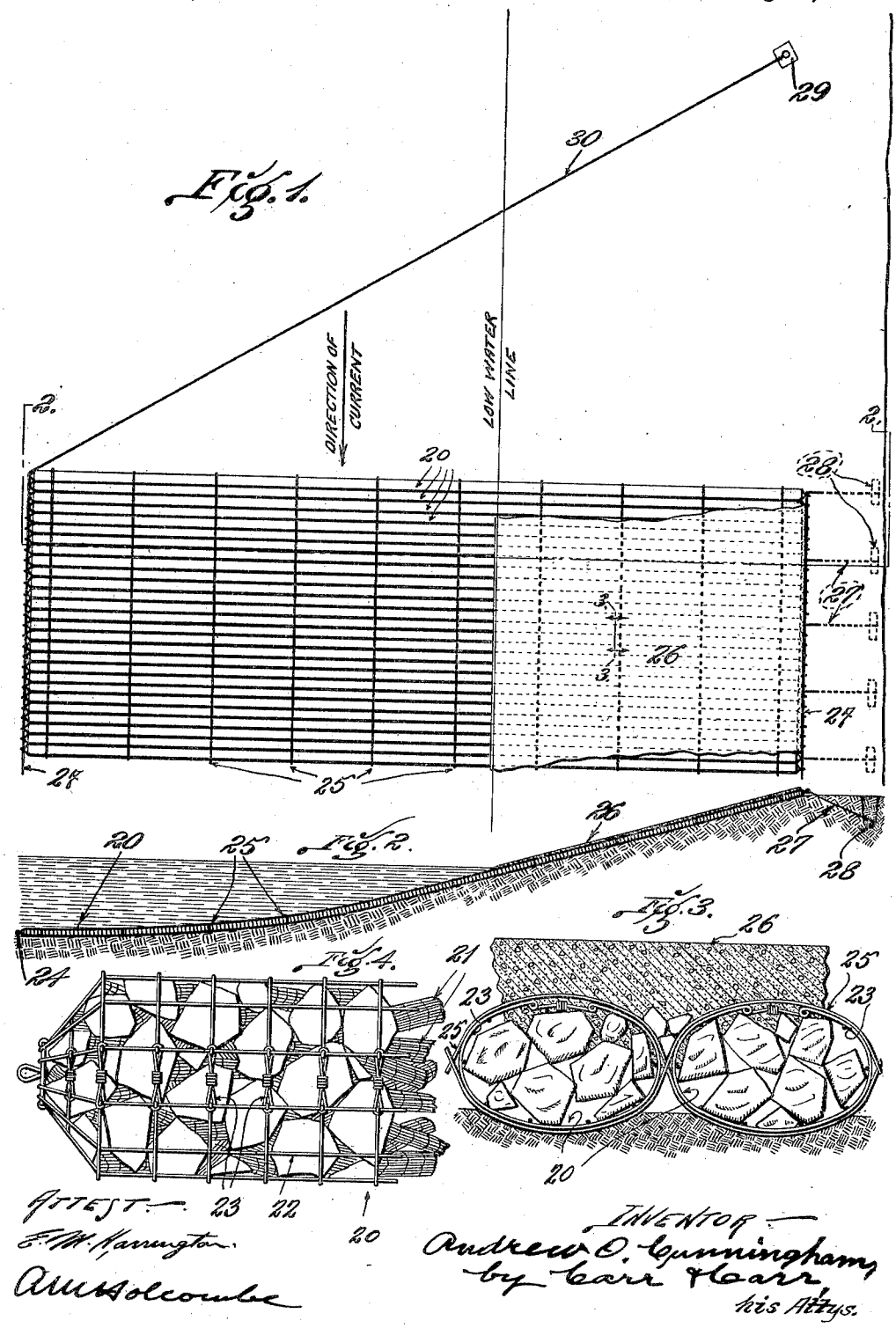
A. O. CUNNINGHAM.

PROTECTING SHORES.

APPLICATION FILED JAN. 17, 1916.

1,275,859.

Patented Aug. 13, 1918.



ATTEST:—

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UNITED STATES PATENT OFFICE.

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PROTECTING SHORES.

1,275,859. Specification of Letters Patent. Patented Aug. 13, 1918.

Application filed January 17, 1916. Serial No. 72,415.

To all whom it may concern:

Be it known that I, ANDREW O. CUNNINGHAM, a citizen of the United States, and a resident of St. Louis county, Missouri, have invented a new and useful Improvement in Protecting Shores, of which the following is a specification.

This invention relates particularly to protecting the banks and bottoms of rivers and other bodies of water from being scoured and undermined by the current, but it is applicable to any shores which need protection from currents or wave action. The invention consists in a flexible mattress of long sleepers or pillows of brush and stones wrapped in a web of metal or other material and laid side by side and laced or lashed together. Where laid upon the bank, the exposed portion of the mattress is covered with a layer of concrete.

The invention also consists in the character, shape and arrangement in the finished structure of the materials whereby they may be readily assembled and placed in the river, and in the method of placing the mattress in the river.

Further objects and details of the invention appear in connection with the following description of the mattress shown in the accompanying drawings, and manner of making and placing it in the river; and what is claimed as the invention appears in the appended claims.

In the drawings, wherein the same reference characters designate like parts in the several views,

Figure 1 is a plan of the upstream edge portion of a mattress embodying the invention, showing it in place on a river bank;

Fig. 2 is a vertical cross-section of the same on the line 2—2 in Fig. 1;

Fig. 3 is an enlarged vertical cross-section of a portion of the shore edge of the mattress, on the line 3—3 in Fig. 1; and

Fig. 4 is a plan view, drawn to the same scale as Fig. 3, of the end portion of a sleeper or pillow ready for placing in the river.

The mattress consists of a series of long sausage-like sleepers or pillows 20 of rock and brush 21 wrapped in webbing of metal or other material, and arranged at right angles to the shore line, extending from the top of the bank out into the stream as far as protection is desired. The webbing 22 for each pillow is in the form of a long strip, the edges of which may be tied together to inclose the filling by means of ties 23, or they may be laced in any other suitable manner. The inner and outer ends of the pillows are closed, and are connected together by cables 24. The pillows are loosely connected to each other at intervals along their length by means of cables 25 which are laced over and under them from the upstream to the downstream edge of the mattress. The pillows may also be laced together by other means.

The shore ends of the pillows are filled with loose rock only, and are covered with a layer of concrete 26, which permeates the interstices of the rock in the pillows and embeds the webbing on their upper sides.

The cable 24 along the upper edge of the mattress is anchored to the top of the bank by means of short cables 27 attached to dead men 28 embedded in the bank, or by other suitable means; and the outer end of the upstream pillow is secured to an anchorage 29 on the shore at a point some distance upstream by means of a cable 30.

The pillows 20 are made one at a time on the upstream side of a barge or barges anchored over the proposed location of the mattress. A strip of webbing is laid down the bank and across the deck of the barge, threading between the two branches of the cables 25. Next, the brush and rock are spread on the webbing and wrapped into it, and the edges of the strip are tied or laced together. As each pillow is made the two branches of each of the respective cables 25 are given a single twist, or half turn, to cause them to thread over and under adjacent pillows in the completed mattress, as shown in Fig. 3. As the work of making the pillows progresses, the barge or barges are dropped down stream and the finished part of the mattress is allowed to slide off the deck and over the side into the water, into place on the bottom. The completed portion of the mattress is guided into place on the bottom by means of the cables 25, the upper ends of which are wound on spools which are secured on the decks of the barges. The upper ends of the pillows, in that part of the mattress above low water, are built in place.

The materials in the pillows are easily handled, and the form of the pillows is such that they may be laid in deep and swiftly running water to form the mattress, which

will accommodate itself to any bottom as it is laid in place. Moreover, the completed mattress is very flexible, and will accommodate itself to changes in the bottom produced by rapid scour or gradual erosion. Its weight causes it to hug the bottom, and its toe will drop into any holes caused by scour as they are formed and thus prevent undermining the whole mattress. The form of the pillows lends itself to the accumulation of sediment and the formation of bars.

Where the character of the bank is suitable, the rock in the pillows may be omitted in the portions covered by concrete, the webbing being embedded in the concrete to form a reinforced concrete bank protection to which the portion of the mattress in the water is integrally united.

The invention is not restricted to the precise details of construction and arrangement described above, nor to any particular method of laying the mattress.

I claim the following as my invention:

1. A sectional mattress for shore protection comprising a flexible portion below water and a rigid portion extending above water, each section of said flexible portion consisting of loose material inclosed in a strip of webbing with its edges secured together, and said rigid portion consisting of webbing connected to the webbing in the flexible portion and covered with concrete.

2. A sectional mattress for shore protection comprising loose material inclosed in webbing, the webbing extending up on the bank above low water and anchored to the bank at its upper edge, the portion of said mattress above low water being covered with concrete to protect the webbing from corrosion, rot and wear above low water.

3. A sectional mattress for shore protection comprising strips of webbing extending crosswise of the stream down the bank into the water, brush and stones inclosed in said strips of webbing below low water, and stones inclosed in said strips of webbing above low water, adjacent strips of webbing being loosely tied together at intervals below low water.

4. A sectional mattress for shore protection comprising strips of webbing, brush and stones inclosed in said webbing below low water, and stones inclosed in said webbing above low water, the webbing above low water being covered with concrete placed over and between the inclosed stones.

5. A mattress for shore protection comprising sections extending transversely of the bank, each of said sections comprising a stuffing of loose materials inclosed in a strip of webbing with its edges secured together, said sections being connected by strands woven alternately over and under them crosswise of their length, the portions of said sections above low water being covered with concrete placed over and between the inclosed materials, and said sections being anchored to the bank at their shore ends.

6. The process of protecting the bank and bed of a stream which comprises placing strips of webbing along the bank, transversely thereto, extending down the bank and onto a barge, wrapping said strips of webbing around brush and stones, securing the edges of each strip together to form a pillow, loosely securing the pillows as formed together at intervals, lowering said pillows from the barge onto the bed and covering the portions of the pillows above the low water line with concrete.

7. The process of protecting the bank and bed of a stream which comprises placing strips of webbing along the bank, transversely thereto, extending down the bank and onto a barge, wrapping said strips of webbing around brush and stones, securing the edges of each strip together to form a pillow, loosely securing the pillows as formed together by weaving strands alternately over and under them, lowering said pillows from the barge into water, guiding them into position on the bottom by means of the free ends of said strands and covering the portions of the pillows above the low water line with concrete.

Signed at St. Louis, Missouri, this 15th day of January, 1916.

ANDREW O. CUNNINGHAM.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."