No. 618,319. Patented Jan. 24, 1899.

W. L. AVERILL.

MEANS FOR PRODUCING SAND BEACHES.

(Application filed May 13, 1898.)

(No Model.) 2 Sheets—Sheet 1.

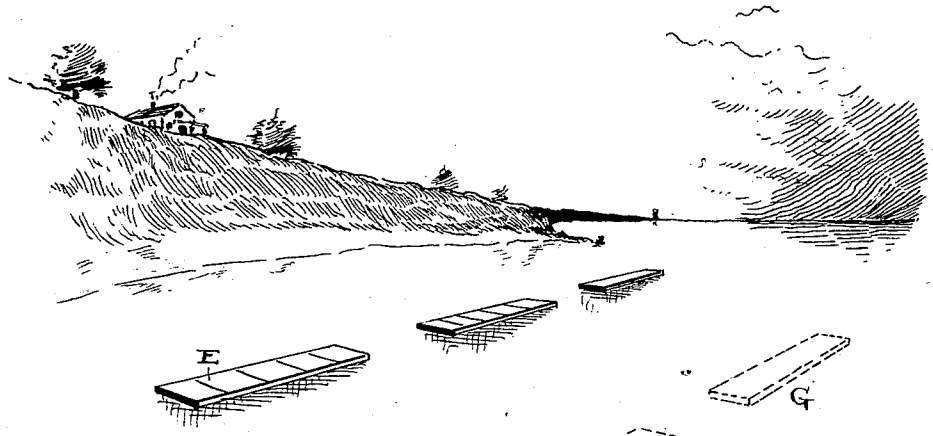


Fig. 1.

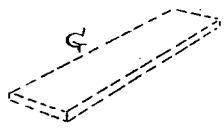


Fig. 2.

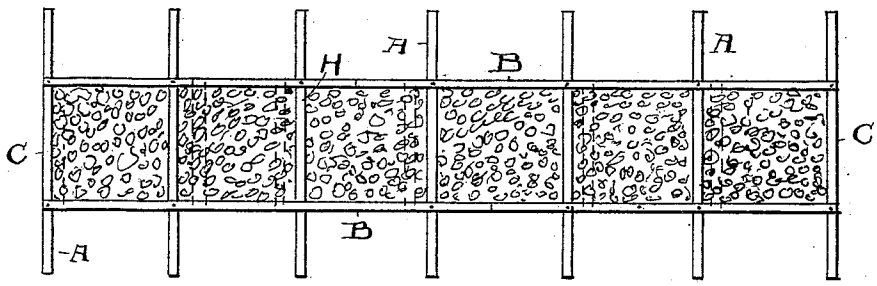
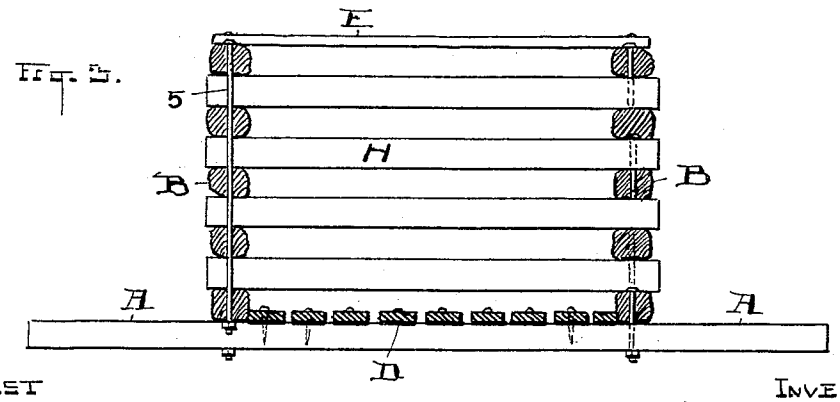


Fig. 3.



ATTEST

P. B. Moser

H. E. Mudra.

INVENTOR

William L. Averill

By W. V. Fisher ATTY

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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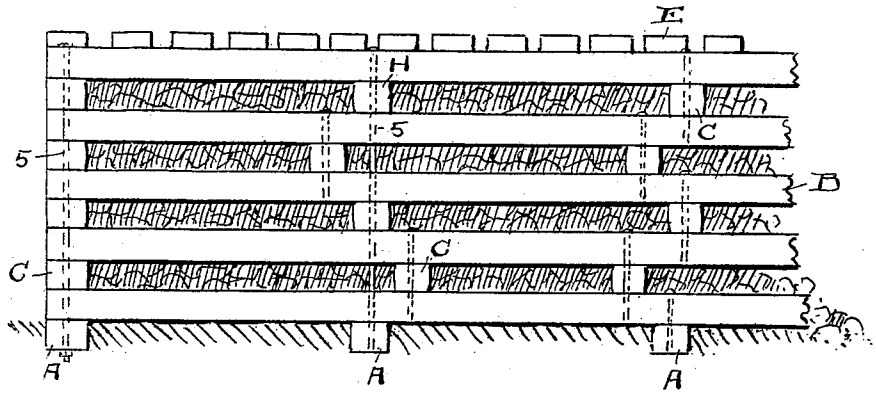
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Fig. 4.



Attest
H. E. Mustra.

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UNITED STATES PATENT OFFICE.

WILLIAM L. AVERILL, OF PAINESVILLE, OHIO.

MEANS FOR PRODUCING SAND BEACHES.

SPECIFICATION forming part of Letters Patent No. 618,319, dated January 24, 1899.

Application filed May 13, 1898. Serial No. 680,601. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM L. AVERILL, a citizen of the United States, residing at Painesville, in the county of Lake and State of Ohio, have invented certain new and useful Improvements in Methods of and Means for Producing Sand Beaches; and I do declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to a method of and means for producing sand beaches along the shores of lakes, oceans, rivers, bayous, and the like and wherever by reason of waves or tides or flowing waters there is movement of sand. Usually beaches are formed from the sands of the shores behind them rather than from sand borne along or washed up by the waters and deposited, and yet it does occur that beaches are developed as deposits from running streams and in eddies where a gradual settlement of sand may occur as it is borne thither from storm-waves and floods or the like. However, the preservation of beaches that already exist or their development from embankments along shore where there are sand deposits affords probably the simplest illustration of my invention, and the drawings and description, therefore, are especially prepared with these conditions in view.

It is well known to all who are familiar with lake and ocean beaches that they are very uncertain and are constantly shifting. Neither is there any natural guarantee of the continuance of a beach at any given place for any definite time, even though such beach has been known for years and survived many shore changes. Though this be true, it has been known to totally disappear for miles in a single season. Neither is there any guarantee in a heavy sand-formed shore or embankment that a beach will result therefrom or remain if it has been formed. Indeed, it frequently occurs that such beaches, which seem to be necessarily permanent because of the sand behind them, are among the first to disappear, and not only this, but the embankments themselves melt away and disappear with alarming rapidity and frequently with great and irreparable loss of real and improved property. So true is this universally along our coasts that many fortunes have been spent, and generally in vain, to stem the ravages of the rolling sea and preserve what must otherwise become a total loss. A not uncommon expedient for this has been a wall of piles, driven sometimes directly at the foot of the embankment, where it might serve as a breakwater and to prevent the outwashing of the sand; but this method, besides being too expensive for anything like extended use, is insufficient, because it does not really accomplish what it is intended to, not even if what is known as "sheet-piling" be used. The reason is obvious. Probably there is nothing more searching and uncontrollable known than the surging waters which roll up against a coast, especially in stormy weather. The wall of pile is designed to confine the sand behind it as well as to stop the waves; but the fact is that neither result follows, and especially is it impossible to prevent the constant suction and draining away of the sand until in a comparatively short time the shore-line is gone and the sand too, and the piles remain alone to show their failure. The trouble with this and all kindred defenses is that they are designed to act on the defense principle—to preserve what exists. This is the exact reverse of the principle upon which my invention proceeds and directly contrary to what I believe to be the only true principle of operation and which alone offers a practical solution of the beach and shore making and protecting problem. Instead of working to preserve the bank or beach that is against the ravages of the water I employ the water to create or build. If I have an embankment which I wish to preserve and have no defenses, I plan to make the water build a defense which will both preserve the bank and provide a beach, which is always desirable. If I want a beach with or without a bank of sand behind, I again employ the water to build and preserve it; and since the water in one case is so refractory and destructive in the other case it is equally constructive and subservient when brought under control by my novel method of beach formation.

The invention therefore consists in the

means for making beaches, substantially as shown and described, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a combined marine and land view, showing my improved beach-builders in sections in the water a short distance from shore. Fig. 2 is a plan view of one of the said beach-builders, and Fig. 3 is an end sectional elevation thereof. Fig. 4 is a side elevation, partly in section, of one of the cribs and showing the zigzag arrangement of the cross-rails.

In the building of a beach by my method I depend on the moving sand, which is always found shifting about in more or less abundance as it is carried by the water from place to place. My idea is to intercept this sand from whatsoever place it may have come last, whether along shore or from the outer embankments, and cause it to deposit where I want it to build up a beach. To this end my plan is to place one or more of my beach-builders in one or more lines at the right place for such building action and then leave the work to be done wholly by the water. The "beach-builders," so called, are exceedingly simple and cheap structures, which renders them available to persons of limited means, and they possess the additional advantage of being preferably erected in the winter on the ice over where they are to remain, so that otherwise idle labor can be employed and the ice used to get the material together and do the work. When the ice melts, the structure simply drops into the water where it is wanted and the work is done.

Now, referring to Figs. 2 and 3, the construction of the sand-builders is shown as being built up, many of logs or rough timbers, comprising in this instance a series of sleepers A—say nine feet long—and on these the frame or superstructure is erected. This frame comprises a series of side pieces B and a series of cross-pieces C, one built upon the other without any regard to nicety and designed to form a crib-like structure which is more or less open between said pieces B and C. The frame thus built up is firmly bolted together where the parts cross each other, and both threaded and drift bolts are used for this purpose. The cross-pieces are used every five to eight feet apart, and five feet is wide enough for the frame, though it may be wider, or even some narrower, especially in the lighter waters. Where the sea is heavy, a heavier structure is desirable. I do not care to particularize too specifically about bolting or arranging the cross-pieces C, as there may be much discretion used in this respect and keep within my invention, and any strong putting together of the frame will suffice. In the bottom I place a floor D, of plank, and then I fill the crib with rocks or stones, as may be convenient, and cover it over with plank or boards E on top, if the stones or rocks require it, to prevent washing out. Otherwise no cover is required. The rocks or stones may be of varying sizes, and by reason of the width of the structure there is compactness and closeness enough to prevent action upon the sand in either direction through the same. Hence no sand that may come behind the structure is drawn through, as in the case of piles, and it is left there to build up by natural accumulation, and in this instance, more or less by washings from the bank at the rear. It follows that as soon as a sand-builder of this kind is placed in position—say fifty or a hundred feet, more or less, from the shore-line and in water, say, three or four feet deep or in that neighborhood—sand drifting and building will immediately begin behind it and continue until the space is filled. Then I may take another position in advance, a hundred feet or more, if I desire, with another builder—one or more—as seen in dotted lines at G, or I may sink both lines of builders at the same time. Usually, for convenience of construction, each separate builder is, say, forty feet in length, and I may place each one separate with an interval to the next one of, say, thirty feet, more or less, or I can place two or more builders together, end to end, and then have a space sometimes of a hundred feet or more to the next, and so on. Much latitude is allowed in these dispositions, and in any case judgment needs to be exercised as to what is best. Of course the object is to keep behind the builders all the sand practically that comes there, and the intervening or open space between cribs or builders must not be such as to allow washing outward to occur at these points. After a time all the builders may become built over with sand, and they remain there and hold that which they accumulated. In this way an extensive beach can be formed and preserved, and of course as this occurs there is also permanent and sure protection to the embankment at the rear. If the builders were not erected on ice, they would not need the long projections of the sleepers A at either side, as these projections are designed to keep them upright when the ice melts away, and they might be overturned or tilted to one side were they not prevented by these projections. It will be noticed that by this method of forming a beach I need not make the sand-builder continuous, but can have long interruptions between the sections thereof—as long, indeed, or even longer than a section, if preferred—that is, if I use, say, sections a hundred feet in length I can skip a hundred to a hundred and fifty feet between them and get good results. It will therefore be seen that I am not troubled with the movement of water to and fro in the space behind the builder and, in fact, use such movement with an open way through the same to do the work. Usually the builder or crib is of a height to stand out from the water more or less; but in time it gets built over with sand, especially when the advance wall G is doing its ultimate work.

For convenience in erecting the builders, as well as to give them the requisite strength to withstand heavy seas, I subdivide them by short cross-pieces H at intervals, thus forming compartments, which are filled with stone or any like heavy material which will keep the builder submerged and in stationary position. These cross-pieces are, however, not necessarily one directly over the other, but are staggered, so as to allow drift-bolting into the next longitudinal side piece below without striking a lower bolt. Finally, to knit all the structure together I generally run several long tie-rods 5 through each side from top to bottom. This done and the builder being finished and standing on the ice where it is to rest, it is filled with stone and left to take care of itself when the ice melts away. Obviously, however, the builders may be erected and located at any time when there is no ice by launching from a boat, but then it is likewise loaded and sunk.

What I claim is—

1. A series of sand-building cribs to form beaches, consisting of cribs spaced apart to leave waterways between their ends, said cribs each formed with a series of subdivisions having open-work walls and bottoms, and stone filling said subdivisions to hold the cribs down in the water, and each crib having projections on its base along both sides to prevent tilting, substantially as described.

2. A sand-building crib for water-washed shores, consisting of a series of bottom timbers projecting at each side beyond the side walls of the crib such distance as to prevent the crib from tilting and upsetting when it settles to position, a series of walled compartments constituting said crib having fixed bottoms and zigzag dividing-walls, and bolts fastening the walls together at their corners, substantially as described.

3. The means herein described to promote beach-building along bodies of water by the action of the water, consisting of a series of weighted cribs placed in the water substantially parallel with the shore-line and at such distance from the shore as will promote sand-drifting on the shore side of said cribs, the said cribs being separated at their ends sufficiently to afford a free flow for tide-water or the like back and forth in said spaces, substantially as described.

Witness my hand to the foregoing specification this 7th day of May, 1898.

WILLIAM L. AVERILL.

Witnesses:
H. T. FISHER,
R. B. MOSER.