

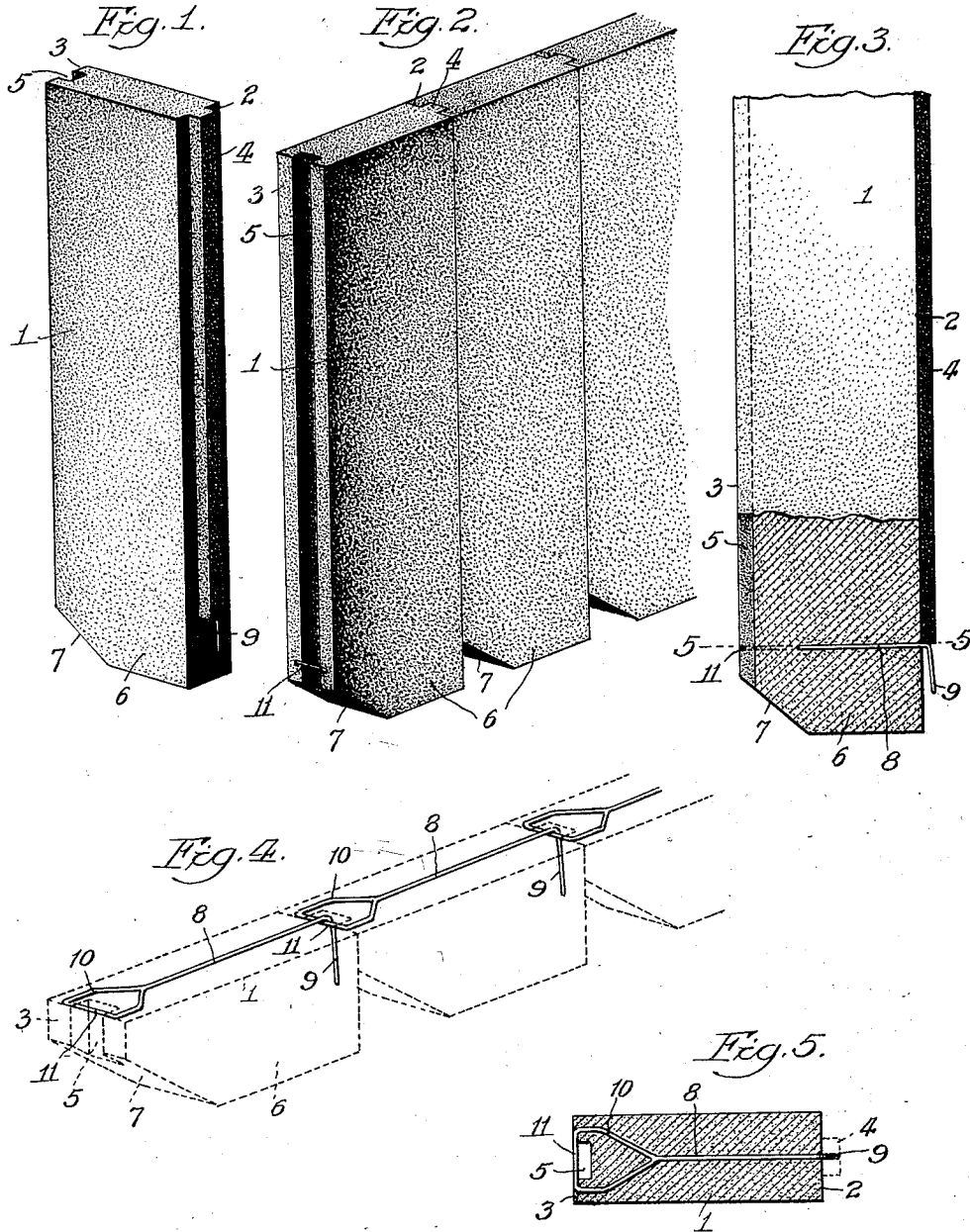
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PILING

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UNITED STATES PATENT OFFICE.

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PILING.

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The present invention relates to piling, such as sheet piling and the elements thereof.

Among the objects of the invention is to provide a novel piling structure and novel pile elements with means for aiding in the guiding of the elements when being driven and for holding the parts in alinement and from spreading, as at the bottom of the piling. The elements of sheet piling frequently separate from each other at the lower ends thereof thus weakening the barrier or diking effect of the piling and often permitting the leaking and breaking through of the water intended to be held back or dammed. The present invention, therefore, comprehends the provision of means, preferably at the lower part of the piling, as near the lower ends of the pile elements composing the piling, for holding the pile elements together and from spreading, as also to maintain them in alinement and preventing lateral displacement of any pile element relative to the others of the piling. It also comprehends the provision of such means with means for aiding in the guiding of the pile element when it is being driven in place and also for effecting a tightening and drawing action on the pile elements, preferably near and at the end of the driving operation of each element. Such a means is preferably located near the lower end of the pile element, as being imbedded in the pile element when the latter is of concrectionary material, the means acting as a reinforcing member. The ends of this member preferably extend to the joining edges of the pile member or element with the end portions of the member exposed or partly exposed and located for cooperation with the ends of adjacently located members of adjacent pile elements. In a specific form illustrative of the invention, the member has an eye at one end with a part of the eye exposed at the groove of the edge of the pile element and located to receive a hooked end of a member in the adjacent pile element, and the other end of the member is provided with a hooked end, which may be inclined to enter into an eye of a member in an adjacent pile element, and to effect a wedging action on said eye portion so as to draw the adjacent pile elements tightly together and also to hold them together.

Another object of the invention is to provide a sheet piling with the members in the

lower part thereof so connected together as to form a continuous linkage along the lower part of the piling whereby the elements of the piling will not spread or be separated at the lower ends thereof and also will not be displaced laterally from the adjacent pile elements.

Other advantages, capabilities, objects and features are comprehended by the invention as will later appear and are inherently possessed thereby.

Referring to the drawings, Fig. 1 is a perspective view of one of the pile elements.

Fig. 2 is a similar view of a series of elements arranged or forming a sheet of piling.

Fig. 3 is a part fragmentary and part sectional view and also partly in vertical elevation of one of the pile elements.

Fig. 4 is a perspective view of the tie members and the mode of linking the same together with a dotted line showing of the lower ends of the pile elements.

And, Fig. 5 is a horizontal sectional view of a pile element and showing a tie member in plan, the section being taken in a plane represented by line 5-5 in Fig. 3 of the drawings.

Referring now more in detail to the drawings, the embodiment selected to illustrate the invention is shown as comprising a pile element 1 which may be of any material, such as concrete or the like, and having lateral joining edges 2 and 3 of which the former may have a tongue 4 and the latter a groove 5, of such that the tongue 4 of one pile element may join or fit in with a groove 5 of an adjacent pile element. Each element is of elongated form and is provided at its lower end portion 6 with a tapered part 7 to aid in the driving of the pile in the soil.

Near the lower end of the pile is carried a tie member 8, which when the pile is of concrectionary material, is imbedded therein and is formed at one end with a protruding and downwardly bent and inclined hook portion 9, and at the other end thereof with an eye portion 10 having a part 11 thereof passing through the groove 5 to be exposed therein.

The tie element is located a short distance from the lower end of the pile element and has the hook portion extending beyond an edge 2 of the pile element and below the

lower end of the tongue portion 4, the latter being cut short as shown in Fig. 3 of the drawings.

In use and operation, the pile elements are driven successively with a successive element having its tongue 4 sliding and being guided in a groove 5 of a previously driven element. As the pile element nears or reaches its lower or finally driven position the inclined hook part 9 of the tie member will be received within the space of the eye and in the groove 5 behind the eye portion 11 and will engage with the latter so as to effect a clamping or wedging action so as to draw the adjacent pile elements together to hold the same tightly in position. Each succeeding pile will be driven in the same manner. In this way the series of pile elements will form a sheet of piling with the lower end thereof tied or connected together by the tie members so as to prevent any spreading or separating of the pile elements at the lower end thereof, and also the lateral displacement of any elements that might be possible from the spreading of the pile elements. The tie members will form a series of links forming a linkage or chain holding the lower part of the sheet piling in alinement, while at the same time reinforcing the same.

While I have herein described and upon the drawings illustrated an illustrative embodiment of the invention, it is to be understood that the invention is not limited thereto but may comprehend other constructions, arrangements of parts, details, and features without departing from the spirit thereof.

Having thus disclosed the invention, I claim:

1. Sheet piling comprising a series of pile elements having guiding means comprising a tongue and groove in each of said elements whereby an element may be driven adjacent to and in alinement with an adjacent driven element, and means to aid said guiding action, said latter means having an inclined member cooperating with an eye in the adjacent driven element to hold the adjacent elements together.

2. Sheet piling comprising a series of pile elements having joining means along the edge portions thereof, said joining means comprising a tongue and groove in each of said elements, each of said elements carrying a member having an inclined end portion cooperable with the eye member of an adjacent element for tightly drawing and holding the lower ends of said elements together.

3. A pile element of concretionary material and having edge portions adapted for joining with the edge portions of adjacent pile elements and for guiding the driving of said element, said joining and guiding means comprising a tongue and groove in

each of said elements, and a reinforcing member imbedded in said element and having an eye at one end thereof and a hook at the other end thereof, said eye and hook cooperating respectively with a hook and an eye of members in adjacent pile elements, said hook being inclined to effect a wedge action on the cooperating eye of the member of the adjacent pile element for tightly drawing and holding together said pile elements.

4. Sheet piling comprising a series of pile elements having joining means, said joining means comprising combined recesses and projections in said adjacent pile elements for providing tightly cooperating surfaces, each of said elements carrying a member having an inclined end portion cooperable with the eye member of an adjacent element for tightly drawing and holding the lower ends of said elements together.

5. A pile element having edge portions adapted for joining with the edge portions of adjacent pile elements, a reinforcing member imbedded in said elements and having an eye at one edge thereof and a hook at the other edge thereof, said eye and hook cooperating respectively with a hook and an eye of members in adjacent pile elements, said hook being inclined to effect a wedge action on the cooperating eye of the member of the adjacent pile element for tightly drawing and holding together said pile elements.

6. A pile element of concretionary material and having edge portions adapted for joining with the edge portions of adjacent pile elements and for guiding the driving of said elements, said joining and guiding means comprising a tongue and groove in each of said elements, and a reinforcing member in said element and having means for connection to the members of the adjacent pile elements, said means including an inclined member for cooperating with the eye member of an adjacent element for tightly drawing and holding the lower ends of said elements together.

7. Sheet piling comprising a series of pile elements having joining means along the edge portions thereof, each of said elements provided with a tongue and groove for engagement with the tongue and groove respectively of the adjacent elements, and a reinforcing member in said element and having an eye cooperable with the groove and a hook cooperable with the tongue of said element for effecting a wedging action of the cooperating eye of the member of the adjacent pile element for tightly drawing and holding together said pile elements.

In witness whereof, I hereunto subscribe my name to this specification.

MARSHALL HOWARD.