No. 807,987. PATENTED DEC. 19, 1905.

D. G. AMBLER.

TRAINING WALL.

APPLICATION FILED DEC. 17, 1904

2 SHEETS—SHEET 1.

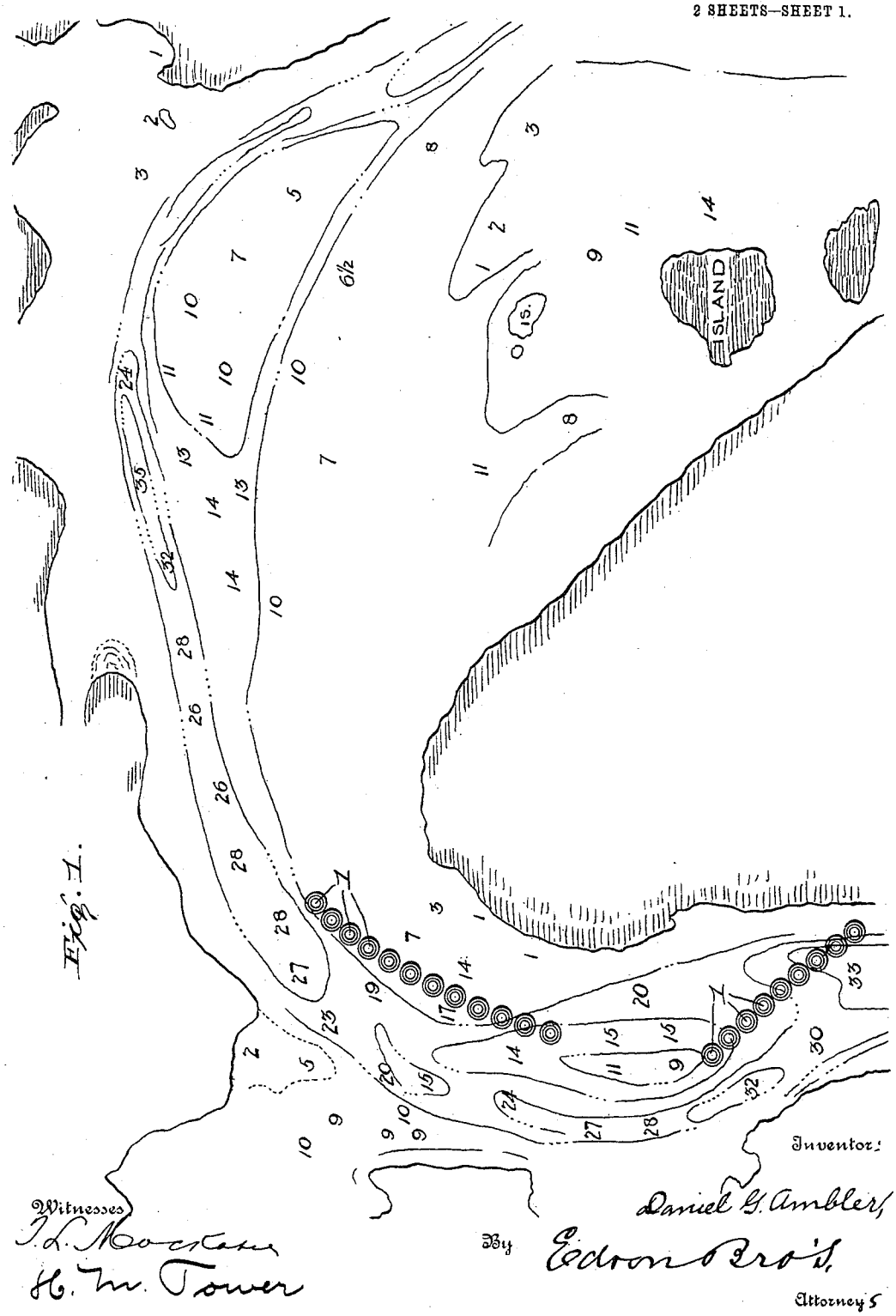


Fig. 1.

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2 SHEETS—SHEET 2.

Fig. 2.

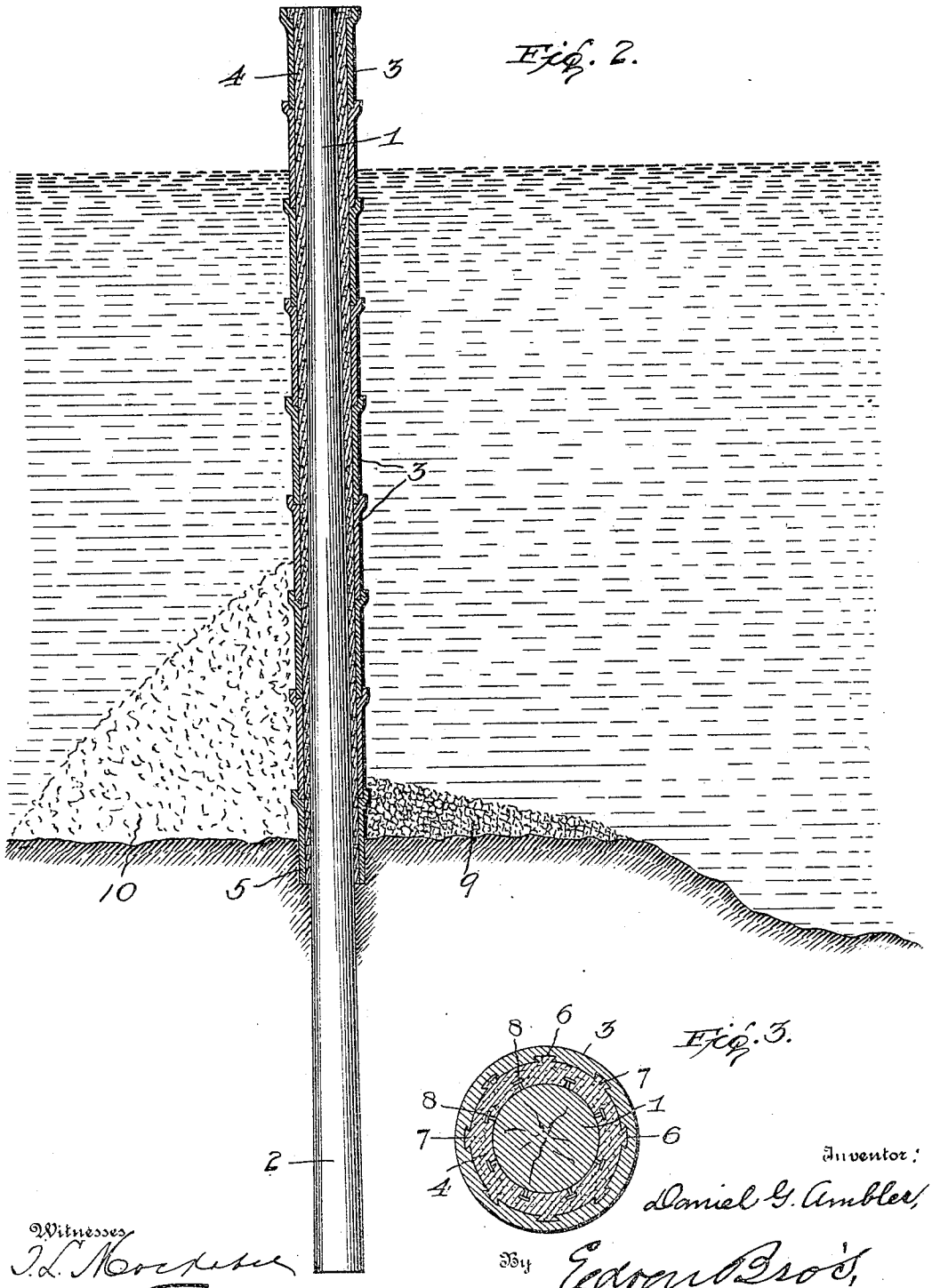


Fig. 3.

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UNITED STATES PATENT OFFICE.

DANIEL G. AMBLER, OF JACKSONVILLE, FLORIDA.

TRAINING-WALL.

No. 807,987. Specification of Letters Patent. Patented Dec. 19, 1905.

Application filed December 17, 1904. Serial No. 237,319.

To all whom it may concern:

Be it known that I, DANIEL G. AMBLER, a citizen of the United States, residing at Jacksonville, in the county of Duval and State of Florida, have invented certain new and useful Improvements in Training-Walls; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to the construction of training-walls to prevent a stream from spreading out at an estuary and retracting from the force of the current in the main channel.

The invention consists, broadly, in arranging a series of protected piles across a river in front of a shoal, as shown in Figure 1 of the drawings, where two such walls are illustrated to confine the current to the channel. The invention also consists in the peculiar construction of the piles and their protecting-covering.

In the accompanying drawings, illustrating the preferred embodiment of my invention, Fig. 1 is a diagram or plan view showing an example of a condition or form of stream or river where my training-wall is necessary, the numerals representing the depth of the water in feet. Fig. 2 is a central cvertial sectional view through one of the piles, its protecting-covering, and its surroundings; and Fig. 3 is a horizontal cross-sectional view through a pile with its protecting covering or armor.

While the preferred embodiment of my invention is fully shown in the accompanying drawings and its construction and operation are clearly described in this specification, the right is reserved to make such changes from the construction shown and described herein as the scope of the claims hereto appended will permit.

In carrying out my invention I drive, by pile-driver or steam-hammer, a series of, preferably, wooden piles, butt or larger end down, into the bed of the stream before a shoal, as shown in Fig. 1. Around each pile are placed interlocking pipe-sections, preferably tile "gutter-pipe," the lowest pipe-section being forced down into the mud for about two and one-half feet to provide for scour, which is bound to take place where the river is obstructed. I further provide against the scour of the current by filling in a quantity of broken stone on the main-channel side of the wall and a filling of shell on the other side. The shell-filling may extend up to or nearly up to the surface of the water and tends to brace and strengthen the wall.

The space between the piles and the pipe-sections is filled in with a suitable refractory material, preferably concrete, which when it hardens holds the two together. It has been found by experience, however, that whenever a raft or vessel comes in contact with a pile so protected the tile pipe being brittle may break off and, when exposed, the stone below it may break away also, leaving an opening to the wood of the pile itself, which opening, although not larger than the hand, will permit the teredo to very quickly destroy the pile, though it would give but little hold for the *Limnoria*. To provide against this peeling off of the tile piping or the concrete when it becomes cracked by any means such as described, I form the interior surface of the piping with dovetail-shaped grooves and drive headed nails or bolts into the pile. Then when the cement is poured in it will fill up the grooves and harden around the headed nails or bolts, whereby the cement and pipe are both held securely in place on the pile. The grooves in the pipe and the nails in the surface of the pile are preferably arranged alternately around the pile to prevent a break all the way through.

Referring more particularly to the drawings, 1 represents the wood piles, having their larger ends 2 driven into the bottom of the stream. The tile-sections are designated by 3, and 4 is the cement interlining or filling between the pile and pipe sections. The lowest pipe-sections extend into the mud, as at 5. The pipe-sections have integral longitudinal dovetail-shaped grooves 6, adapted to be filled in by similar-shaped projections 7 from the cement filling. The pile has headed pins, nails, or bolts 8, driven therein at intervals around its surface, and the projecting portions of said pins, nails, or bolts become embedded in the cement.

9 indicates the filling or covering of broken stone, placed on the bottom of the stream on the main-channel current, while the filling of shell on the other side of the wall is designated at 10.

It will be noted that the piles are placed as near to each other as possible to make a solid wall. The piles may be arranged in a straight

or curved line, as the nature of any particular place may require, and two or more rows may be used together to make a stronger wall, if necessary.

While I have shown and described my construction of protected pile as particularly adapted for use in constructing training-walls, it should be understood that it may also be used in the construction of docks, &c.

In some instances I prefer to have the tiling manufactured without a glazed inner surface in order to strengthen the union between the tiling and the cement or concrete.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A training-wall comprising a series of wooden piling having a covering of refractory material extending below the surface at the bottom of the stream, and a filling placed on the bottom against said piling to prevent scouring by the current.

2. A training-wall comprising a series of wooden piling covered by tile piping with concrete filling extending below the surface of the bottom of the stream, and a covering placed on the bottom against the piling, for the purpose specified.

3. The combination with a wooden pile, of a concrete covering for said pile, and projections arranged at intervals on the surface of said pile and terminating within the outer surface of the concrete.

4. The combination with a wooden pile, of a concrete covering for said pile, and headed projections arranged at intervals on the surface of said pile and terminating within the outer surface of the concrete.

5. The combination with a wooden pile having projections at intervals on its surface, a pipe arranged around said pile and a filling of concrete between said pile and pipe, said projections terminating within said concrete.

6. The combination with a wooden pile having projections at intervals on its surface, of pipe arranged around said pile, said pipe having interior depressions therein, and a filling of concrete between said pile and pipe.

7. The combination with a wooden pile, of a pipe arranged around said pile, said pipe having interior depressions therein, and a filling of concrete between said pile and pipe.

8. The combination with a wooden pile having headed projections arranged at intervals on its surface, of pipe arranged around said pile, and a filling of concrete between said pile and pipe, in which said projections are embedded.

9. The combination with a wooden pile, of pipe having dovetail-shaped depressions on its inner surface, and a filling of concrete between said pile and pipe.

10. The combination with a wooden pile, of pipe having dovetail-shaped grooves on its inner surface, and a filling of concrete between said pile and pipe.

11. The combination with a wooden pile having headed projections arranged at intervals on its surface, of pipe arranged around said pile, said pipe having dovetail-shaped depressions in its inner surface and a filling of concrete between said pile and pipe.

12. The combination with a wooden pile having headed projections arranged at intervals on its surface, of pipe arranged around said pile, said pipe having dovetail-shaped grooves in its inner surface and a filling of concrete between said pile and pipe.

13. The combination with a wooden pile having projections on its surface, of pipe arranged around said pile, said pipe having interior depressions therein, and a filling of concrete between said pile and pipe, said depressions in said pipe and projections from said pile arranged alternately around said pile.

14. The combination with a wooden pile having headed projections arranged at intervals on its surface, of pipe arranged around said pile, said pipe having dovetail-shaped depressions in its inner surface, and a filling of concrete between said pile and pipe, said projections from the pile and depressions in the pipe arranged alternately around said pile.

In testimony whereof I affix my signature in presence of two witnesses.

DANIEL G. AMBLER.

Witnesses:

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W. CLARENCE DUVALL.