

No. 884,270.

PATENTED APR. 7, 1908.

S. T. FIERO.
INTERLOCKING SHEET METAL PILING.

APPLICATION FILED JUNE 24, 1907.

2 SHEETS—SHEET 1.

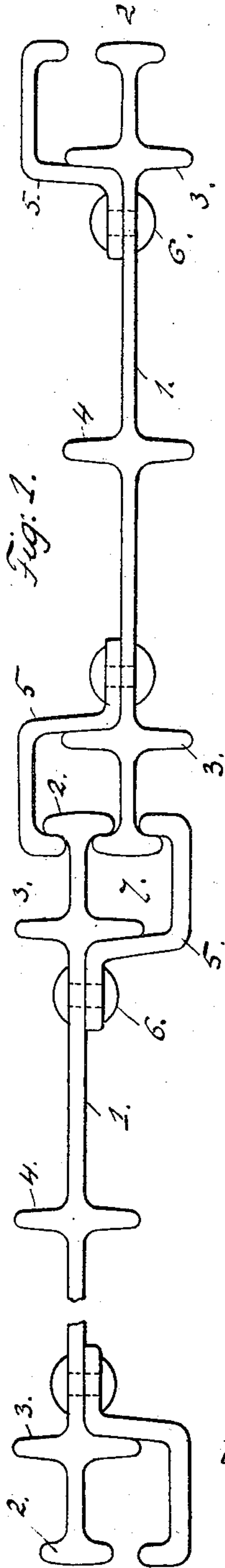


Fig. 1.

Fig. 2.

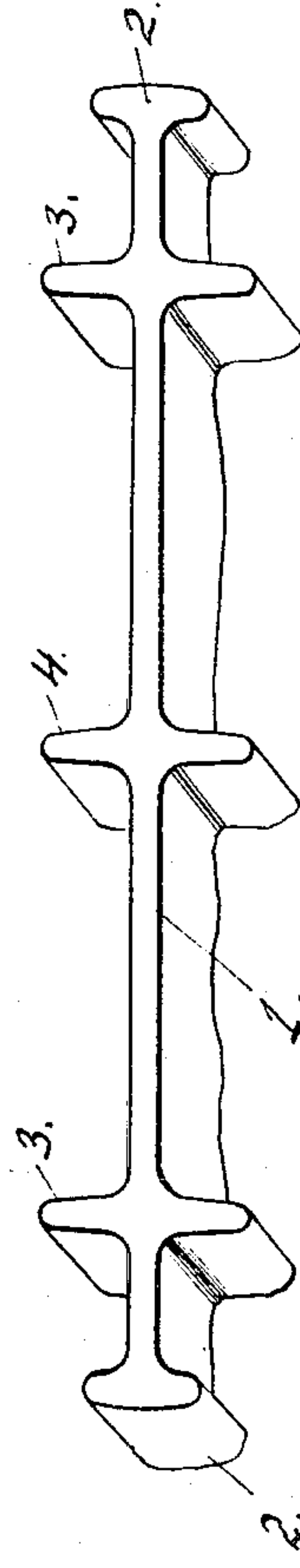


Fig. 3.

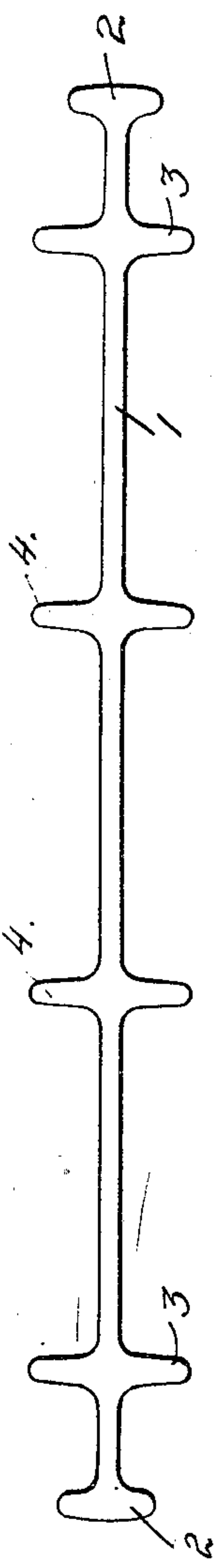
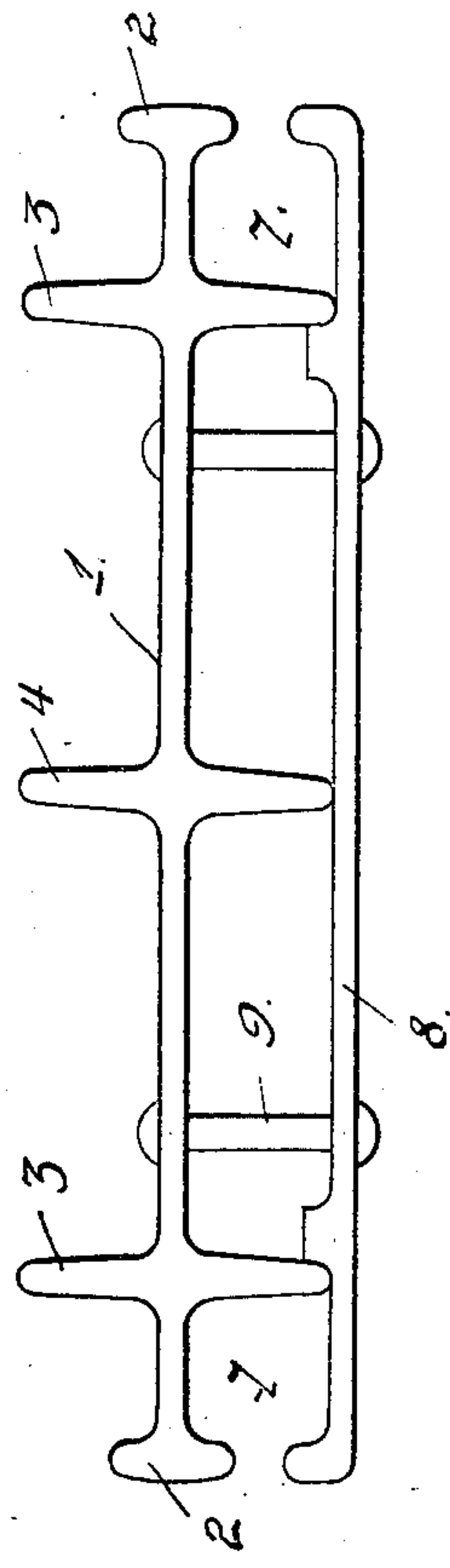


Fig. 4.



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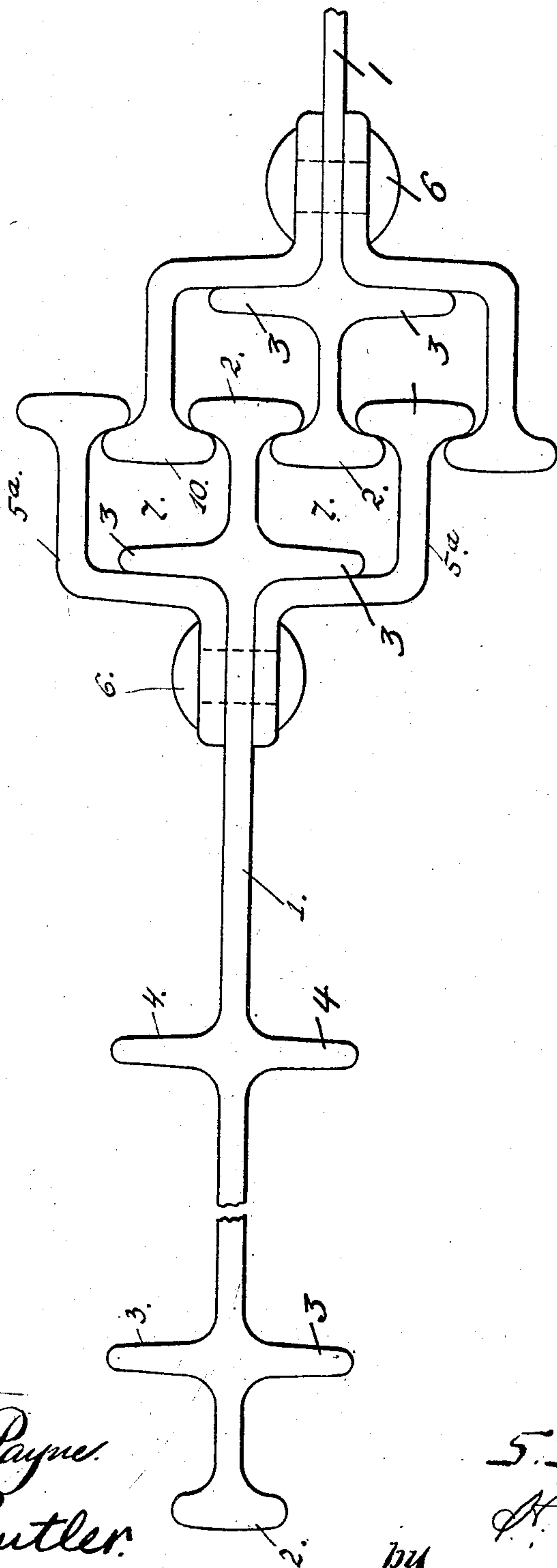
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2 SHEETS—SHEET 2.

Fig. 5.



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UNITED STATES PATENT OFFICE.

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INTERLOCKING SHEET-METAL PILING.

No. 884,270.

Specification of Letters Patent.

Patented April 7, 1908.

Application filed June 24, 1907. Serial No. 380,458.

To all whom it may concern:

Be it known that I, SLATER T. FIERO, a citizen of the United States of America, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Interlocking Sheet-Metal Piling, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to improvements in interlocking sheet metal piling, as generally used in the construction of abutments, piers, retaining walls, coffer dams and submarine structures.

The object of this invention is to provide a novel reinforced interlocking piling that can be quickly assembled and easily manufactured, the piling being light and durable, rigid and comparatively inexpensive to produce.

With the above and other objects in view which will more readily appear as the invention is better understood, the same consists in the novel construction, combination and arrangement of parts to be hereinafter more fully described, and then specifically pointed out in the appended claims.

Referring to the drawings forming a part of this specification, Figure 1 is an end view of an interlocking reinforced piling constructed in accordance with my invention, Fig. 2 is a perspective view of a portion of a sheet piling, Fig. 3 is an end view of a piling illustrating an additional reinforcement, Fig. 4 is a similar view illustrating a modified form of construction, and Fig. 5 is an end view of a piling illustrating a double interlocking feature of the same.

To put my invention into practice, I roll the piling from strong and durable metal having such qualifications as to render it adaptable to numerous structures, other than those above specified.

The piling will be considered principally in cross sectional contours, the invention residing in the shape and novel reinforcements by which a plurality of pilings are connected together, to produce a partition or wall of considerable rigidity capable of withstanding internal and external pressures.

The piling comprises a sheet 1 of a desired width and length having headed or T-shaped edges 2, which in some instances may conform to an eye-beam in cross section. In constructing the edges 2, I use such radii as

to produce strong and durable T-shaped edges upon the sheet 1. Contiguous to the edges 2 of the sheet I provide reinforcing ribs 3 and intermediate ribs 4, said intermediate ribs being duplicated at suitable intervals according to the width of the sheet, for instance, in Fig. 3 I have illustrated two intermediate ribs 4. The ribs 3 and 4 are of a sufficient height and breadth as to insure rigidity and stability of the sheet 1; the fellets of such ribs being described upon radii conducive to overcome such stresses and strains as may be placed upon the ribs or upon the sheet 1.

To produce an interlocking piling from the sheet of metal constructed in accordance with my invention, I use bracket-bars 5, which are riveted or otherwise secured to the sheets 1, as at 6, adjacent to the ribs 3, whereby said ribs will form an angular seat or brace for the bracket-bars 5, the free edges of the brackets lying in a plane approximately coincident with the face of the T-shaped edges, but spaced therefrom, so that when the bracket-bars are properly secured to the sheet piling 1, longitudinally extending grooves 7 are formed along the edges of the sheet piling, said grooves being open-sided between the opposing projecting portions of the head 2 and the bracket 5, through which the shank portion 2^a of the head 2 of a piling having a similar cross-sectional construction, extends, the T-shaped edges being received within the groove 7, as illustrated in Fig. 1. of the drawings, the relative sizes of the restricted opening between the opposing portions of the bracket and the T-shaped edge, preventing disengagement of the adjoining sheets excepting by a relative longitudinal movement of the sheets. This arrangement of the sheet pilings and the bracket bars 5 permits of the interlocking of the T-shaped edges of two sheet pilings, said interlocking being provided by reason of the presence of the bracket-bars 5 carried by the adjoining pilings, in a manner to form the groove having a restricted opening.

In Fig. 4 of the drawings I have illustrated a modification of my invention, in which the brackets 5, instead of being separate for each of the edges of the piling, are formed integral, being connected by a sheet piling 8 extending in parallel planes with the piling 1, contacting with the edges of the ribs 3 and 4 and being positioned by means of inwardly extending projecting portions 8^a

which lie in rear of the ribs 3. The piling 8 is secured to the piling 1 by means of rivets or other suitable securing devices, as at 9. In this form, it will be necessary to arrange
 5 adjacent pilings with the piling 8 of one structure on the opposite side of the piling 1 from that on which the similar piling is located on the adjacent piling 1.

As will be seen, the head 2 of each sheet
 10 provides two surfaces on the opposite sides of the shank 2^a, against which contact is made by the adjacent sheet, while the bracket 5 supplies a third surface for this purpose. It will, therefore, be understood that I have
 15 provided, in the construction shown in Figs. 1 to 4, a structure in which at least three separate and distinct points of opposing contact are provided between the adjoining sheets, said contact points forming a corre-
 20 sponding number of barriers against a separation of the sheet in a lateral direction, thereby affording an equitable distribution of any strain which may be placed on the piling.

In Fig. 5 of the drawings, I have illustrated a double interlocking structure which may be employed as a modification of my invention. In this construction two bracket-bars 5^a are secured to the opposite sides of the sheet
 30 piling 1, as at 6. The bracket bars 5^a, in this form, are each headed to form T-shaped edges, so that when in position, said bars will provide headed portions located on opposite sides of the headed portion 2 of the piling
 35 1, the several headed portions lying in approximately the same plane, and providing, on opposite sides of the shank 2^a, a longitudinally disposed groove 7, one of said grooves receiving the T-shaped edge 2 of an adjoining sheet piling, the other groove receiving
 40 the T-shaped head 10 of one of the bracket-bars. It will thus be observed that the bracket-bars 5^a are provided with T-shaped heads in lieu of the angular heads or edges of
 45 the bars 5, and in overlapping the heads 10 and the edges 2 of the pilings 1, I provide interlocking edges of sheet piling that cannot be possibly separated due to the stresses and strains exerted in any direction with re-
 50 spect to the adjoining sheets of piling.

In each of the construction shown, it will be seen that the planes of adjoining sheet pilings will not be coincident but will be parallel with each other, the variation depending
 55 upon the sizes of the T-shaped edges and the position of the open side of the groove or grooves 7. Hence, the pilings have the appearance of being in staggered relation, but in parallel planes, so that pulling strains
 60 placed thereon in a direction tending to separate the adjacent pilings will be opposed by the heads of the pilings and the adjacent ribs 3, said ribs forming laterally projecting portions which tend to distribute the strain.

65 In summarizing the above description

taken in connection with the drawings, it will be apparent that I have devised sheet pilings which when properly assembled and constructed will produce durable interlocking units not easily separated by shearing or
 70 similar stresses to which piling is ordinarily subjected.

The invention can be considered figuratively speaking, as a reinforced eye-beam having its edge provided with brackets, the
 75 edges of such eye-beams and brackets overlapping adjoining eye-beams and brackets, and while I have herein illustrated straight sheets of piling, I desire it to be understood that the sheets of pilings can be bent or
 80 formed to permit of their adaptation to curved structures or corners.

I reserve such other changes in the structural details, size and proportion as are permissible by the appended claims. 85

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

1. Interlocking sheet metal piling comprising adjoining sheets of metal having T shaped edges, right angular disposed ribs
 90 carried by said sheets adjacent to said edges, right angular disposed intermediate ribs carried by said sheets, bracket bars secured to said sheets adjacent to the first mentioned ribs and bearing against said ribs, the edges
 95 of said bars alining with the T shaped edges of said sheets and having an interlocking engagement with the edges of the adjoining sheet.

2. Interlocking sheet metal piling comprising adjoining sheets of metal having T
 100 shaped edges, right angularly disposed ribs arranged upon both sides of said sheets, bracket bars secured to both sides of said sheets adjacent to some of said ribs, said
 105 bars having their edges alining with the T shaped edges of said sheets and interlocking with the T-shaped edges of the adjoining sheets.

3. Interlocking sheet metal piling comprising adjoining sheets of metal having
 110 overlapping T shaped edges, longitudinally disposed ribs carried by the sides of said sheets adjacent to said edges, longitudinally disposed intermediate ribs carried by the
 115 sides of said sheets, longitudinally disposed bracket bars secured to said sheets and having portions interlocking with the edges of the adjoining sheet.

4. Interlocking sheet metal piling comprising adjoining sheets of metal having over-
 120 overlapping T shaped edges, longitudinally disposed ribs carried by said sheets of metal, some of said ribs being located in close proximity to said overlapping edges, bracket bars
 125 secured to said sheets of metal and having edges alining with the T shaped overlapping edges of said sheets.

5. Sheet metal piling comprising adjoining sheets of metal having T shaped overlapping
 130

adjoining edges, longitudinally disposed ribs carried by the sides of said sheets of metal, bracket bars secured to the sides of said sheets of metal and engaging one of the sides of the
5 T shaped overlapping edges of said sheets.

6. Sheet metal piling comprising adjoining sheets of metal having T shaped edges, ribs longitudinally disposed upon the sides of said sheets, the ribs upon one side of the
10 sheets alining with the ribs upon the opposite side, bracket bars secured to the sides of said sheets and engaging one of the sides of the T shaped edges of the adjoining sheet.

7. Sheet metal piling comprising adjoining
15 sheets of metal having T shaped edges, longitudinally disposed ribs carried by the sides of said sheets, an angle bar secured to one side of one of the sheets and engaging the T shaped edges of the adjoining sheet, and
20 an angle bar secured to the opposite side of the adjoining sheet of metal and engaging the opposite side of the T shaped edge of first mentioned sheet.

8. Sheet metal piling comprising adjoining
25 metallic sheets having T shaped edges, ribs carried by said sheets adjacent to said edges, intermediate ribs carried by said sheets, and angle bars secured to said sheets and engaging said T shaped edges of said sheets.

9. Sheet metal piling comprising metallic
30 sheets having longitudinally disposed T shaped edges, longitudinally disposed ribs carried by the sides of said sheets, and longitudinally disposed bracket bars carried by
35 said metallic sheets, said bars and T-shaped edges providing grooves to receive the T-shaped edge of the adjoining sheet.

10. Sheet metal piling comprising metallic
40 sheets having T shaped edges, ribs carried by said sheets, and bracket bars carried by said sheets, said bars and T-shaped edges providing grooves adapted to receive the T-shaped edges of an adjoining sheet.

11. Sheet metal piling comprising adjoining
45 metallic sheets having longitudinally disposed T shaped edges, ribs carried by the sides of said sheets, longitudinally disposed bracket bars carried by the sides of said sheets for interlocking the T shaped edges of
50 said sheets.

12. The combination of adjoining reinforced metallic sheets having T shaped edges, and bracket bars carried by said sheets for interlocking the edges of said adjoining
55 metallic sheets.

13. The combination of adjoining reinforced metallic sheets having abutting edges, and bracket bars carried by said sheets for interlocking the edges thereof.

14. A sheet metal piling comprising a metallic sheet having T shaped longitudinally
60 disposed edges, longitudinally disposed ribs carried by the sides of said metallic sheets, and longitudinally disposed bracket bars carried by said sheet adjacent to some of said
65

ribs, said bracket bars having edges alining with the T shaped edges of said sheet.

15. A sheet metal piling comprising a rolled metallic sheet having T shaped longitudinally disposed edges, longitudinally disposed ribs carried by the sides of said sheet; and bracket bars carried by said sheet. 70

16. A sheet metal piling comprising a reinforced metallic sheet having longitudinally disposed T shaped edges, and bracket bars
75 carried by said metallic sheet.

17. A sheet metal piling comprising a reinforced metallic sheet having longitudinally disposed T shaped edges, and longitudinally disposed bracket bars carried by one side of
80 said sheet.

18. A sheet metal piling comprising a reinforced metallic sheet having an open-sided longitudinally-extending groove formed at its edges, the open side of each groove being
85 of less width than the width of the groove and located on a plane at one side of and parallel with the plane of the main portion of the sheet and intermediate the planes of the opposing walls of the groove, the groove extending on opposite sides of the planes of the
90 walls of the open side of the groove.

19. A sheet metal piling comprising a reinforced metallic sheet having an open sided longitudinally extending groove formed at
95 its edges, the opposing side walls of the groove being in parallel planes, the open side of each groove being of less width than the width of the groove and located on a plane at one side of and parallel with the plane of the
100 main portion of the sheet, the planes of the walls of the open side of the groove being parallel with and spaced from the planes of the side walls of the groove.

20. Interlocking sheet piling comprising
105 metallic sheets having their side edges of similar configuration, the side edge of one sheet being interlockable with the side edge of the adjacent sheet, the edge of each sheet having an open sided longitudinally-disposed
110 groove, the opposing walls of which extend in parallel planes.

21. Interlocking sheet piling comprising metallic sheets having their side edges of similar configuration, the side edges of one
115 sheet being interlockable with the side edge of the adjacent sheet, the edge of each sheet having an open-sided longitudinally disposed groove, the opposing side walls of which extend in parallel planes, the open side of the
120 groove, being located intermediate the planes of the side walls of the groove.

22. Interlocking sheet piling comprising metallic sheets having their side edges of similar configuration, the side edge of one sheet,
125 being interlockable with the side edge of the adjacent sheet, the edge of each sheet having a longitudinally-disposed groove, the opposing side walls of which extend in parallel planes, the forward continuation of the side walls
130

being bent toward each other, said walls being of a combined length less than the distance between the said side walls of the groove to form an open side for the groove
 5 located intermediate the planes of the side walls of the groove.

23. Sheet metal piling comprising independent metallic sheets mutually interlocked at their abutting edges, the interlocking sheets having more than two separate
 10 points of opposing contact, said contact points forming a corresponding number of barriers against a separation of the sheets in a lateral direction.

24. Sheet metal piling comprising independent metallic sheets mutually interlocked at their abutting edges, the interlocked sheets having three separate points of
 15 opposing contact, said contact points forming a corresponding number of barriers against a separation of the sheets in a lateral direction.

25. Sheet metal piling comprising independent metallic sheets mutually interlocked at their abutting edges, the interlocked
 20 sheets having three separate points of opposing contact, said contact points forming a corresponding number of barriers against a separation of the sheets in a lateral direction,
 25 two of these points being adjacent to and on opposite sides of the plane of the sheet.

26. Sheet metal piling comprising inde-

pendent metallic sheets mutually interlocked at their abutting edges, the interlocked sheets having more than two separate
 35 points of opposing contact, two of these points being equidistant from and on opposite sides of the plane of each sheet.

27. Sheet metal piling comprising independent metallic sheets of similar configuration mutually interlocked at their abutting
 40 edges, the interlocked sheets having more than two points of opposing contacts on the sides of the planes of the sheets, said contact points forming a corresponding number
 45 of barriers against a separation of the sheets in a lateral direction.

28. Sheet metal piling comprising independent metallic sheets of similar configuration mutually interlocked at their abutting
 50 edges, the interlocked sheets having more than two points of opposing contacts on the sides of the planes of the sheets, said contact points being separate from one another and
 55 forming a corresponding number of barriers against a separation of the sheets in a lateral direction.

In testimony whereof I affix my signature in the presence of two witnesses.

SLATER T. FIERO

Witnesses:

MAX H. SROLOVITZ,
 FAY CHAMBERLAIN.