

S. T. FIERO.
 INTERLOCKING SHEET METAL PILING.
 APPLICATION FILED APR. 7, 1908.

912,661.

Patented Feb. 16, 1909.

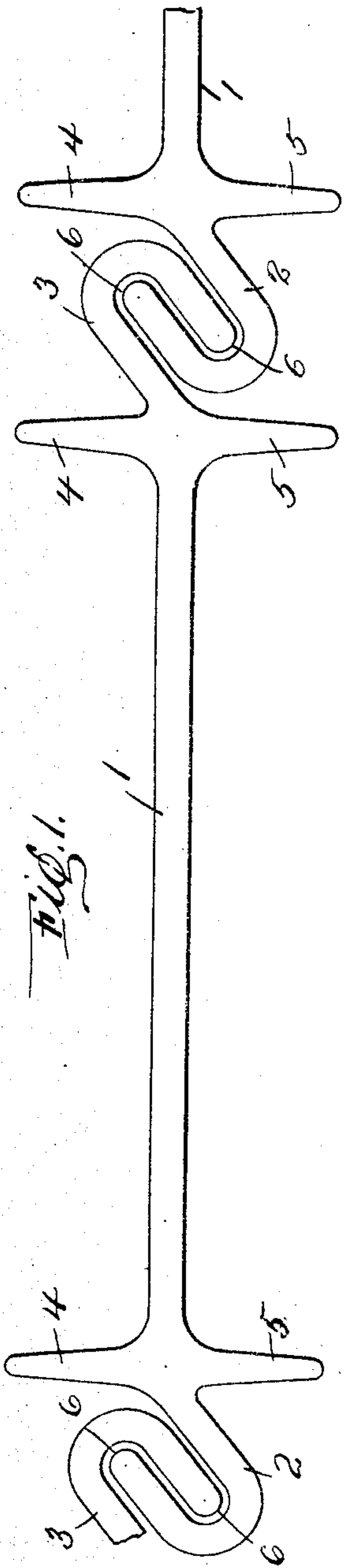


FIG. 3.

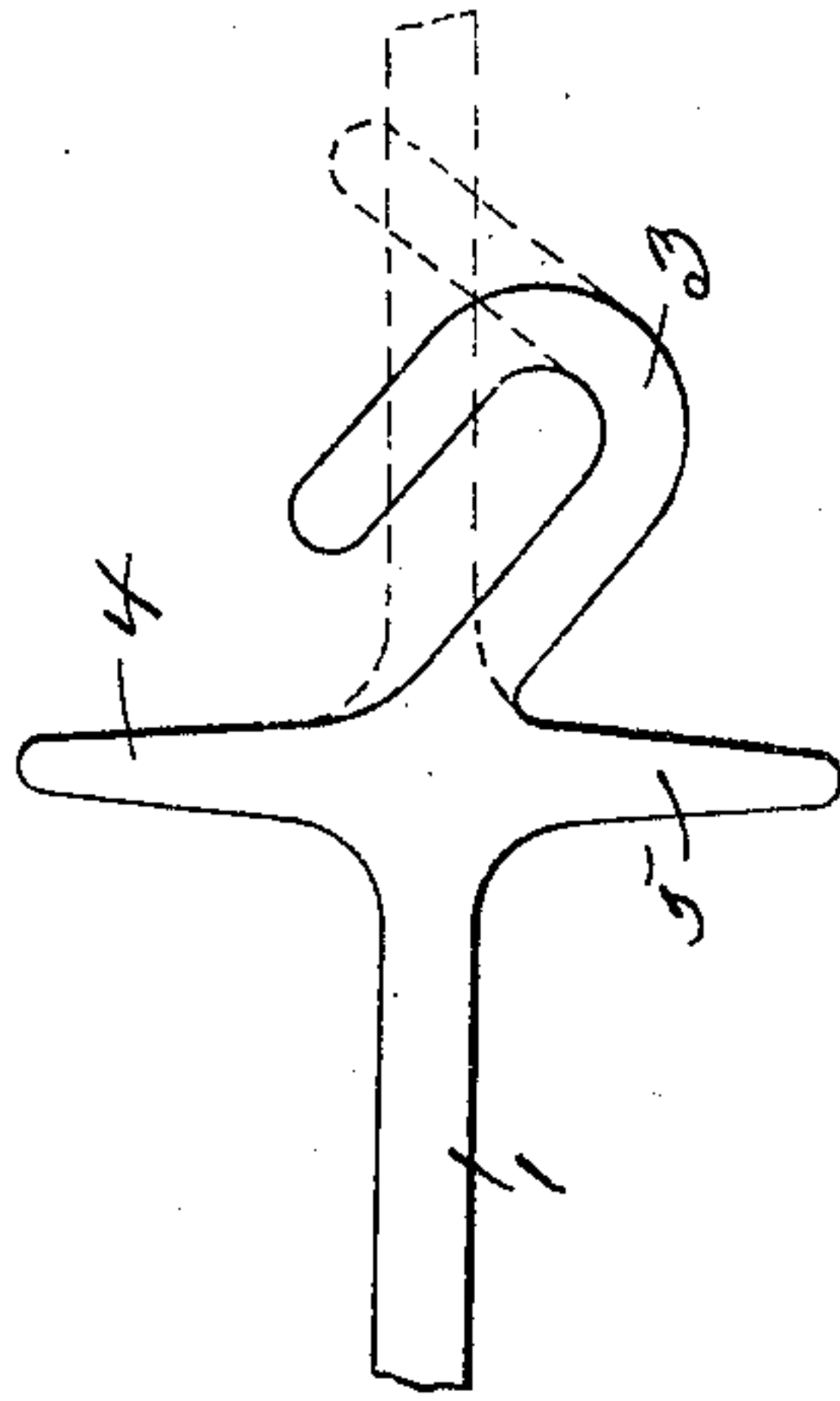


FIG. 2.

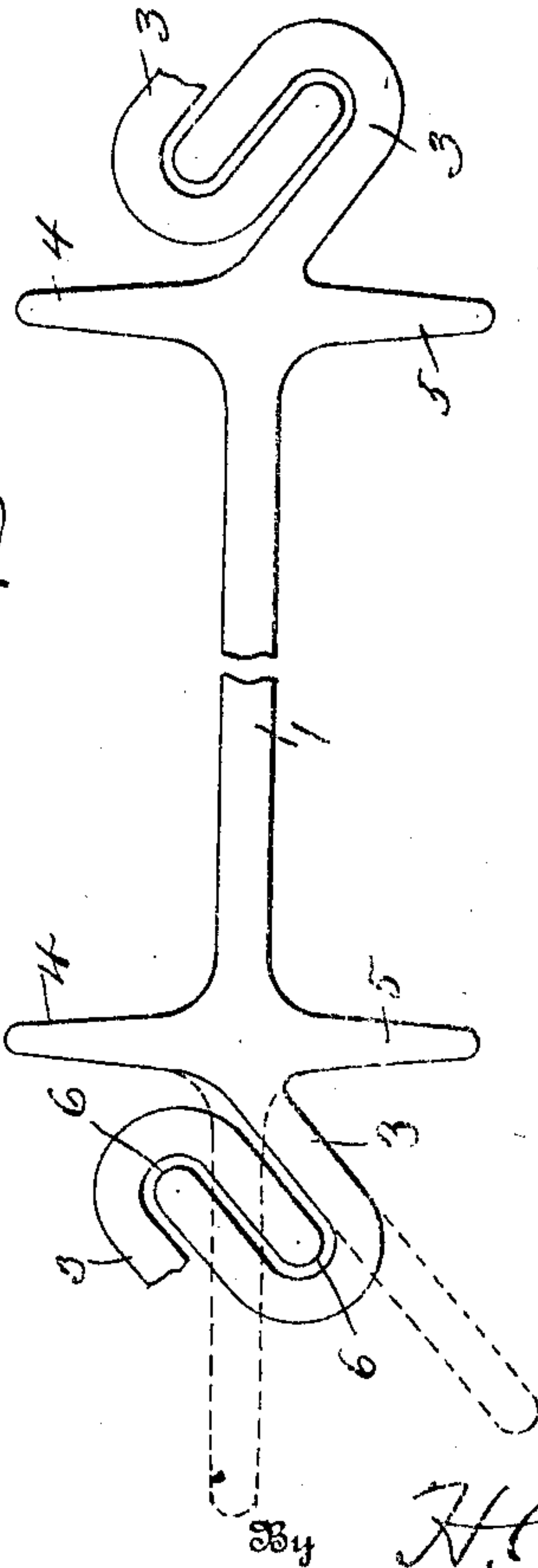
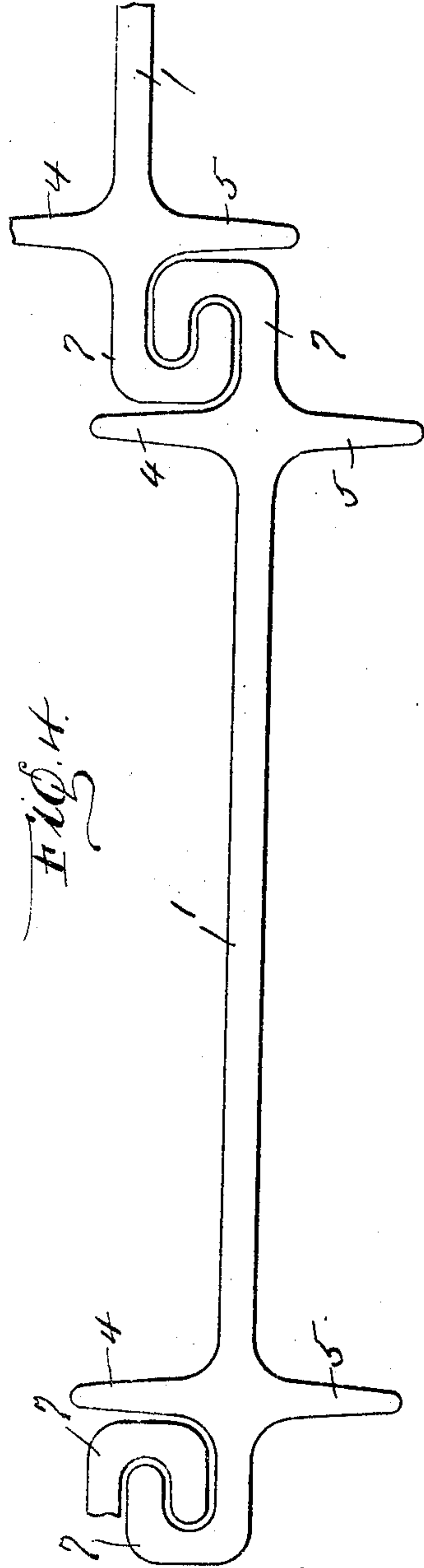


FIG. 4.



Witnesses

Samuel Payne
 A. H. Butler

Inventor
 S. T. Fiero.

H. L. Everett & Co.

Attorneys

UNITED STATES PATENT OFFICE.

SLATER T. FIERO, OF PITTSBURG, PENNSYLVANIA.

INTERLOCKING SHEET-METAL PILING.

No. 912,661.

Specification of Letters Patent.

Patented Feb. 16, 1909.

Application filed April 7, 1908. Serial No. 425,668.

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 interlocking sheet metal piling, as ordinarily used in the construction of abutments, piers, retaining walls, cofferdams and submarine structures.

The primary object of this invention is to provide a novel reinforced interlocking piling of a light, durable and rigid construction.

A further object of this invention is to provide interlocking pilings that can be easily manufactured and assembled.

To this end, I have devised a sheet metal piling having longitudinal reinforcements and hook-shaped interlocking edges, said edges being constructed to maintain the pilings either in a common plane or in two parallel planes with said pilings alternately arranged in parallel planes.

The detail construction entering into my invention will be presently described and then specifically pointed out in the appended claims.

In the drawings:—Figure 1 is an end view of an interlocked reinforced piling constructed in accordance with my invention, Fig. 2 is a similar view of a slight modification, Fig. 3 is an end view of a portion of the piling, illustrating the formation of the edge thereof, and Fig. 4 is an end view of another modified form of piling.

In the accompanying drawings, 1 designates a sheet of metal provided with angularly disposed hook-shaped edges 2 and 3, the edge 3 being disposed at an angle opposite to the edge 2 and in a plane parallel therewith. The sheet of metal adjacent to the hook-shaped edges 2 and 3 is provided upon both sides with longitudinal ribs or reinforcements 4 and 5, these ribs or reinforcements extending from one end of the sheet to the opposite end thereof, with the ribs or reinforcements 4 opposite the ribs or reinforcements 5.

The manner of interlocking two pilings constructed in accordance with my invention is clearly illustrated in Fig. 1 of the drawings, where two hook-shaped edges are inter-

locked. It will be observed that the ribs or reinforcements confronting the groove 6 of the hook-shaped edge prevents the connecting hook-shaped edge from being dislodged, other than by a movement longitudinally of the piling, and when the pilings are connected together to reinforce a partition or wall constructed of concrete, the concrete is adapted to enter the small space between the interlocking edges and prevent one piling from moving with respect to the other.

In Fig. 2 of the drawings, I have illustrated a piling wherein the hook-shaped edges 3 lie in planes at right angles to one another, said hook-shaped edges being disposed upon one side of the vertical plane of said piling. In other respects the piling of Fig. 2 is conformable to the piling of Fig. 1.

A modification of my invention is illustrated in Fig. 4 of the drawings, wherein the hook-shaped edges 7 are in a plane parallel with the body of the piling, these hook-shaped edges being of a slightly different shape in cross section to produce a more snug connection between adjoining pilings. In sections of this formation, adjoining pilings will be alternately arranged in parallel planes.

As will be understood by reference to the drawings, each piling sheet in cross-section consists of three parts, viz.: the main or body portion (the portion located intermediate the planes of the laterally-extending ribs) and the two edge portions located on the opposite or outer side of these rib planes.

Each edge portion in cross-section consists of a return bend, one of the arms of which (the inner) is integral with the ribs, the two arms being substantially parallel with each other, the two arms being joined by a curved portion, the whole forming a hook-shaped portion one end of which is joined to the body portion of the sheet, the curved portion forming one of the side edges of the sheet. The planes of the arms of the edge portions (in cross-section) are angular with respect to a plane extending at right angles to the plane of the body portion in similar section, in contradistinction to a structure in which the hooks are formed by placing a return bend on the ribs 4 or 5, in which case the arms would have planes parallel with the plane extending at right angles to the plane of the body portion.

By reason of the substantial parallelism of the two arms of the edge portions, there is formed a groove which extends throughout

the length of the edge portion and has for its walls the inner faces of the two arms and the similar face of the curved connecting portion, thereby forming a groove which (in cross-section) is closed at one end and has substantially parallel side walls. The groove is not closed at the point of juncture of the arm and rib structure, the free end of the opposite (the outer) arm being spaced from the rib a distance sufficient to provide an open end for the groove, said end being in opposition to the closed end of the groove and adjacent the outer face of the rib toward which the outer arm of the edge portion extends.

By reason of the fact that the inner wall of the open end of the groove (the rib 4, for instance in Fig. 3) extends at a substantial right angle to the plane of the body-portion (said wall being provided to prevent a withdrawal movement of the interlocking edge portions in one direction), the actual opening for the groove is at the point of shortest distance between the free edge of the outer arm and such inner wall of the open end of the groove, and the plane of this shortest distance is substantially parallel with the plane of the body-portion or coincident with such plane dependent upon the position of the free end of the outer arm relative to the plane of the body-portion, and as shown in the drawings, the line of shortest distance which forms the actual opening to the groove is of greater length than the line of shortest distance between the side walls (the width) of the groove.

Inasmuch as the arms of the edge portions extend angularly with respect to and tending toward a plane extending at right angles to the plane of the body-portion, the groove necessarily extends in similar angularity, and as its open end is adjacent the rib structure, it will be readily understood that such open end is located at the inner end of the groove, and such inner end is located at a point between its outer end and the body portion of the sheet. And while the grooves are located intermediate the side edges of the sheet formed by the outer faces of the curved connecting portions of the hooks, the outer or closed end of each groove extends to a point closer to the adjacent side edge than the inner or open end of the groove, so that it will be obvious that the groove extends to a point between its open end and such side edge of the sheet.

By reason of the construction shown, the groove in cross-section is closed at all points excepting at its inner end, so that any lateral strains of the sheet will be placed on the free edge of the bend and the part of the bend of the adjacent sheet which opposes said free edge, as in each of the forms shown, while the form shown in Figs. 1, 2 and 3 provides the additional oblique surfaces to aid in resisting the strain.

In the manufacture of my piling, the extensions of the body of the piling, as illustrated in dotted lines in Figs. 2 and 3 can be bent to produce the hook-shaped edges by two or more passes between rolls, it being preferable to roll the hook-shaped edges as illustrated in dotted lines in Fig. 3, and then produce a complete edge by another pass of the piling, although the passes may be continuous.

It is apparent that when a partition or wall is constructed of a plurality of my pilings connected together, that considerable rigidity will be maintained capable of withstanding internal and external pressures, and that when properly assembled, a plurality of durable interlocking units will be provided not easily separated by shearing or similar stresses to which the piling may be subjected.

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

1. A sheet piling member comprising a metallic sheet having its edge-portions in cross-section each formed to provide an open ended longitudinally-extending groove, the open end of the groove being located intermediate the side edges of the piling sheet, the groove extending to a point between its open end and the adjacent side of the piling sheet.

2. A sheet piling member comprising a metallic sheet having its edge-portions in cross-section each formed to provide an open ended longitudinally-extending groove, the open end of the groove being located intermediate the side edges of the piling sheet, the groove extending to a point between its open end and the adjacent side edge of the piling sheet, the groove being of substantially equal width throughout its depth.

3. A sheet piling member comprising a metallic sheet having its edge-portions in cross-section each formed to provide an open ended longitudinally-extending groove, the open end of the groove being located intermediate the side edges of the piling sheet, the groove extending to a point between its open end and the adjacent side edge of the piling sheet, the width of the open end of the groove being greater than the length of the shortest distance between the opposing side walls of the groove.

4. A sheet piling member comprising a metallic sheet having its edge-portions in cross-section each formed to provide an open ended longitudinally-extending groove, the open end of the groove being located intermediate the side edges of the piling sheet, the groove extending to a point between its open end and the adjacent side edge of the piling sheet, the plane of the open end of the groove being angular with respect to the plane of the line of shortest distance between the opposing side walls of the groove.

5. A sheet piling member comprising a

metallic sheet having its edge-portions in cross-section each formed to provide an open ended longitudinally-extending groove, the open end of the groove being located intermediate the side edges of the piling sheet, the groove extending to a point between its open end and the adjacent side edge of the piling sheet, the plane of the open end of the groove being angular with respect to the plane of the line of shortest distance between the opposing side walls of the groove, a line taken at right angles to and extending through the plane of the open end of the groove being parallel with a line taken at right angles to and extending through the plane of the body portion of the sheet.

6. A sheet piling member comprising a metallic sheet having each of its edge portions in cross-section formed with a return bend having portions extending on opposite sides of the plane of the body portion of the sheet, the outer arm of the bend extending in a direction tending toward a plane at right angles to and extending through the plane of the body-portion of the sheet.

7. A sheet piling member comprising a metallic sheet having each of its edge-portions in cross-section formed with a return bend having parallel portions, the outer portion of which extends in a direction tending toward a plane taken at right angles to and extending through the plane of the body-portion of the sheet.

8. A sheet piling member comprising a metallic sheet having each of its edge-portions in cross-section formed with a return bend, the outer portion of which extends in a direction tending toward a plane taken at right angles to and extending through the plane of the body portion of the sheet, the plane of said direction being less than a right angle to the plane of the sheet.

9. A sheet piling member comprising a metallic sheet having each of its edge-portions in cross-section formed with a return bend, the outer portion of which extends in a direction tending toward a plane taken at right angles to and extending through the plane of the body portion of the sheet, the plane of said direction being inclined relative to the plane of the sheet.

10. A sheet piling member comprising a metallic sheet having each of its edge portions formed with a return bend, said bend having its outer arm extending in a direction tending toward a plane taken at right angles to and extending through the plane of the body portion of the sheet, the free edges of the bends being located intermediate the side edges of the piling sheet each free edge being spaced from the plane of the adjacent side edge of the sheet.

11. A sheet metal piling member comprising a metallic sheet having its edge-portions

in cross-section each formed to provide an open-ended longitudinally-extending groove having substantially parallel side walls, the open end of the groove being located at one of the lateral ends of the groove, the opposing end of the groove being located a greater distance from a plane taken at right angles to and extending through the main portion of the sheet than the open end of the groove.

12. A sheet metal piling member comprising a metallic sheet having its edge-portions in cross-section each formed to provide an open-ended longitudinally-extending groove, having parallel side walls, the open end of the groove being located at the inner end of the groove.

13. A sheet metal piling member comprising a metallic sheet having its edge portions in cross-section each formed to provide an open-ended longitudinally-extending groove, the open end of the groove being located at one of the ends of the groove, the distance between the open ends of the grooves of the opposing edge portions of the sheet being less than the distance between the closed ends of the same grooves.

14. Interlocking sheet-metal piling comprising metallic sheets having inter-engaging edge-portions, each sheet having each of its edge-portions in cross-section formed with an open-ended longitudinally-extending groove, one wall of each groove being in direct opposition to the similar wall of the groove of the adjacent sheet when the sheets are interlocked, said opposing walls of the grooves having their facial planes extending at an angle to a plane taken at right angles to and extending through the plane of the body of the sheet.

15. Interlocking sheet-metal piling comprising metallic sheets having inter-engaging edge-portions, each sheet having each of its edge-portions in cross-section formed with an open-ended longitudinally-extending groove the walls of which are of similar configuration, one wall of each groove being in direct opposition to the similar wall of the groove of the adjacent sheet when the sheets are interlocked, said opposing walls of the grooves having their facial planes extending at an angle to a plane taken at right angles to and extending through the plane of the body of the sheet.

16. Interlocking sheet-metal piling comprising metallic sheets having inter-engaging edge-portions, each sheet having each of its edge-portions in cross-section formed with an open-ended longitudinally-extending groove the walls of which are of similar configuration, one wall of each groove being in opposed contact with the similar wall of the groove of the adjacent sheet when the sheets are interlocked, said opposing walls of the grooves having their facial planes extend-

ing at an angle to a plane taken at right angles to and extending through the plane of the body of the sheet.

17. Interlocking sheet-metal piling comprising metallic sheets having inter-engaging edge-portions, each sheet having each of its edge-portions in cross-section formed with an open-ended longitudinally-extending groove, one wall of each groove being in direct opposition to the similar wall of the groove of the adjacent sheet when the sheets are interlocked, the open end of said groove being located intermediate the side edges of the sheet.

18. Interlocking sheet-metal piling comprising metallic sheets having inter-engaging edge-portions, each sheet having each of its edge-portions in cross-section formed with an open-ended longitudinally-extending groove, one wall of each groove being in direct opposition to the similar wall of the groove of the adjacent sheet when the sheets are interlocked, the plane of said opposing walls being angular with respect to a plane taken at right angles to and extending through the plane of the sheets.

19. Interlocking sheet-metal piling comprising metallic sheets having inter-engaging edge portions, each sheet having a longitudinally-extending groove located in each edge-portion, each groove having an open end, one wall of the open end of a groove of one sheet extending within a groove of the adjacent sheet and engaging a wall of the groove of the latter sheet beyond its open end.

20. Interlocking sheet metal piling comprising metallic sheets having inter-engaging edge-portions, each sheet having its edge-portions in cross-section formed with a return bend to form an open-ended longitudinally-extending groove, said return bend having its plane extending in a direction tending toward a plane at right angles to and extending through the plane of the body-portion of the sheet, the end of the bend being free, the free end of one bend extending into the groove of the bend of the adjacent sheet.

21. Interlocking sheet metal piling comprising metallic sheets having inter-engaging edge-portions, each sheet having its edge-portions in cross-section formed with a return bend to form an open-ended longitudinally-extending groove, the end of the bend being free, the free end of one bend extending into the groove of the bend of the adjacent sheet, said engaging free ends each forming a barrier against separation of the sheets in a lateral direction.

22. Interlocking sheet-metal piling comprising metallic sheets having inter-engaging edge-portions, each sheet having its edge-portions in cross-section formed with a return bend to form an open-ended longitudinally-extending groove, the end of the bend

being free, the free end of one bend extending into the groove of the bend of the adjacent sheet the walls of the grooves adjacent the free end of the engaged bends being in direct opposition to each other in a manner to prevent lateral separation of the sheets.

23. Interlocking sheet-metal piling comprising metallic sheets having inter-engaging edge-portions, each sheet having its edge-portions in cross-section formed with a return bend to form an open-ended longitudinally-extending groove, the end of the bend being free, the free end of one bend extending into the groove of the bend of the adjacent sheet said engaging free ends and the opposed walls forming barriers against separation of the sheets in a lateral direction.

24. Interlocking sheet-metal piling comprising metallic sheets having inter-engaging edge-portions, each sheet having its edge-portions in cross-section formed with a return bend to form an open-ended longitudinally-extending groove, the end of the bend being free, the free end of one bend extending into the groove of the bend of the adjacent sheet the closed ends of the grooves of the engaged bends forming barriers against a separation of the sheets in a lateral direction.

25. A sheet piling member comprising a metallic sheet having each of its edge-portions in cross-section formed with a return bend, the outer portion of which is in parallelism with the inner portion of the bend and which extends in a direction tending toward a plane taken at right angles to and extending through the plane of the sheet, the plane of said direction being inclined relative to the plane of the sheet.

26. Interlocking sheet piling comprising metallic sheets having the side edge of one sheet interlockable with the side edge of the adjacent sheet, the engaging edge of each sheet having an open-sided longitudinally disposed groove, the opposing side walls of which extend in parallel planes, the open end of the groove, being located at one of the lateral ends of the groove and in the plane of one of the side walls of the groove.

27. A sheet piling member comprising a metallic sheet having its edge-portions in cross-section formed with a groove, said sheet having a laterally-projecting rib-structure forming one of the end walls of the groove.

28. A sheet piling member comprising a metallic sheet having its edge-portions in cross-section formed with a return bend to provide a groove, said sheet having a laterally-extending rib-structure intermediate the body-portion of the sheet and the edge-portion, said rib-structure forming one of the end walls of the groove.

29. A sheet metal piling member comprising a metallic sheet having its edge portions in cross-section of similar configuration and each formed to provide an open-ended

longitudinally-extending groove, the open end of the groove being located at one of the lateral ends of the groove, the opposing end of the groove being located a greater distance
5 from a plane taken at right angles to and extending through the main portion of the sheet than the open end of the groove.

30. A sheet metal piling member comprising a metallic sheet having its edge portions
10 in cross-section of similar configuration and

each formed to provide an open-sided longitudinally-extending groove, the open end of the groove being located at the inner end of the groove.

In testimony whereof I affix my signature 15
in the presence of two witnesses.

SLATER, T. FIERO.

Witnesses:

MAX H. SROLOVITZ,
K. H. BUTLER.