R. B. WILLARD.

SEA WALL OR BULKHEAD.

APPLICATION FILED JULY 26, 1919.

1,359,475. **Patented Nov. 16, 1920.**

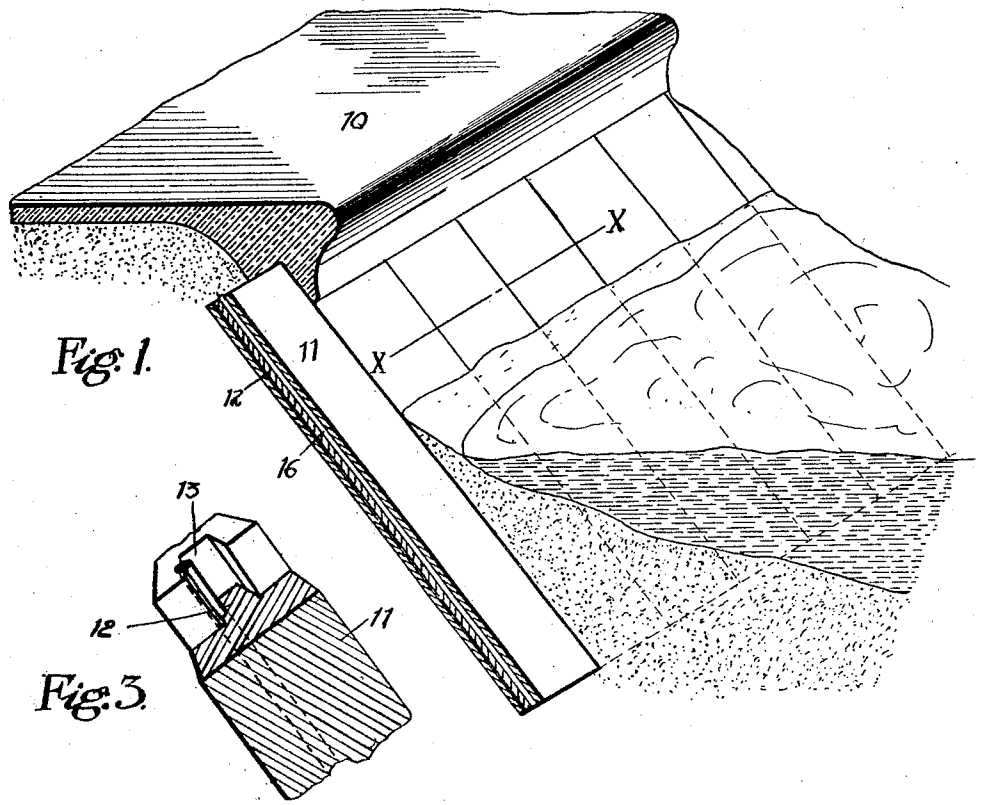


Fig. 1.

Fig. 3.

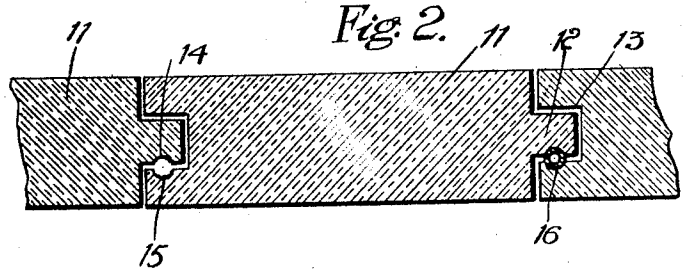


Fig. 2.

WITNESS
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SEA-WALL OR BULKHEAD.

1,359,475. Specification of Letters Patent. Patented Nov. 16, 1920.

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To all whom it may concern:

Be it known that I, RUFUS B. WILLARD, a citizen of the United States, and a resident of Hollywood, in the county of Los Angeles and State of California, have invented a certain new and useful Sea-Wall or Bulkhead, of which the following is a specification.

The object of my invention is to provide a sea wall or bulkhead of simple, durable and inexpensive construction, of the class ordinarily constructed of reinforced concrete panels, designed when used as a sea wall to be set deeply into the sand or shore, and to be inclined upwardly and toward the shore, and to be filled in on the shore side with sand or other material to form a firm base or foundation for the sea wall in resisting the pounding action of the waves.

In sea walls or bulkheads of this character, it has been customary heretofore to provide some sort of a locking tongue and groove connection between the various panels, whereby the panel first set in position will form a guide for the next one being moved into position and whereby the panels are always held close together and in parallel position.

In these tongue and grooved constructions, it has been impracticable to form tight joints for the reason that the surfaces of the panels at the joints are necessarily quite rough on account of the sand or gravel used in the construction of the panels, and the successive panels cannot be slid into position readily, unless there is considerable play or looseness at the locking joint.

One object of my invention is to provide means whereby a water tight locking joint may be provided between the several panels and at the same time the panel first positioned may serve as a guide for the panel being positioned, and whereby the last mentioned panel will readily, easily and freely slide to position, after the sand is withdrawn from beneath its lower end.

My invention consists in the construction, arrangement and combination with a tongue and groove panel, sea wall or bulkhead of a metal tube made of such material and so proportioned that it will serve as a guide and locking member for the panels, and at the same time, will also serve after a brief period of use, as a water tight seal for the space between the panels, and whereby the objects contemplated are attained as hereinafter more fully set forth, pointed out in my claims, and illustrated in the accompanying drawings in which:

Figure 1 shows a sectional, perspective view of a sea wall embodying my invention.

Fig. 2 shows an enlarged, detailed, sectional view on the line x—x of Fig. 1.

Fig. 3 is an enlarged, detailed perspective view illustrating a portion of two adjacent panels, with a locking guide tube in position.

Referring to the accompanying drawings, I have used the reference numeral 10 to indicate the cap member of the sea wall preferably having a flat, horizontally arranged body portion and an outer edge curved from the body of the sea wall upwardly and outwardly to deflect spray. This portion is usually constructed after the sea wall proper has been placed in position and the upper ends of the panels are embedded in this cap portion so that any unevenness of the top ends of the panels is covered up and concealed by the cap.

Each panel is formed of concrete, preferably in a suitable mold and in the ordinary way. These panels may be reinforced in the ordinary manner if desired. The body portion of the panel is indicated by the numeral 11. At one vertical edge, there is a tongue 12 and at the opposite edge is a corresponding groove 13. In a construction of this kind, it is necessary that the groove be appreciably larger than the tongue, so that one panel may be slid longitudinally into position relative to a previously positioned panel without undue friction or sticking.

On one side of the tongue 12 is a longitudinally arranged groove or notch 14 and on the mating part of the groove 13 is a similar groove or notch 15.

Inserted in these notches 14 and 15 is a smooth iron rod or tube 16. The proportions of the said rod, relative to the notches and to the tongue and groove, are such that when the first panel is placed in its position inclined from the vertical toward the shore line, the rod or tube 16 may be placed in the notch or groove 15, and then when the mating panel is placed in position, it will engage the rod or tube 16 in its notch 15, but the adjacent surfaces of the tongue and groove will be held, and not slide out of engagement, so that during the sliding movement of the panel being positioned, all of

the friction will be borne by the smooth rod or tube 16, so that the last mentioned panel will slide very readily and easily into its position without undue friction, as the sand from beneath it is removed (the ordinary way of doing this, is by injecting a jet of water under pressure beneath each panel, as it is being lowered to position by gravity). The proportion of the rod or tube 16 relative to the other parts of the tongue or groove construction, is such that the rod or tube will form a lock preventing ready displacement of one panel relative to the other, thus insuring the accurate positioning of the panels relative to each other after they are moved in position forming a sea wall or bulkhead.

It is, also, important that the rod or tube be made of iron or some other material that will readily and quickly rust or corrode. Common, ordinary iron pipe is well suited for this purpose, and this is especially true when subjected to the action of salt water. I have found that when an iron pipe is used and after it has been subjected to the action of salt water for a few days only, it will rust and corrode to such an extent as to fill and completely seal the space between the adjacent tongue and groove members, and thus form a water tight seal, preventing the sand on the shore side of the sea wall from being washed through the joint.

Furthermore this construction is very durable and long-lived, because after the iron rusts and disintegrates after a long period of use, the rust or scale from the iron pipe is relatively hard and strong enough to maintain the water tight seal, even after the iron pipe has fully disintegrated and changed its form into iron rust and scale.

In practical use, the sea wall is constructed by placing one of the panels in proper position, then laying the iron pipe or rod in the inclined groove 14, and then placing the next panel in position above the panel first laid with its groove 15 against the outer edge of the rod or pipe 16, and then removing the sand from beneath the second panel, so that it may drop by gravity into position. After a section of the sea wall has thus been completed, the cap member 10 is placed in position in any ordinary way, thus covering the exposed upper ends of the panels and making a smooth and workmanlike job.

I claim as my invention:

1. An improved sea wall construction comprising a series of panels, said panels being provided with mating tongues and grooves at their edges, one of the sides of each tongue and the mating side of each groove being formed with longitudinal notches, and said panels, together with the tongues and grooves, being made of concrete material, and a metal rod inserted in said notches and designed to serve as a guide for the panels when they are being slid into position, and to make the panels easily slidable into position by avoiding friction between the concrete tongue on one side and the concrete groove on the other, and providing a friction bearing between a concrete member and a metal rod, said rod also forming a lock for the panels to prevent their separation transversely after they have been placed in position.

2. An improved sea wall construction, comprising a series of panels, said panels being provided with mating tongues and grooves at their edges, one of the sides of each tongue and the mating side of each groove being formed with longitudinal notches, and a rod inserted in said notches and designed to serve as a guide for the panels when they are being slid into position, and also to form a lock for the panels to prevent their separation transversely after they have been placed in position, said rods being formed with readily rustable material, whereby after a period of use the rods with their accumulated rust will form a water-tight seal.

Des Moines, Iowa, June 17, 1919.

RUFUS B. WILLARD.