(No Model.)

G. H. HENSHAW.

MEANS FOR CONTROLLING THE SHIFTING ACTION OF MOVING WATER ON LAND.

No. 419,121. Patented Jan. 7, 1890.

Fig: 1.

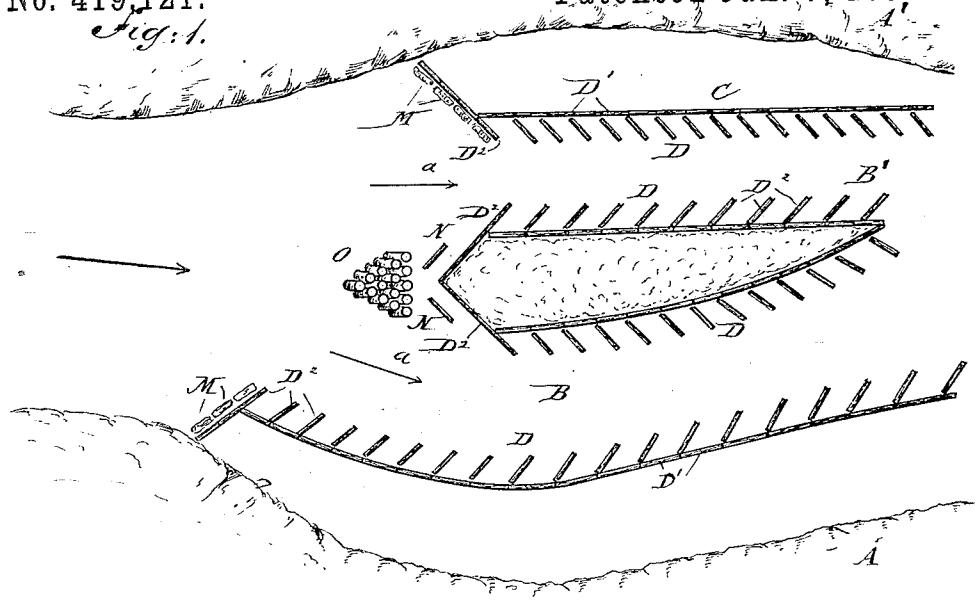


Fig: 2.

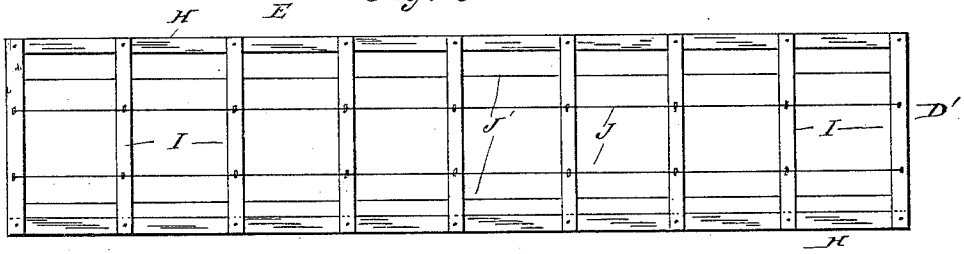


Fig: 3.

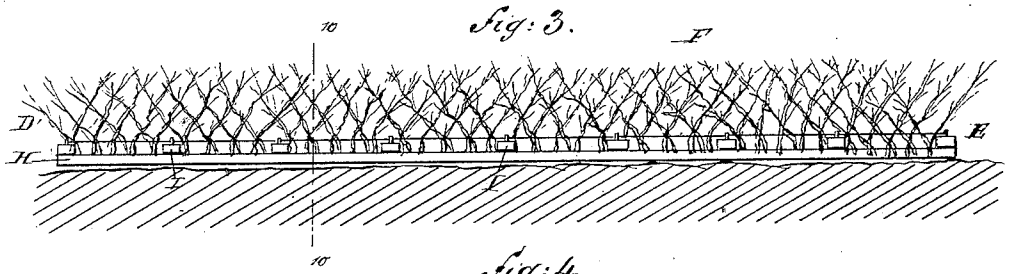


Fig: 4.

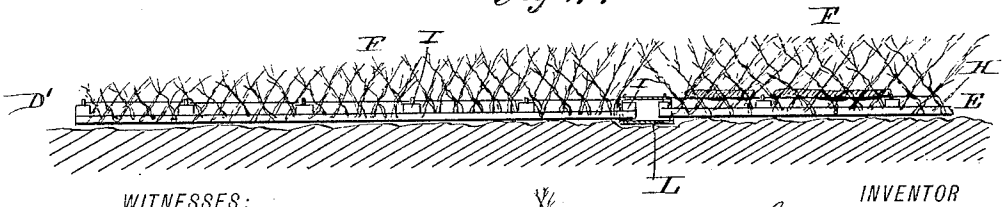
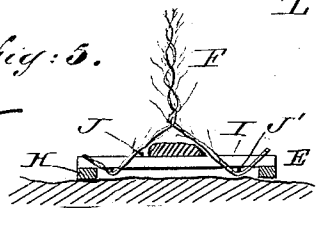


Fig: 5.



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GEORGE H. HENSHAW, OF BROOKLYN, NEW YORK.

MEANS FOR CONTROLLING THE SHIFTING ACTION OF MOVING WATER ON LAND.

SPECIFICATION forming part of Letters Patent No. 419,121, dated January 7, 1890.

Application filed October 22, 1888. Serial No. 288,806. (No model.)

To all whom it may concern:

Be it known that I, GEORGE H. HENSHAW, of Brooklyn, in the county of Kings and State of New York, have invented a new and useful Improvement in Means for Controlling the Shifting Action of Moving Water on Land, of which the following is a specification.

This invention is in the nature of a means for controlling the shifting action of running or turbulent water on land, by which river-channels may be formed and preserved, bars off the mouths of deltas removed and the channels through deltas deepened and preserved, sea-beaches repaired and protected from erosion, shifting shoals fixed, and estuary lands reclaimed. Heretofore it has been attempted to accomplish these results by obstructing the movement of the water outside the portion of land or bottom to be protected. Thus, in deepening river and delta channels, stone jetties, mattress-work, and other rigid and unyielding structures have been arranged along the sides of the channel with the intention of confining the current and causing it to scour out and deepen the channel. In some cases these obstructions have been made slightly permeable, with the hope of catching some of the matter suspended in the moving water, and thus preventing its deposition in other and undesirable places; but in every case the obstructions have been unyielding to resist the force of the water and compel it to take the required course. This rigid resistance develops an eddy-like reactive force, which is much greatest alongside the obstructions, and thus causes the rapid undermining of the obstructions and the formation of the channel so close thereto as to be dangerous to navigation, while no provision is made for the suspended matter, the greater part of which is carried along with the current and deposited in different places as the height of the water varies.

My improved means for controlling the action of the water so as to obtain the desired results consist, in general, of an artificially-constructed flexible and permeable submarine barrier anchored upon bottom outside the part to be protected, as hereinafter fully set forth.

To the end that my invention may be fully understood, I will first describe in detail the mode in which the same may be carried into effect, and then point out its distinctive features in the claim.

Reference is to be had to the accompanying drawings, forming part of the specification, in which—

Figure 1 is a diagrammatic plan view representing my improved means for controlling the shifting action of moving water applied to the preservation and deepening of two adjacent river-channels. Figs. 2, 3, 4, and 5 are detail views of devices, hereinafter referred to, forming part of said means.

Like letters of reference designate corresponding parts in the different figures.

A A′ designate the opposite banks of a river, and B B′ two natural channels therein to be preserved and deepened. To effect this I anchor submarine barriers D, formed, as shown in Figs. 2, 3, 4, and 5, of a rigidly-constructed base E and a flexible permeable fence F, attached to and rising from the base upon the bottom along opposite sides of each of the channels B B′ about in line with the direction of the current, as shown, the height of the barriers being made about one-third the depth of the water where they are anchored.

Each barrier D is by preference formed of a longitudinal body composed of a number of independent sections D′ of uniform height, as that illustrated in Figs. 2 and 3, and of a series of wings D^2, projecting outward from the body and inclined with the current, each wing D^2, as well as the downstream end section of the body, vanishing in height toward its outer end, according to the desired slope of the sides of the channel-bottom.

The base of each body-section D′ and wing-section D^2 is, as clearly shown in Figs. 2, 3, 4, and 5, formed of longitudinal wooden stringers H, rigidly connected by wooden cross-beams I, and along the top and bottom of the latter are strung inner and outer pairs, respectively, of stout wire J J′, with which are securely entwined willows or other light straight brush, the upper parts of which are interlaced diagonally, so as to form the permeable and flexible net-work fence F lengthwise of the base.

The bases of the several sections D′ D^2 are

joined together by flexible ties L, Fig. 4, so that the base E of the whole barrier can conform to the general shape of the bottom.

It is preferred to anchor the barriers D on bottom by placing slabs of clay upon the base, as indicated in Figs. 3, 4, and 5.

The wings D^2 at the upper ends of the shore-barriers D are shown in Fig. 1 continued to the shore and protected from undermining by mattress-work M at the foot, while the inclined wings D^2 at the heads of the mid-stream barriers D are shown continued to a meeting and protected from undermining by separate barrier-wings N, arranged in front of them, and by a rigid cut-water O, formed of piles, one of which may be elevated above water to serve as a buoy, and which are driven in front of the barrier-wings N.

The winged permeable and flexible barriers D effectually serve the purpose of checking the current flowing thereover by offering a diffused resistance, which is re-enforced naturally by the deposit produced and retained by the permeable barriers, and as there is no obstruction there is no reaction to disturb the deposit.

If the deepening of the channel produced by one set of barriers is not sufficient when such barriers have been silted up, other sets of barriers may be then placed directly above the first to continue the process until the desired depth is attained.

In applying this means to fixing shifting shoals, preserving sea-beaches, reclaiming estuary lands, and the like, the same general arrangement of anchored flexible and permeable submarine barriers is employed, modified according to the various conditions met with.

I am aware that it has been attempted heretofore to improve water-ways by placing permeable dams of brush and of separate trees and clumps of brush anchored to the bottom at the sides of the water-way, so as to divert or contract the channel through the accumulation of sediment in and around the permeable dams; but, owing to the irregular structure and partial resistance to the current of these brush dams and the oscillation of the dams made up of the separate trees or clumps, the erosion is irregular, variable, and usually destructive.

I claim as new and desire to secure by Letters Patent—

In means for protecting land against water erosion, an upright flexible reticulated fence of regular structure rigidly secured along its foot to a frame-work as a base anchored upon, so as to cover, the land or bottom to be fixed, substantially as described.

GEORGE H. HENSHAW.

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