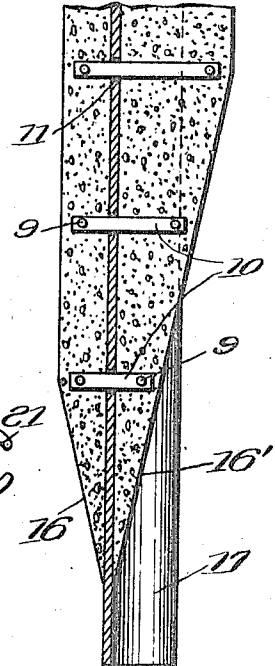
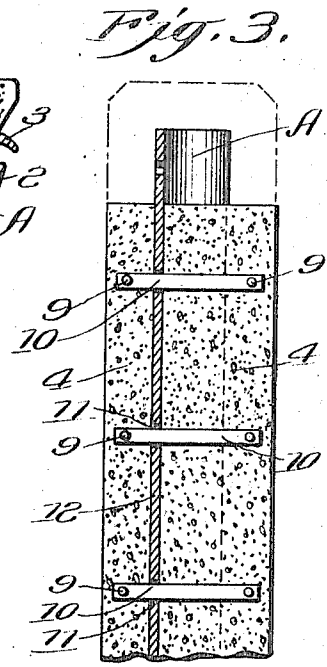
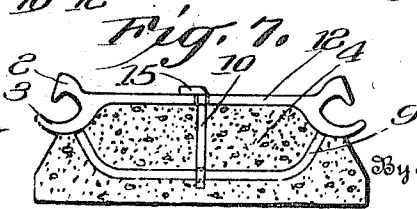
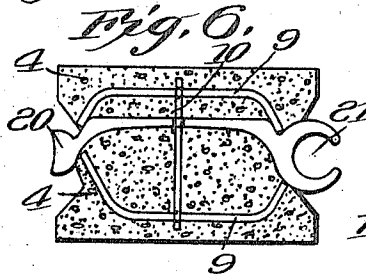
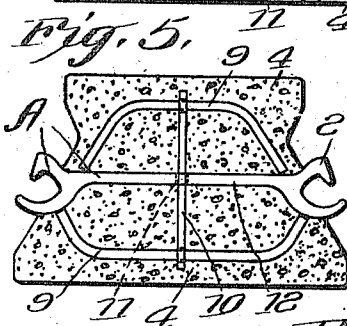
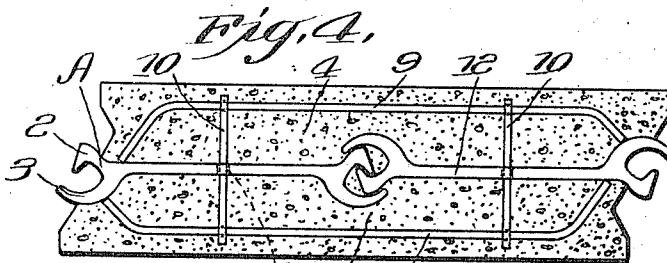
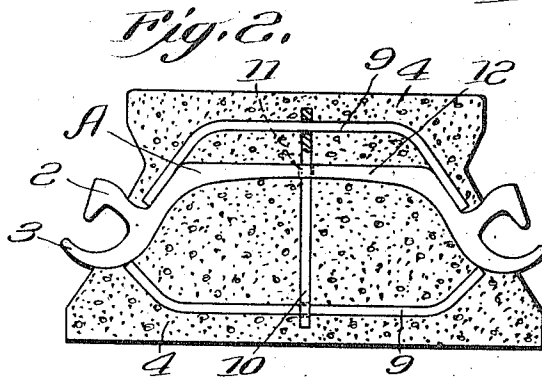
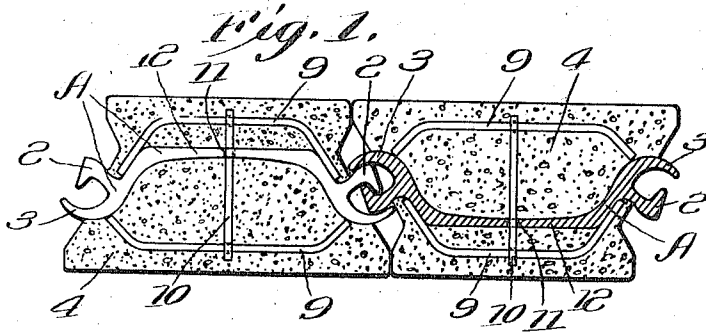


C. C. CONKLING.
 PROTECTED PILING.
 APPLICATION FILED NOV. 15, 1911.

1,063,185.

Patented June 3, 1913



Witnesses:
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UNITED STATES PATENT OFFICE.

CLOUD CLIFFORD CONKLING, OF BUFFALO, NEW YORK, ASSIGNOR TO LACKAWANNA STEEL COMPANY, OF LACKAWANNA, NEW YORK, A CORPORATION OF NEW YORK.

PROTECTED PILING.

1,062,185.

Specification of Letters Patent.

Patented June 3, 1913.

Application filed November 15, 1911. Serial No. 660,411.

To all whom it may concern:

Be it known that I, CLOUD CLIFFORD CONKLING, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented new and useful Improvements in Protected Piling, of which the following is a specification.

My present invention relates to the well known protected piling for permanent work, 10 having an interlocking steel sheet piling core covered and protected by a permanent concrete facing, and consists of a particular means, adapted to particular forms of piling, for binding such concrete facing to the steel. Heretofore by Patent No. 969,343 15 issued September 6, 1910, I have broadly protected such piling and the concrete binding means, comprising any suitable projections on the section webs, and consisting desirably of rods connected to the sections by any suitable means. Since the time of said patent I have invented an improved form of steel sheet piling, called the arched-web piling, whereby the modulus and moment of 20 resistance of the section are greatly increased. In a broad sense, protecting concrete may be secured on arched sections by the same means as that of said patent, but the particular form of binding means there 30 illustrated, that is integral ribs, could not conveniently be used with the arched shape. I have therefore devised for arched piling the special form of binding projections here shown and described. This form consists 35 of tie-rods, or wires, similar to those of my said patent, but these are held in position by tie-bars, structurally different from said integral ribs, but functionally similar.

My invention is illustrated in the drawing 40 herewith in connection with various forms of pile sections.

The reference numerals of this description indicate the same parts in all the figures.

Figures 1 and 2 are cross-sections showing my invention applied respectively to two 45 assembled arched sections and to a single larger section. Fig. 3 is a longitudinal section. Figs. 4 and 5 show my invention applied to straight web Lackawanna sections; 50 Fig. 6, to a U. S. section, made in arched form. Fig. 7 shows a modification for binding the concrete to one side only of the steel section.

Referring first to Figs. 1, 2 and 3, A indicates the steel sections, or cores, of Lacka-

wanna type having on the edges the interlocking members 2 and 3, sometimes called the thumb and finger. 4 is the protecting covering, or coating, of concrete, which may be applied by any desirable means, but must 60 be securely locked to the steel core. Such locking, or binding, means here consists of tie-rods, or heavy wires, 9, arranged substantially as shown and connected to the steel cores by means of tie-bars 10, arranged 65 to extend through holes 11, in the section web 12 and engaged on each side by the tie-rods. These tie-bars correspond to the non-continuous ribs specified in my said patent.

When the concrete is to be applied, the 70 pile is inserted in a wooden form with removable top and bottom, the tie-bars are set in place from the open top of the form and the tie-rods inserted on the upper side, through the hole in the end of each tie-bar. 75 The ends of the rods are bent inwardly to engage with the steel core, thus giving a spring hold, and said tie-bars and tie-rods are thus held in position while the concrete is being applied on the upper face of the 80 pile. Of course in this securing means there must be two tie-rods, one on each side, for each tie-bar, for the two oppose each other to hold the tie-bar in place. Therefore, after the rods and the concrete are in position 85 on one side the form and the inclosed pile are turned over and the same process repeated on the other side of the pile, which is now uppermost. As the tie-rods are resilient, they adjust themselves and the tie-bar to slight variations in arrangement and 90 form of the parts. When the concrete is applied in the form, the tie-rods and tie-bars are embedded therein and held against movement in any direction, and they react 95 securely to bind the concrete to the steel. As shown in Fig. 3, these tie-bars may be of various lengths for instance shortened, and the tie-rods correspondingly formed, toward the lower end so that the concrete may be 100 beveled at 16° to promote easy driving. The projecting and uncovered end 17 of the steel acts as a cutting edge. In case of arched piling one bevel, as 16°, is longer than the other, so that the inclinations of the two 105 shall be the same.

In Fig. 6 I have shown my invention applied to arched piling having interlocking members of the U. S. type; that is ball or tongue 20 and socket, or groove, 21. While 110

my invention is particularly designed for use with arched sections yet it may be applied to the various ordinary forms of straight piling as shown in Figs. 4 and 5.

Almost universally, the concrete will be applied to both sides, but there may be situations where it is desirable to protect one side only, and to that end the structure may be slightly modified as shown in Fig. 7, where there is a tie-rod on one side only, and the tie-bar is provided with a bent end to maintain it in place.

Having described my invention, I claim—

1. A protected sheet piling section comprising a steel core having a web and interlocking members on the web edges, said web being formed with a series of holes, tie-bars extending through said holes and having perforated ends, and tie-rods arranged to extend through said perforations and having their ends engaging with the steel core.

2. A protected piling section consisting of at least one steel core section and of concrete applied to the surface of the core, said core being provided with interlocking members on both edges, and also with tie-bars extending through holes in the web of the core and with rods inserted through holes in the tie-bars to bind the concrete.

3. A steel core for protected piling having interlocking elements on its edges, tie-bars extending through openings in the web and binding rods inserted through holes in the bars to bind the concrete on the core.

4. As a new article of manufacture, a protected pile element, comprising an arched-web steel core and a protecting coating of concrete applied to both sides thereof, said core having interlocking members on both edges extending beyond the concrete and a series of holes along the center of its web

to receive tie-bars, extending on both sides of the web at unequal distances, said bars having end holes for tie-rods, which are bent in to engage with the core on both and to exert a resilient tension to counteract each other.

5. A steel core for protected piling, tie bars adjustably extending through openings in the steel core, and binding rods extending through holes in the bars and having their ends turned inwardly to engage with the said core.

6. A steel sheet piling core for protected piling formed with openings longitudinally arranged in its web, tie-bars extending through said openings and free to move therein, resilient tie-rods extending through holes adjacent the ends of the bars and having their ends bent inwardly to engage with the surface of the core.

7. A protected piling section comprising a steel core provided with a web and interlocking elements on the web edges, said web being formed from end to end with openings arranged at intervals, a tie-bar arranged to extend through each opening and project on opposite sides of the web, said tie-bars adjacent the lower end of the core gradually diminishing in length, tie-rods inserted through holes in the ends of the bars, and concrete applied to the surfaces of the core, the concrete being beveled toward the lower end and the extreme lower end of the steel being left uncovered.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CLOUD CLIFFORD CONKLING.

Witnesses:

MATTHEW JACOBS,
THOMAS U. BUNTING.