosion.

From the foregoing description and the accompanying drawings it will now be readily understood that this invention provides an improved construction for a pier which will enable the pier to be fabricated in a practical and satisfactory manner from preformed or precast concrete deck and pile members. It will also be seen that a pier of the construction herein provided will be strong and durable and can be used for mooring small boats and for various other purposes.

Although the improved pier construction of the present invention has been herein described and illustrated in considerable detail, it will be understood, of course, that the invention is not intended to be correspondingly limited but includes all changes and modifications coming within the scope of the appended claims.

Having thus described my invention, I claim:

1. A pier of the character described comprising, a plurality of spaced piles driven into the earth, said piles being wholly preformed and having lateral shoulders thereon and portions of reduced size extending above said shoulders, and a deck structure comprising a preformed slab assembled on said piles and supported by said shoulders and having spaced openings located wholly inwardly of its edges and into which the reduced portions of the piles extend.

2. A pier of the character described comprising, a plurality of spaced upright piles driven into the earth, said piles being wholly preformed and having lateral shoulders thereon and portions of reduced size extending above said shoulders, and a deck structure comprising a preformed slab assembled on said piles and supported by said shoulders and having spaced openings located wholly inwardly of its edges and into which the reduced portions of the piles extend for preventing lateral shifting of the deck structure, said reduced portions being of a length to extend through said openings and project a substantial distance above the top surface of said deck structure.

3. A pier of the character described comprising, a plurality of upright piles made of concrete and extending into the earth at spaced points, said piles being wholly preformed and having lateral shoulders thereon adjacent their upper ends and integral portions of reduced size extending above said shoulders, and a preformed deck structure made of concrete and assembled on said piles and supported by said shoulders, said deck structure having openings therein located wholly inwardly of its edges and spaced to correspond with the spacing of said piles and into which said reduced portions extend for preventing lateral shifting of said structure.

4. In a pier of the character described, a plurality of concrete piles extending into the earth at spaced points, said piles being wholly preformed and having lateral shoulders thereon and portions of reduced size extending above said shoulders, and a deck structure comprising a preformed concrete slab assembled on said piles and supported by said shoulders and having spaced openings located wholly inwardly of its edges and into which said reduced portions extend, said slab having portions of increased depth extending along its side edges and forming rubbing surfaces and slab reinforcing beams.

5. In a pier of the character described, a plurality of concrete piles extending into the earth at spaced points, said piles being wholly preformed and having lateral shoulders thereon and

portions of reduced size extending above said shoulders, a deck structure comprising a preformed concrete slab assembled, on said piles and supported by said shoulders and having spaced openings located wholly inwardly of its edges and into which said reduced portions extend, and portions of increased depth formed integral with said slab and extending along its side edges and forming rubbing surfaces and slab reinforcing beams, the inner faces of said beams being substantially in line with the outer edges of said openings and being engageable with the sides of said piles below said shoulders.

6. A pier of the character described comprising a plurality of upright piles extending into the earth at spaced points, said piles being wholly preformed and having lateral shoulders thereon adjacent their upper ends and portions of reduced size extending above said shoulders, a main deck structure comprising a preformed slab assembled on said piles and supported by said shoulders and having spaced openings located wholly inwardly of its edges and into which the reduced portions of said piles extend, other piles extending into the earth and disposed in a row extending outwardly from said main deck structure, said other piles also being wholly preformed and having lateral shoulders thereon adjacent their upper ends and portions of reduced size extending above said shoulders, and an auxiliary deck structure comprising a preformed slab assembled on said other piles and supported by the shoulders thereof and having spaced openings located wholly inwardly of its edges and into which the reduced portions of said other piles extend.

7. A pier of the character described comprising a plurality of upright piles extending into the earth at spaced points, said piles being wholly preformed and having lateral shoulders thereon adjacent their upper ends and portions of reduced size extending above said shoulders, a main deck structure comprising a preformed slab assembled on said piles and supported by said shoulders and having spaced openings located wholly inwardly of its edges and into which the reduced portions of said piles extend, other piles extending into the earth and disposed in a row extending outwardly from said main deck structure, said other piles also being wholly preformed and having lateral shoulders thereon adjacent their upper ends and portions of reduced size extending above said shoulders, and an auxiliary deck structure comprising a preformed slab assembled on said other piles and supported by the shoulders thereof and having spaced openings located wholly inwardly of its edges and into which the reduced portions of said other piles extend, said main and auxiliary deck structures having integral portions of increased depth extending along their side edges and forming rubbing surfaces and reinforcing beams.

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