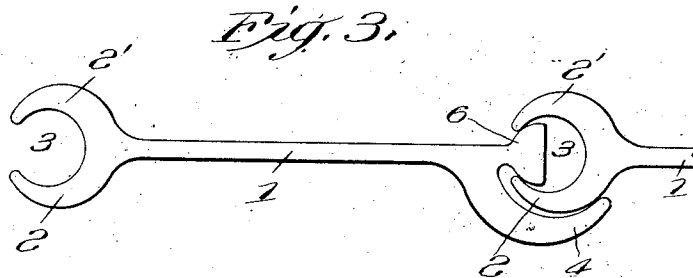
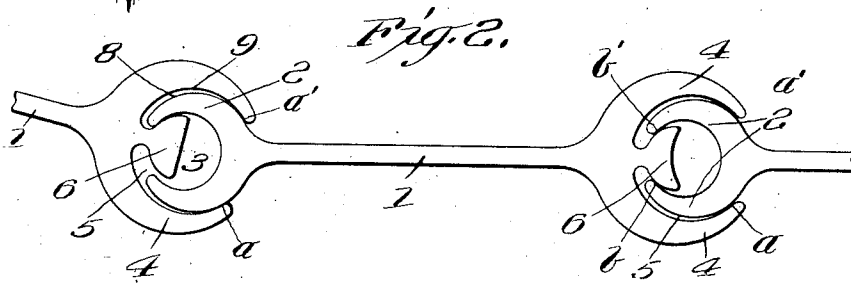
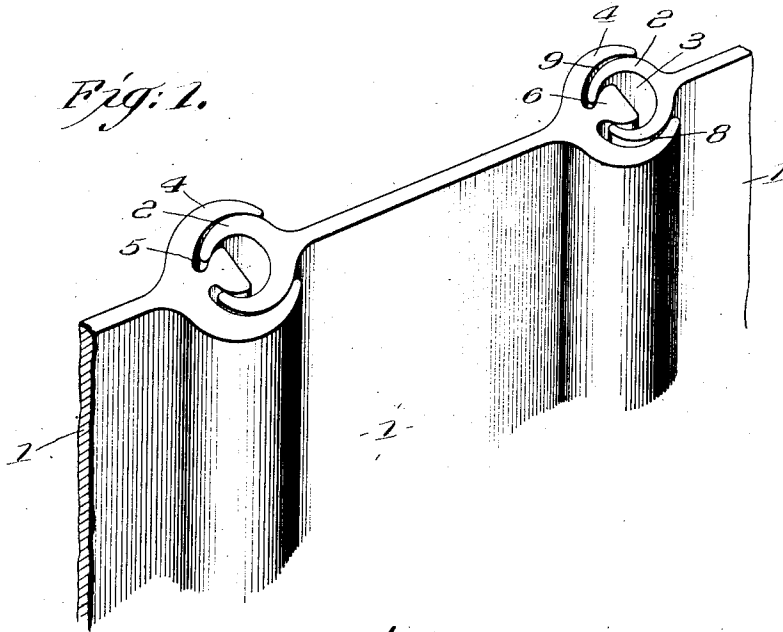


C. C. CONKLING.
 STEEL SHEET PILING.
 APPLICATION FILED NOV. 11, 1908.

965,157.

Patented July 26, 1910.



Witnesses:
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UNITED STATES PATENT OFFICE.

CLOUD C. CONKLING, OF BUFFALO, NEW YORK, ASSIGNOR TO LACKAWANNA STEEL COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

STEEL SHEET-PILING.

965,157.

Specification of Letters Patent. Patented July 26, 1910.

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To all whom it may concern:

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

My invention relates to steel sheet piling and consists in an improvement on the so called well known "United States" piling, in which the individual piles or sections are constructed on one edge with a groove, whose interior width is greater than the width of its mouth, and on the other edge with a tongue, substantially semi-circular in cross-section, and adapted to fit within the groove of the adjacent pile to form a sliding connection therewith. Such piles have been considerably used, but they have certain disadvantages, in that under the strain of driving, particularly in hard soils or where boulders or ledges are encountered, the tongue tends to spread the flanges of the groove throughout a great or less length and to pull out, thus destroying the continuity of the wall, and rendering the piling at that point useless; also the fit is too loose, that is there is too much clearance, permitting too much side-play, and longitudinal-play, and the off-setting of the piles, one after the other, destroys the alinement of the wall of piling and increases the number of pieces required for a given length of wall. This clearance permits also longitudinal inclination of the piles, which often increases as one pile after another is driven, so that when it comes to closing an opening in the wall there is considerable difference in the size of the space at the top and at the bottom, which prevents such closing of the opening without the use of a special piece. I have overcome these disadvantages to a large extent and have produced a pile which gives a very strong interlock, with four points of contact, and opposes great resistance to separation under longitudinal and lateral strains, by constructing the piles, as here shown, at one edge with an enlarged pair of curved flanges forming a pocket or groove and within the pocket a tongue; the other edge is somewhat of the form of the "United States" piles, that is having a pair of smaller curved flanges forming, as to their inner surfaces, a groove to receive the tongue on the opposite edge of an adjacent

pile, and as to their outer surfaces, a tongue to fit within the enlarged groove or pocket of the adjacent pile. I have thus produced a double-interlock pile as distinguished from the single-interlock style of the former piling referred to, with the results that when the tongue tends to spread the smaller flanges, these cannot be bent outward and the smaller groove opened without first bending the larger flanges on the tongue edge, and this system of double interlock immensely increases the strength of the joint against longitudinal or transverse strains, without detracting from the flexibility of the joint.

My invention is shown in the drawing herewith in which the reference numerals of this description indicate the corresponding parts in all the figures.

Figure 1 is a fragmentary perspective view, showing three interlocked piles. Fig. 2 is a corresponding plan, illustrating also the possibilities of angular adjustment. Fig. 3 shows a modification.

In the figures, 1 indicates the pile web, 2 the shorter flanges, forming the smaller or secondary groove, or pocket, 3, and 4 the longer flanges forming the larger groove, or pocket, 5, in which is arranged the tongue 6. Evidently each pocket is of greater width in its interior than at its mouth.

The outer surfaces 8 of the shorter flanges 2 are substantially concentric with the inner surfaces 9 of the larger flanges 4, permitting the sections to be driven at different angles to each other and permitting them to adapt themselves in driving to obstacles and to varying conditions in the soil, so as better to preserve the general alinement of the wall of piling. This form of pile has comparatively thin end edges, so that driving will be comparatively easy. And when the piling is in position, there will be a considerable space left in the smaller groove and also in the larger groove between the two pair of flanges, which facilitates driving and gives space for displaced material. Such material generally packs in said spaces rendering the joints practically water tight. Other material may be introduced into the pockets for the same purpose. However the water-tight quality of the joints is increased and practically insured by the four lines, at a a' b and b' respectively between the outer flanges and the inner, and between the inner

flanges and the tongue, where the parts are in contact, or in contact as near as may be, without impeding free driving.

While these pile sections may be formed or constructed in various ways and from any suitable material yet it will be understood that I prefer to make them in one piece and to roll them from steel as a complete article.

The advantages of my invention may be obtained in a lesser degree by the form of piling shown in Fig. 3, in which only one longer or guard flange 4 is provided on each section. In this modified form the weight is somewhat diminished and this form might be desirable for some purposes and easier to roll, but generally speaking it is not so good as the form of Figs. 1 and 2. As there is only one guard flange in the modified form the smaller flange 2' which is not reinforced by a guard flange on an adjacent section should be made heavier.

The tongue may be of the form shown, that is semicircular, or less in section or larger or smaller, for instance in Fig. 2 one tongue is cut away or grooved to reduce the weight.

Having thus described my invention, what I claim is:—

1. A pile section for steel sheet piling, having in combination a web, a pair of smaller flanges along one edge of the web forming a groove and on the other edge a tongue adapted to fit the said groove on an adjacent section, and at least one guard flange adapted to fit outside of the smaller flanges on an adjacent section.

2. A pile section for steel sheet piling having in combination a web, a pair of similar flanges along one edge of the web, forming a groove having a mouth less in width than the internal width of the groove, and along the other edge a tongue to engage in said groove, said tongue being less in lateral length than the groove but greater than the mouth along the tongue edge, a larger pair of flanges forming a pocket around the tongue to receive within it the first flanges of an adjacent section, said pocket being greater in internal width than its mouth.

3. A pile section for steel sheet piling as an integral article rolled from steel, consisting of a web, along one edge of the web a pair of larger or guard flanges forming a pocket, a tongue in said pocket and along the other edge of the web a pair of smaller flanges forming a groove, said smaller flanges being adapted to fit within the larger flanges and to fit around the tongue of the opposite edge on adjacent section, and to engage with said opposite parts, with at least four lines of contact or substantial contact, making a particularly water tight joint between the parts and leaving at least three spaces around the tongue for the displaced

earth or other suitable packing, and the outer surfaces of the tongue being substantially concentric with the inner surfaces of the smaller flanges and the outer surfaces of the inner flanges being substantially concentric with the inner surfaces of the outer flanges, so that adjacent sections can turn one on the other, substantially as set forth.

4. A pile section for steel sheet piling having in combination a web, a pair of smaller flanges along one edge of the web forming a groove, and on the other edge of the web a tongue, and at least one guard flange outside of the tongue, said groove being of sufficient size to permit angular adjustment of the pile sections, one on the other.

5. A pile section for metallic sheet piling having in combination a web, a pair of smaller flanges along one edge of the web forming a groove, a tongue on the other edge of the web, and a pair of guard flanges on said second edge outside of the tongue, the ends of the smaller flanges and the ends of the guard flanges being separated sufficiently to permit angular adjustment of adjacent piles with reference to each other, when set in position.

6. A pile section for metallic sheet piling having in combination a web, a pair of smaller flanges on one edge of the web forming a groove, a tongue on the other edge of the web and a pair of guard flanges outside of the tongue on said second edge to form a groove for the reception of the smaller flanges of an adjacent section, said smaller flanges being substantially in contact with the tongue and the guard flanges of an adjacent section along four lines of contact.

7. A pile section for steel sheet piling, being formed in one integral piece, and having in combination a web, said web being provided along one edge with smaller flanges to form a groove, and along the other edge with an inner element and an outer element, said inner element being adapted to fit within the groove and said outer element to fit outside of the flanges on an adjacent section.

8. An integral pile section for steel sheet piling having a web, a pair of flanges along one edge of the web to form a groove, a tongue along the other edge of the web, and a pair of guard flanges outside of the tongue.

9. A pile section for steel sheet piling having a web, a pair of flanges along one edge of the web, a tongue on the other edge of the web, and a pair of guard flanges outside of the tongue.

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

CLOUD C. CONKLING.

Witnesses:

CHARLES S. BOARDMAN,
MATTHEW JACOBS.