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3,198,614

PILING CONSTRUCTION

Filed Feb. 26, 1962

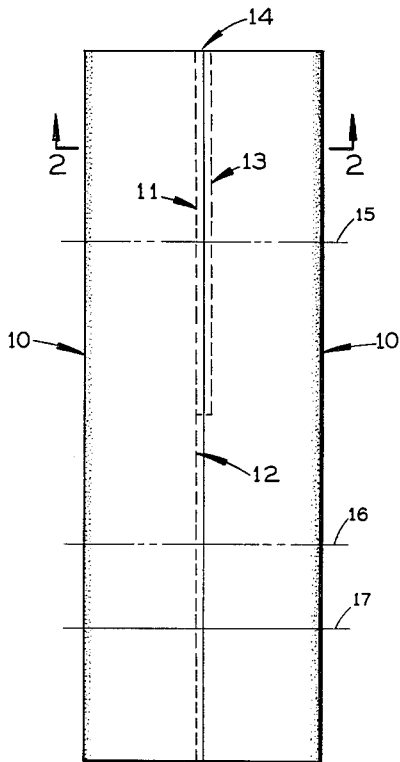


FIG. 1

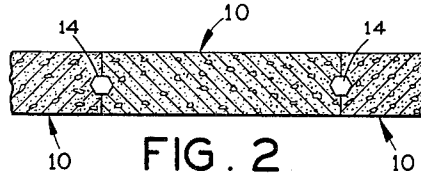


FIG. 2

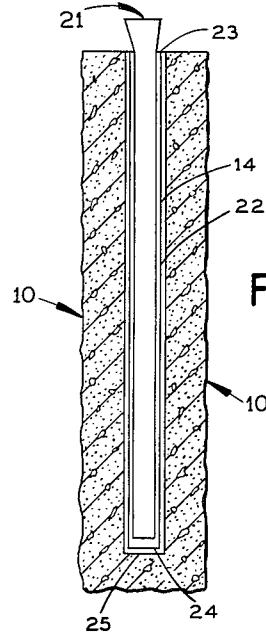


FIG. 3

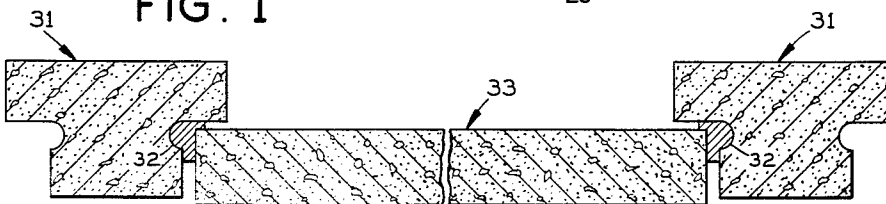


FIG. 4

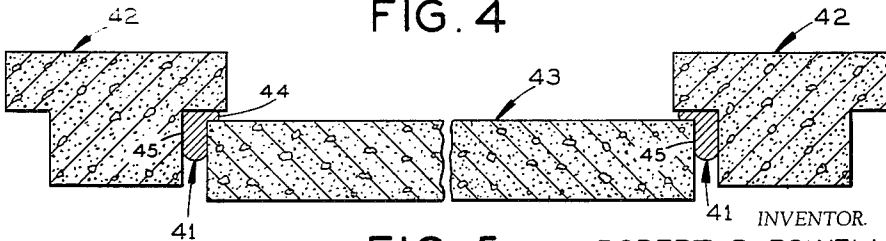


FIG. 5

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PILING CONSTRUCTION

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This invention is a continuation in part of application Serial No. 785,727, filed by me on January 8, 1959, and now abandoned. It relates to bulkhead or concrete sheet piling construction, in which bulkheads or pilings are sealed after driving or placement and before capping.

Conventional piles are usually constructed with matching channels or grooves into which grout is introduced to effect a lock or seal. An object of this invention is to provide a means for introducing the grout which will retain it within the channels without loss by outward seepage, and permit it to set without dilution by inward seepage of water, all without the extra labor entailed in locating and removing temporary forms to contain the grout.

The invention is equally adaptable to providing a locking engagement between T type piling and slab bulkheads.

Another object of my invention is to reduce the cost of sheet piling installations by the elimination of setup and removal of temporary forms during the grouting operation.

In the operation of locating piling and bulkheads, slight misadjustment between contiguous members is unavoidable, and thus small gaps or interstices regularly occur. A further object of my invention is to provide a low cost, rapid means of grouting these intersections between sheet piling, or T type and slab bulkheads.

A further object of my invention is the provision of means for effectively sealing the interstices or gaps between sheet piling or T type piling and slab bulkheads arising through the unavoidable variances or misadjustments during the operation of shutting heavy piles or slabs.

In the drawings, FIG. 1 shows a pair of piles in front elevation utilizing my invention. FIG. 2 is a sectional view of a set of piling taken along the lines 2—2 of FIG. 1. FIG. 3 shows the seam between adjacent piles, broken away, with my grout container and a grout tube in place, preliminary to the commencement of the grouting operation. FIG. 4 is a sectional plan view, partly broken away, showing my invention applied to T piling in combination with slab bulkheads. FIG. 5 is a sectional plan view, partly broken away, showing my invention applied to T piling without channels in the T's.

Referring now to FIG. 1, this form of my invention comprises a series of sheet piles 10, each pile having one side grooved at 11 and the other side with a tongue 12 in its lower portion and a complementary groove 13 in its upper portion, adapted to form, in abutment with an adjacent pile, a channel 14 having a depth of approximately one-half of the length of the pair of piles. It is this channel 14 which serves as the receptacle for the grout which is made a part of the combination in the manner presently to be described. A normal high water mark is indicated at 15, mean low water mark at 16 and bottom at 17.

Referring to FIG. 3, I utilize a grout tube 21 to deliver grout to a tube 22 in the channel 14 having an open end at 23 and a closed end at 24, at or near the bottom 25 of the channel 14. The tube 22 can be of any thin relatively impermeable material. As a practical matter in the field, I find it expedient to use extruded polyethylene tubular film of two to four thousandths of an inch in thickness and of a sufficient diameter to permit the grout to fill channel 14 when the operation is completed. In the field the tube can be cut to length from rolls, then bound at the

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bottom as by tying. The tube is then drawn over the grout tube to its full length, and then the tube 21 and tube 22 are inserted at the head of the channel 14 and moved downwardly within the channel to its bottom. Grout is then introduced by suitable conventional means into the grout tube to the extent that the channel and tube are filled with grout, after which the grout tube is withdrawn and the operation repeated in sequence through the length of the bulkhead or piling series.

Ordinarily, in the field, where the channels are of substantial size, say four or more inches in diameter, the insertion of the grout tube within the plastic tube is not necessary. All that is required for the practice of my invention is the preparation of the grout container by cutting and tying, as described, and then placement at the bottom of the envelope of one or more handfulls of semi-dry grout, the weight of which will distend the limp plastic tube which then can be lowered into the channel. The grout may then be introduced at the mouth of the plastic tube simply by use of such means as a funnel.

It will be observed that through the interposition of the impermeable tube, no water can diffuse into the grout to thin it, nor can any grout escape, and when the grout is set, a firm lock is provided between the adjacent piles without the performance of any further operations. This is of particular importance where the piling is set in water.

In the adaptation of my invention to slab bulkheads and T piling as shown in FIG. 4, in one form I provide a series of spaced T piles 31, with a pair of channels 32, to a suitable depth along the pile, which channels are defined when the slab 33 is placed in position. The limp plastic tube and grout tube are then located in the channels 32 and grout introduced through a grout tube, all as previously described.

In FIG. 5, a space 41 of suitable width is provided between the T's 42 and slab 43, to receive a tube 44 and grout 45. This construction is applicable where suitably channelled T's cannot be procured. While no interlocking is effected in this type of construction, adequate and permanent sealing is obviously attained.

Heretofore in describing my invention, I have referred to "grout" or a "grouting" operation. One of the great advantages of my invention is that where the channels 14 have a substantial diameter, say six inches or more, the use of grout may be dispensed with, and ordinary concrete substituted with substantial savings in cost. The tube 22 would be the same as if grout were employed, and the procedure described above without the grout tube would be followed, irrespective of whether or not a portion of the channel was submerged. Thus, where I refer to "grout" in the claims, it is to be understood that this term is used interchangeably with the term "concrete," and the term "grouting" with the placement of concrete.

It is obvious from this description of my invention that I have thereby achieved an efficacious and low cost method of sealing and interlocking piling with a minimum of field operations and a maximum of effective seal and interlock between adjacent piles, irrespective of the accuracy with which the piles were located. It is further obvious that my method is effective, whether or not the piling is partially submerged.

Having fully described my invention, I claim:

1. The method of providing a mechanical joint and water seal between adjacent concrete slab piles which have been driven into water-covered ground and which define between adjacent vertical edges thereof an open top vertical channel which extends from above the high

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water line to below the high water line, which comprises:
 positioning a weight in the bottom of a closed-bottom
 open-top limp tube of water impervious film plastic
 and of a transverse cross-section large enough, when
 distended, to bridge the channel from one pile edge 5
 to the other;
 feeding the lower end of the tube downwardly into said
 channel from the top thereof until the lower end of
 the tube lies below the high water line while main-
 taining the top of the tube above the high water line;
 and pouring grout into the open top of the tube 10
 until the tube is filled and distended with grout in
 contact against opposed edges of the channel and the
 channel is thereby bridged.
 2. The method as defined in claim 1, said weight being 15
 grout.

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