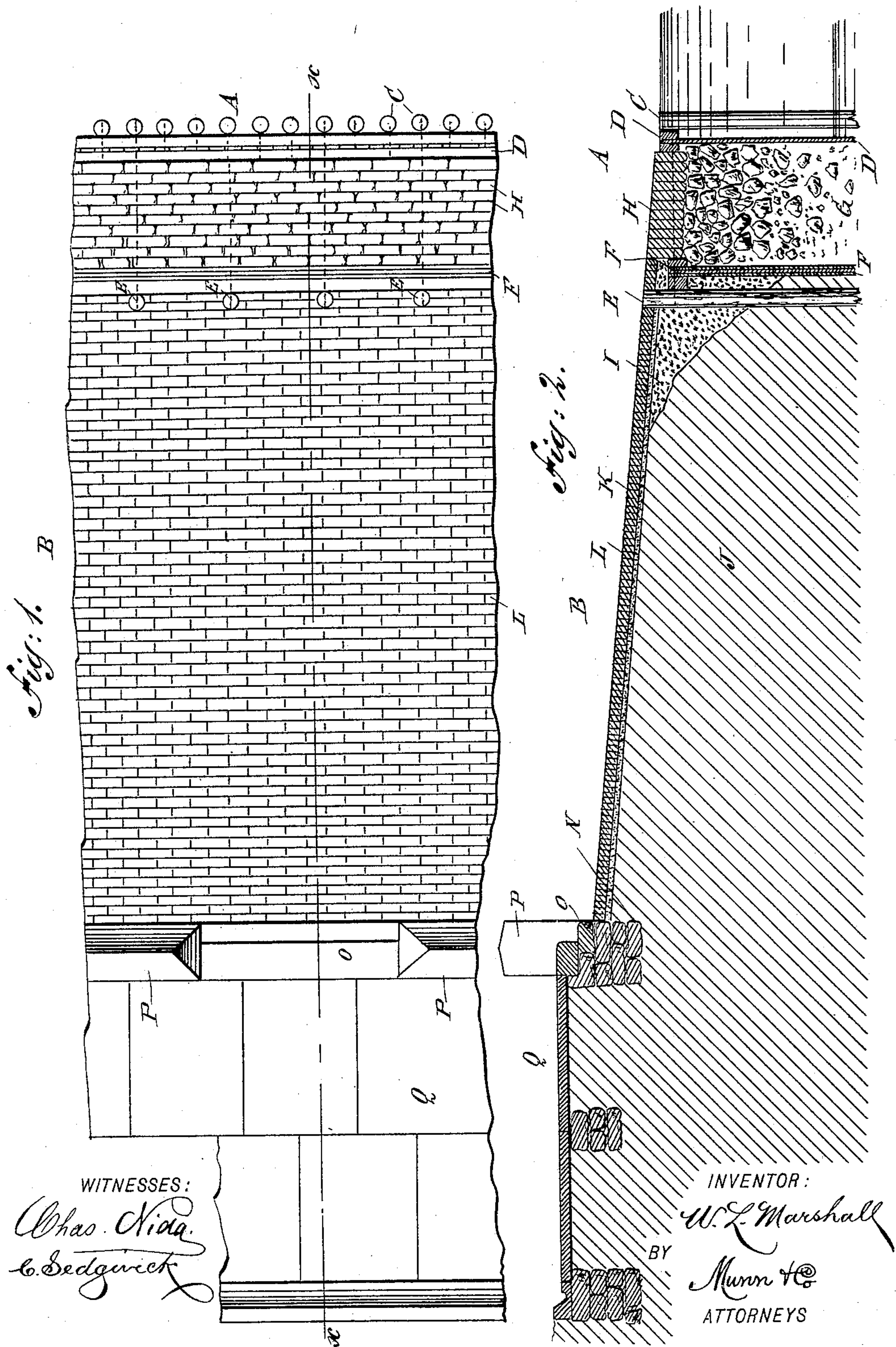


(No Model.)

W. L. MARSHALL.
COMBINED BREAKWATER AND BEACH.

No. 452,229.

Patented May 12, 1891.



UNITED STATES PATENT OFFICE.

WILLIAM L. MARSHALL, OF CHICAGO, ILLINOIS.

COMBINED BREAKWATER AND BEACH.

SPECIFICATION forming part of Letters Patent No. 452,229, dated May 12, 1891.

Application filed January 2, 1891. Serial No. 376,458. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM L. MARSHALL, of Chicago, in the county of Cook and State of Illinois, have invented a new and Improved
5 Combined Breakwater and Beach, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved combined breakwater and
10 beach designed to form a sand-tight shore, beach, or bank protection against the waters of lakes, rivers, &c., at the same time forming an ornamental paved beach or approach to the water.

15 The invention consists of a water-tight paved beach adjacent to and connected with the breakwater at the innermost row of piles and sheet piles and formed by stone paving-blocks laid in hydraulic cement, concrete, or
20 formed entirely of artificial stone made of hydraulic cement as a principal ingredient.

The invention also consists of certain parts and details and combinations of the same, as will be hereinafter fully described, and then
25 pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in both the figures.

30 Figure 1 is a plan view of the improvement, and Fig. 2 is a transverse section of the same on the line *xx* of Fig. 1.

The improvement consists, principally, of a breakwater A and a paved beach B. The
35 breakwater A is provided with a row of outside piles C, on the inside of which is secured by suitable means sheet piles D, extending a suitable depth and made of single boards or otherwise, as desired. A second row of piles
40 E is arranged parallel to the first row of piles C and at a suitable distance inland, the said second row supporting on the outside sheet piles F, extending parallel to the sheet piling E and to a suitable depth. This sheet piling
45 F may be made of tongued and grooved boards or of several layers of boards breaking joints, as shown in the drawings, so as to make the sheet piling water-tight.

50 The space formed between the two sheet pilings D and F is filled in with stone, packed with smaller stones, pebbles, or gravel, so as to form a more or less sand-tight wall. On

the top of the stone G are arranged in regular order paving-blocks H, extending above the sheet pilings D and F and preferably in line
55 with the angle of the top surface of the beach B. Next to the upper part of the sheet piling F and on the inside thereof is arranged concrete I, resting on the natural soil J of the beach B and extending a suitable depth be-
60 low the water-level of the lake, river, &c. This concrete base extends under the entire width of the beach, forming the foundation of the beach. On top of this concrete I is
65 laid in cement, mortar, or other material K paving-blocks L, having their joints filled with suitable material to make the same impervious to water. In the rear of the beach B is arranged a stop-wall N, as is plainly illus-
70 trated in Fig. 2, and extending below the pavement of the beach B. On this wall N may be arranged steps O or a parapet P of suitable size and serving to break or limit the water washing over the beach B to protect the pave-
75 ment or sidewalk Q, arranged on the inside of the wall N and the steps O and parapet P.

The stop-wall N, steps O, and parapet P prevent water which washes over the beach B from undermining the latter from the rear.

The beach B may be paved entirely with
80 concrete, or with concrete and stone blocks, if desired; but whatever material is used it must be impervious to flowing water.

A beach and breakwater combined in this manner will effectually protect the shore or
85 bank of a river or lake, at the same time forming an ornamental beach wholly impervious to water and arranged to prevent underwashing at the rear of the beach.

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

1. A breakwater and beach consisting in the sand-tight breakwater, a sand and water tight paving or flooring covering said break-
95 water and extending inward the desired width of the beach, and a concrete backing behind the breakwater under the flooring or paving, substantially as set forth.

2. A breakwater and beach consisting in
100 the sand-tight breakwater, a concrete base therefor extending inward from the rear side of the breakwater the desired width of the beach, and a paving or flooring laid on said

concrete and top of the breakwater, substantially as set forth.

3. In a combined breakwater and beach, the combination, with the sand-tight breakwater
5 comprising two rows of piles, sheet piles attached to the said rows of piles, and a filling between the said sheet piles, of a sand-tight beach forming a continuation of the said breakwater and comprising a concrete foundation placed around the innermost row of
10 piles and against the inside of the innermost sheet piling, and a pavement laid in cement placed on top of the said concrete, substantially as shown and described.

15 4. In a combined sand-tight breakwater and beach, the combination, with a breakwater, substantially as described, of a sand-tight paved beach forming a continuation of the said breakwater, and a stop-wall at the inner
20 end of the said beach and extending below the same, substantially as shown and described.

5. In a combined breakwater and beach, the combination, with a sand-tight breakwater, substantially as described, of a sand-tight
25 paved beach forming a continuation of the said breakwater, a stop-wall at the inner end of the said beach and extending below the

same, and steps and a parapet on the said stop-wall, substantially as shown and described.

6. In a breakwater, the combination, with 30 an outermost row of piles and sheet piling secured to the inside thereof, an innermost row of piles, a tongued and grooved sheet piling secured to the inside of the said innermost row of piles, and a stone filling placed in the
35 space between the said two sheet pilings, of a paved beach extending across the top of the breakwater and inward the desired distance therefrom, substantially as shown and described.

7. In a breakwater, the combination, with 40 an outermost row of piles and sheet piling secured to the inside thereof, of an innermost row of piles, a tongued and grooved sheet piling secured to the inside of the said inner-
45 most row of piles, a broken-stone or gravel filling placed in the space between the said two sheet pilings, and paving-stones set on the top of the said stone filling, substantially as shown and described.

WILLIAM L. MARSHALL.

Witnesses:

S. FORD,

LE Y. SIKES.