(No Model.)

E. M. BOYNTON.

JETTY, BREAKWATER, OR SIMILAR STRUCTURE.

No. 315,384. Patented Apr. 7, 1885.

Fig. 1.

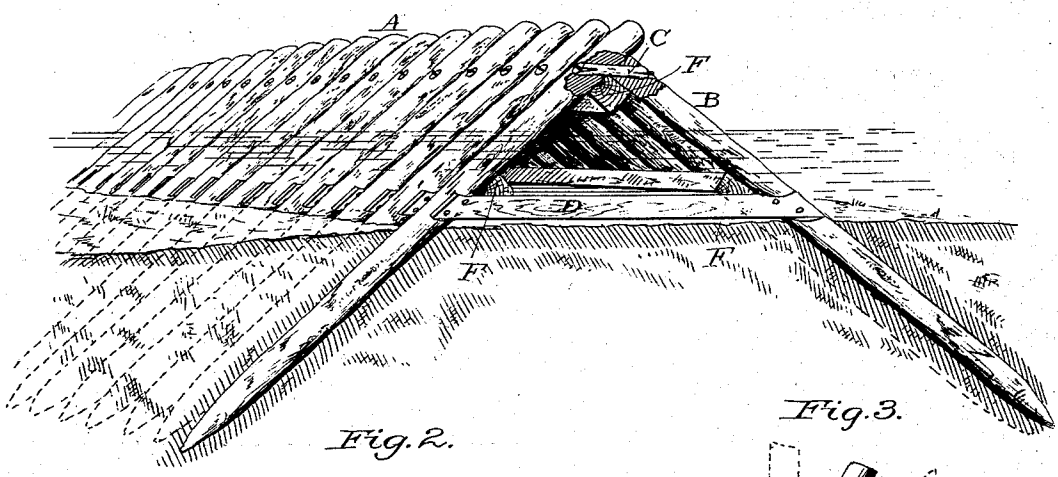


Fig. 2.

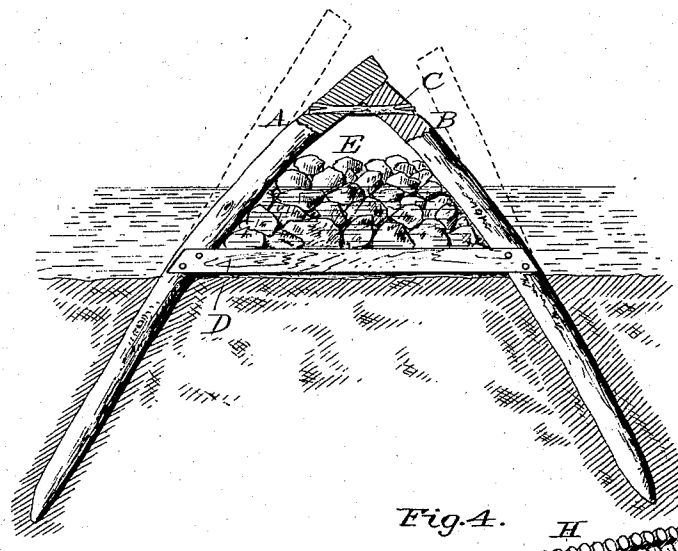


Fig. 3.

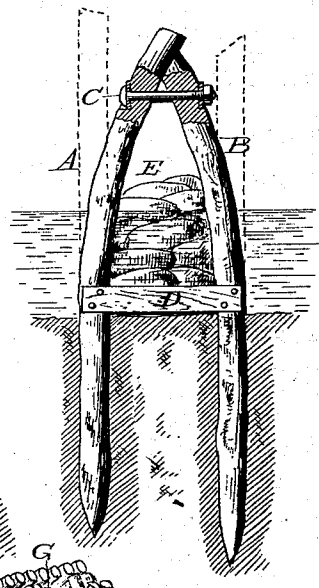
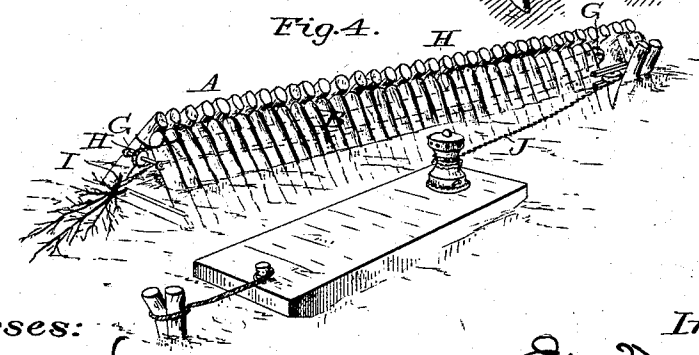


Fig. 4.



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UNITED STATES PATENT OFFICE.

EBEN MOODY BOYNTON, OF WEST NEWBURY, MASSACHUSETTS, ASSIGNOR TO J. B. WATKINS, OF LAWRENCE, KANSAS.

JETTY, BREAKWATER, OR SIMILAR STRUCTURE.

SPECIFICATION forming part of Letters Patent No. 315,384, dated April 7, 1885.

Application filed February 18, 1885. (No model.)

To all whom it may concern:

Be it known that I, EBEN MOODY BOYNTON, of West Newbury, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Jetties, Breakwaters, and similar Structures, of which the following is a specification.

My invention relates to the construction of jetties and breakwaters, and is designed to cheapen and simplify their construction, while greatly adding to their strength and power of resistance.

The leading feature of my construction consists in driving two sets of piles, the first inclining forward toward the advancing waves or water, and the second set inclining in the opposite direction from and supported by the first set, the inclination of the second or outer set being preferably less than the average slope or inclination of waves, the piles being held together by any suitable fastenings. By thus inclining the outer face of the structure the waves are deflected, their force is overcome without injury to or severe strain upon the structure, and their weight acts in such manner as to hold the structure down to place.

In the drawings, Figure 1 is a perspective view of a jetty or breakwater constructed in accordance with my invention; Figs. 2 and 3, views illustrating slight modifications of the construction; Fig. 4, a perspective view illustrating one mode of filling the interior of the structure.

Prior to my invention structures of this character have usually been made of stone or of willow mats, soil, and brush. It has also been proposed more recently to build a structure of this kind of planks three inches in thickness, but in point of strength and durability such planks are vastly inferior to the common wooden piles, and yet more expensive. The piles, being driven deep into the sand or mud, are not liable to displacement, and may be used without other foundation of any kind wherever such a structure is required, permitting ready adaptation to different depths, and utilizing the full strength of timbers at a cost considerably less than cribbing made of sawed lumber, which, if only a few inches in thickness, possesses little strength as compared with piles. As a consequence, the structure is not solely or even mainly dependent upon ballast to retain it in position, but may be used without ballast in most places.

The construction will be better understood upon referring to the drawings annexed.

A indicates the main or outer series of piles, driven at an inclination somewhat less than the average angle of the waves, and B the second or bracing series, arranged directly behind the first, and inclined in the reverse direction, to support the weight and withstand the force of the waves. The upper ends of the piles A B are brought together, and are firmly tied or united by a bolt, C, or by a strap, link, tree-nail, or any equivalent fastening, or by framing the ends of the piles together.

In many places the structure may consist simply of the two sets of piles A B, arranged as above explained; but where greater strength and rigidity are required, cross ties or braces D may be carried from one to the other series, and spiked or bolted to or framed into the piles at the bed, as shown in Fig. 1. These cross-ties, being carried from each pile of the front series, A, to the corresponding pile or brace in the second series, B, form a floor sufficiently close to support stones, sand-mats, or other suitable ballast, E, which will be employed where great solidity is required. Where river and harbor currents only are to be guarded against or resisted, it is usually sufficient to fill the interior of the structure with loose brush, the silt and mud finding its way through the space between piles, and gradually filling up the space in and around the brush, and being retained by the brush. The tops of the trees used as piles may be utilized for thus filling the interior, and a convenient way of hauling these tops or other brush into the interior space is illustrated in Fig. 4, blocks or pulleys G being secured, one at the outer end of the section to be filled and the other at the inner end thereof, both at or near the ridge of the section, and an endless chain, band, or rope, H, being passed about the pulleys, and provided with a hook or claw, I, to take hold of the brush. By driving the chain or band around the pulleys, which may be conveniently done by a

second chain or band, J, attached thereto, the claw or hook can be made to travel inward, carrying the brush with it. It is apparent that a single chain may be used, one end provided with the claw or hook, and the other end attached to the windlass or other hauling device, the single sheave or pulley at the inner end of the jetty-section being in such case employed. This filling of tree-tops requires no binding together or preparation of any kind; but is far cheaper and vastly more durable than mats or bound brush, and by the plan indicated may be placed in position with great ease and rapidity. After the section is filled, the pulleys or chains may be removed, and, when the next section is ready, the operation stated can be repeated, and so on throughout the work.

Stringers F may be employed beneath the ridge and along the angle formed by the meeting of the piles A B, and cross ties or brackets D, to still further brace, tie, and stiffen the structure; but these are not essential, and will be used only when a particularly firm structure is required.

In some places it is found impracticable or inconvenient to secure the required spread of the piles, and in such cases I drive them in a more nearly perpendicular position, as indicated by dotted lines, and then draw and fasten their upper ends together, as shown in full lines in said figure; or, if still less spread be desirable, the piles are driven vertically, as indicated by dotted lines in Fig. 3, and their upper ends are drawn and fastened together, as in full lines in said figure. With these modifications the cross-ties, stringers, and ballast may be used or omitted the same as with the first form.

The piles, being driven close together, form a barrier sufficient to stop the sand carried by the water, and as a consequence the sand is deposited upon the jetty or breakwater to or nearly to the high-water level, and thus prevents the passage of water through it, the sand gradually finding its way into the interior of the structure and filling the same, so that no ballast need be provided, except in very exposed situations where it is needed from the moment the jetty or breakwater is constructed.

A jetty or breakwater constructed in the manner above described is practically indestructible, cheap, and capable of being rapidly built.

I am aware of the patent granted to S. E. Hughes, bearing date May 11, 1880, and numbered 227,531, and I make no claim to anything therein contained. It is to said patent that allusions above made to crib-work and to sawed lumber relate.

Having thus described my invention, what I claim is—

1. A jetty or breakwater consisting of two series of unsawed tree piles, the first series driven with their upper ends inclined forward toward the approaching waves or water, and the second series inclined backward or in the opposite direction and resting upon the first series.

2. In combination with a series of unsawed piles, A, driven in an inclined position equal to or less than the average incline of heavy waves, a second series of similar piles, B, driven at an opposite inclination and serving to brace the first series, and fastenings C, uniting the upper ends of the piles A and B, substantially as shown and described.

3. In combination with unsawed piles A and B, inclined in opposite directions, fastenings C, uniting their upper ends, and cross ties or braces D, connecting the piles at a point near the water-bed line.

4. The herein-described structure, consisting of unsawed piles A B, inclined in opposite directions, fastenings C, cross-brackets D, and stringers F, all substantially as shown.

5. In combination with the structure consisting of unsawed piles A B, fastenings C, and cross-ties D, ballast E, placed upon said cross-ties, substantially as shown, and for the purpose explained.

6. A breakwater or jetty consisting of two series of piles driven with their lower ends separated, and having their upper ends sprung and drawn together and firmly united, substantially as shown and described.

7. A jetty or breakwater having its interior filled with tree-tops or unbound brush, substantially as shown and described.

8. In combination with a jetty or breakwater frame having an open interior, a sheave or pulley journaled in said frame, and a chain or band passing about said sheave and serving to draw tree-tops and brush into the same, substantially as and for the purpose set forth.

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