

D. W. MATHIAS.
 PILING BAR.
 APPLICATION FILED JAN. 31, 1912.

1,039,563

Patented Sept. 24, 1912.

Fig 1

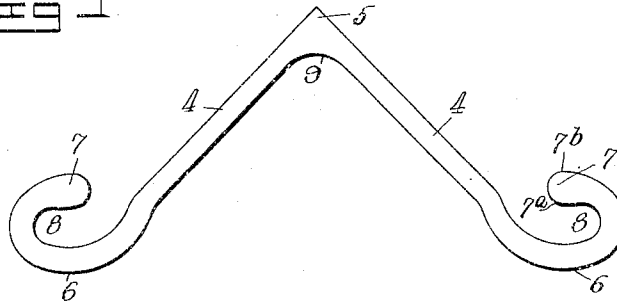


Fig 2

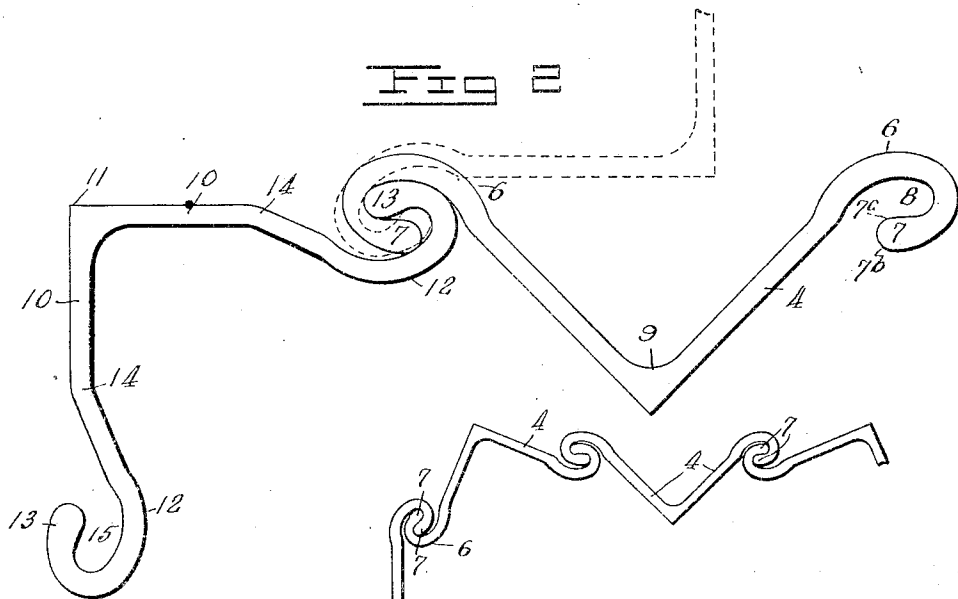
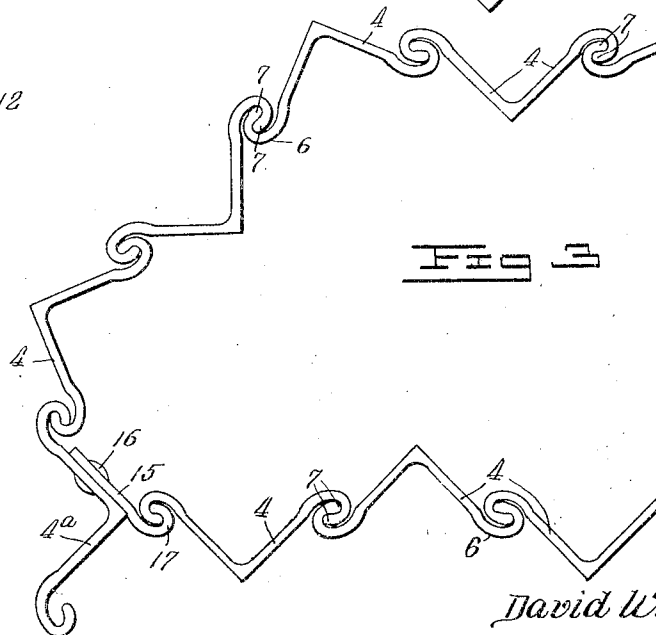


Fig 3



Witnesses
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PILING-BAR.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, DAVID W. MATHIAS, a citizen of the United States, residing at Pottsville, in the county of Schuylkill and State of Pennsylvania, have invented new and useful Improvements in Piling-Bars, of which the following is a specification.

My invention relates to metallic piling bars of the kind adapted to be driven into the ground and to interlock so as to form a practically unbroken metallic wall of great strength and possessing more or less flexibility.

More particularly stated, I seek to provide an improved piling bar having such form as to attain the following desirable results: I. To strengthen the bars at points adjacent to the edges thereof, along the bearing planes where the bars are brought into engagement with each other by extreme angular movements of one bar relatively to another, in either of two directions. II. To give the edge of the bar a simple curve, in the nature of a reflex bend, for the purpose of rendering easy the manufacture of the bar, by rolling. III. To give the edge of the bar, and parts adjacent to such edge, a gentle rotundity coupled with increased thickness, and therefore free sharply defined bends. IV. To so locate the said thickened portions of the bar that these thickened portions serve the double purpose of receiving the maximum wear and of preventing the accidental disconnection of adjacent bars from each other. V. To have certain heavy strains to coincide in direction with the planes occupied by different portions of the web of the bar. VI. To cause a maximum of the unavoidable strains and wear, adjacent to the edges of the bar, to be received edgewise by the portion of the bar more directly affected by such wear, thus rendering both the strains and the wear as nearly harmless as possible. VII. To diminish the degree of angular movement possible between adjacent bars, thus promoting the general rigidity of the piling wall, while allowing the latter an adequate degree of flexibility.

In the accomplishment of the objects enumerated and various other objects, I provide piling bars having different forms.

For the sake of simplicity, I describe and show in the accompanying drawings a few such forms which, however, are merely representative of my invention and do not limit the scope of the latter which is, commensurate with my claims.

Reference is made to the accompanying drawing forming a part of this specification and in which like letters indicate like members.

Figure 1 is a plan showing the upper end of one form of my improved piling bar. Fig. 2 is a fragmentary plan showing two of my improved piling bars forming part of a piling wall having a bend or corner. Fig. 3 is a fragmentary plan showing a number of my improved piling bars formed into a piling wall having a general curvature along a part of its length.

The piling bar shown in Fig. 1 and at the right of Fig. 2 is made of a single piece of sheet metal and is provided with two web portions 4, 4 integral with each other and meeting at an angle 5 which approximates a right angle. Integral with the web portions 4 are thickened portions 6 curved slightly toward each other and thence curved away from each other and merging into edge portions 7, and latter being still further thickened, and more especially so at the points 7^a, 7^b. The edge portions 7 and other portions adjacent thereto have very little curvature and simply revert or extend backward toward the portions 4, thus forming pockets 8, each having a shape more or less analogous to that of the edge portion 7. The piling bar is provided, opposite the angle 5, with a smooth concave portion 9, the thickness of the bar between the middle of this portion and the angle 5 being greater than that of any other portion of the bar.

In the form of bar shown at the left of Fig. 2 there are two web portions 10 which meet upon one face of the bar at an angle 11 constituting a corner. Integral with the web portions 10, 10 are thickened portions 12, 12 which curve slightly toward each other and then curve away from each other. Integral with these thickened portions 12 are edge portions 13 which are still thicker and have substantially the form of the edge portions 7 shown in Fig. 1. Pock-

ets 15 are thus formed, these pockets being similar to the pockets 8 above described and shown in Fig. 1. The web portions 10 are bent slightly at the points 14, 14 as will be understood from the left portion of Fig. 2. My purpose in thus bending the bar at the points 14 is to give the bar such form as to facilitate its use for a corner post. In other words, this form of bar is suitable for enabling the piling fence to bend to a sharper angle than would otherwise be practicable.

As may be seen from the lower left hand portion of Fig. 3 I sometimes give my improved piling bar the form indicated at 15, and for convenience I call a bar of this form as a half-bar. This half-bar may be connected to any one of the other piling bars shown, by aid of rivets 16, the piling bar with which the connection is thus made now forming the form indicated at 4^a. The half-bar is provided with a reverting portion 17—that is with a rounded thickened edge portion similar to those above described with reference to Figs. 1 and 2.

Fig. 2 shows, in full lines, two adjacent piling bars, moved into one extreme angular position. The same figure shows, in dotted lines, the relative positions occupied by the bars when they are moved into opposite angular position.

Fig. 3 shows several piling bars interlocked and so turned relatively to each other that adjacent bars occupy their extreme limits of movement in one direction, the piling wall thus having a gentle curvature and thus being suitable for use in the construction of a caisson or coffer dam having a wall circular or elliptical for a part of its length. In Fig. 3 the portion of the wall shown at the bottom of the figure is substantially straight, while the portion shown at the top of the figure is gently curved as stated.

With the construction of piling bar above described, I find it practicable to so interlock consecutive bars that a given portion of the web of one bar is displaced, relatively to the corresponding portion of the web of the next successive bar, by an angular movement representing a very small part of a circle. In the particular instance shown in the upper portion of Fig. 3, the displacement or angular movement of each bar, relatively to the next successive bar, is about 22½ degrees. Since, however, the angular displacement or movement of one bar relatively to the next successive bar may be in either of two directions, the total angular displacement of two adjacent bars thus interlocked is substantially 45 degrees and is thus a very small fraction of a circle.

The edge portions 7 have, when seen in cross section, such form as to appear bulbous. Each edge portion is thickened at the points 7^a, 7^b where it engages the mating

edge portions of the next successive bars and is adapted to resist undue wear, and moreover wear is concentrated at these points. Again certain strains to which the bars are subjected almost constantly while in use are manifested at these points where the wear takes place and as a consequence are borne by surfaces which are strengthened to receive them.

The web portions 4, 4 according to Fig. 1, and corresponding web portions shown in other figures, can bear greater strain if the strain be directed so as to coincide exactly with the direction in which these web portions extend. By giving the bar the form shown in Fig. 1, the strains in question are caused to thus coincide with the plane positions occupied by the web portions, and as a result these web portions possess each a maximum strength for the purpose of resisting such strains.

With piling bars having the forms above described, the piling wall is not liable to become broken under ordinary circumstances. This is because two adjacent piling bars are not likely to become disconnected. The piling wall has a degree of flexibility suitable for all practical purposes and at the same time has a proper amount of rigidity due to the fact that the piling bars cannot be moved beyond certain angular limits defined by the form of the bars.

It should not be understood, from the foregoing description, that a piling wall constructed as above described, will have any great degree of movement. The angular movements referred to are for the most part conferred upon the bars at the time when they are driven into the ground. If however, owing to the surging of water against the piling wall there is a tendency to displace the piling bars relatively to each other, such displacement is necessarily limited to the angular limit of movement of one piling bar relatively to the next successive piling bar. Of course under ideal conditions there is little or no tendency of the piling wall to become distorted, and as a general rule the only use made of the angular movement of the piling bars relatively to each other is in enabling the bars, when first driven into the ground, to be located at suitable angles relatively to each other.

I claim—

1. A piling bar comprising a body member of sheet metal having a substantially V-shaped cross section, said body member being provided with reverting edge portions slightly thicker than the adjacent portions of said body member, and extending toward each other.

2. A piling bar comprising a body member of sheet metal bent along a central line extending lengthwise of said body member so as to form a continuous corner line, said

body member being further provided with an arcuate concave surface disposed opposite said corner line, so that the portion of said body member between said corner line and said concave surface is thicker than adjacent portions of said body member, said body member being provided with thickened edges bent toward each other.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

DAVID W. MATHIAS.

Witnesses:

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ARTHUR FROST.