(No Model.)

W. S. BATES.

BREAKWATER.

No. 346,140. Patented July 27, 1886.

Fig. 1.

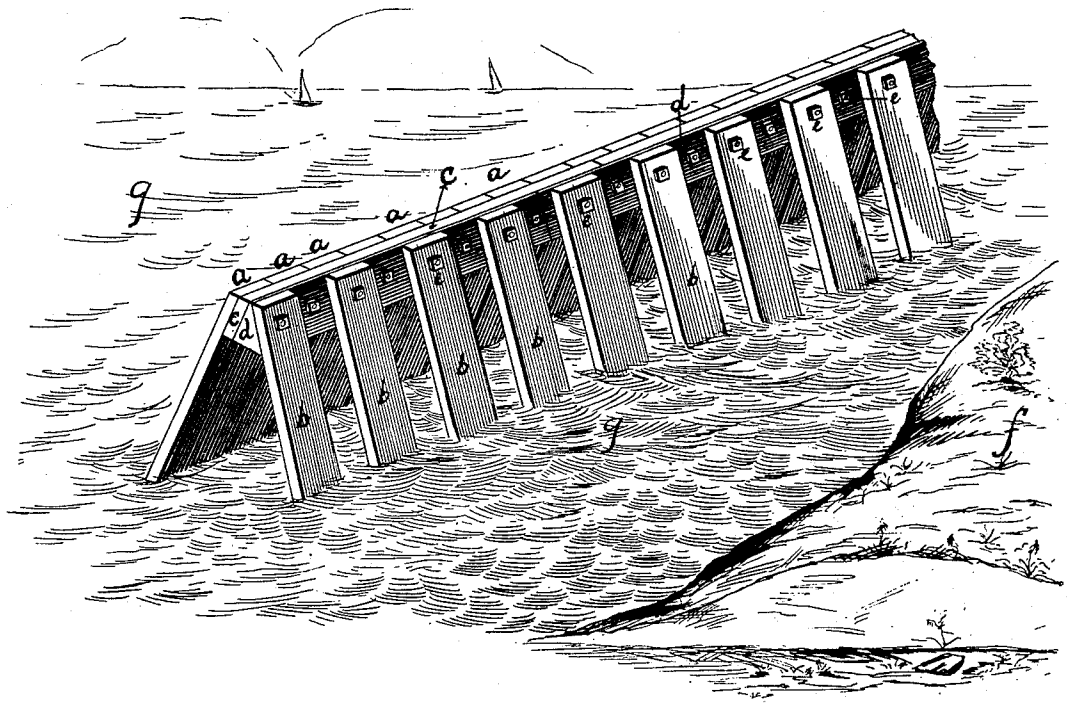
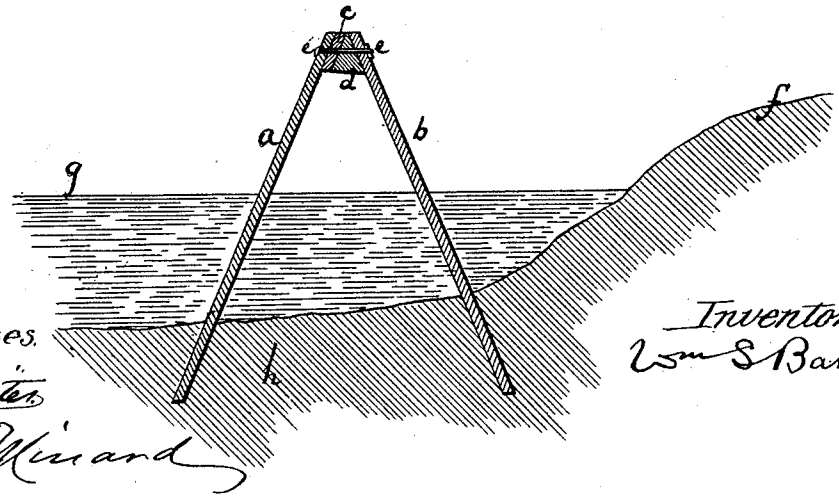


Fig. 2.



Witnesses.
W. Coster
W. C. Minard

Inventor.
Wm S Bates

N. PETERS, Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

WILLIAM S. BATES, OF CHICAGO, ILLINOIS.

BREAKWATER.

SPECIFICATION forming part of Letters Patent No. 346,140, dated July 27, 1886.

Application filed November 27, 1885. Serial No. 184,068. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM S. BATES, of Chicago, Illinois, have invented certain new and useful Improvements in Breakwaters, of which the following is a specification.

Prior to my invention breakwaters have been constructed in the form of boxes or cribs filled with stone, or they have been constructed of rows of piles, the spaces between the rows being filled with stone, and in some cases they have been built after the manner of docks of planks supported by piles. Such breakwaters are expensive to construct, and in the case of stone filling are often expensive to maintain, especially in sandy soils, where the motion of the water loosens the sand and the stones sink, so that refilling is necessary, and in the case of cribs and boxes, the cutting out of the sand causes them to twist and settle in some parts more than others, so that they become very unsightly, and have to be built up and repaired at great expense.

By my invention I produce a breakwater whose first cost is comparatively low, and which is complete in itself, and requires no stone or other filling. This I do by setting planks or timbers firmly in the ground in two rows after the manner of sheet piling, and securing the tops of the rows together, so that the structure is of substantially triangular form in section. Where the breakwater is exposed to waves of any force, it is expedient to have the planks or timbers of the front row set close together, to prevent washing out of the shore behind, and sloped back or inclined, especially in sandy or light gravelly bottoms, as the falling back of the water tends to dig out the ground in front, and in case of vertical or overhanging walls, this digging out frequently extends to great depths. Ordinarily the planks or timbers of the back row may be set at some distance apart.

In the breakwater which I have actually constructed I employ three-inch planks set on a slope of one in three, those of the front row set close together and those of the back row from one to two feet apart in the clear. At the top between the rows, I placed a stringer composed of two pieces put together, so as to break joint. One piece was an ordinary two-inch plank, and the other a triangular piece cut to fit between the two rows of sheeting. The planks were twelve feet long, and the breakwater was placed in about three inches depth of water, with its crest about four feet above the ordinary water-level. The tops of the planks were secured by bolts.

This breakwater contains my invention in the best form in which I have as yet embodied it.

In the drawings annexed hereto I have illustrated this breakwater.

In the drawings, Figure 1 is a perspective view of the breakwater as it appears from the shore, and Fig. 2 is a sectional view.

a a are the planks of the front row; *b b*, the planks of the back row. *c* and *d* are the stringer; *e e*, the bolts extending through the planks and the stringer. *f* is the shore; *g*, the water; *h*, the bottom of the body of the water. The stringer-pieces *c d* are placed so as to break joints, as clearly shown in Fig. 1.

Having thus described and illustrated my invention, what I claim is—

1. The breakwater composed of two rows of planks or timbers secured together at the tops with a stringer between them, those of the front row being close together and sloping backward from the sea, and those of the back row having spaces between them, and the lower ends of the planks or timbers being set in the ground, substantially as described.

2. The combination of the planks *a*, the planks *b*, the stringer *c d*, and the bolts *e*, substantially as described.

WM. S. BATES.

Attest:

ROBT. H. MCMURDY,

ANDREW PAULSON.