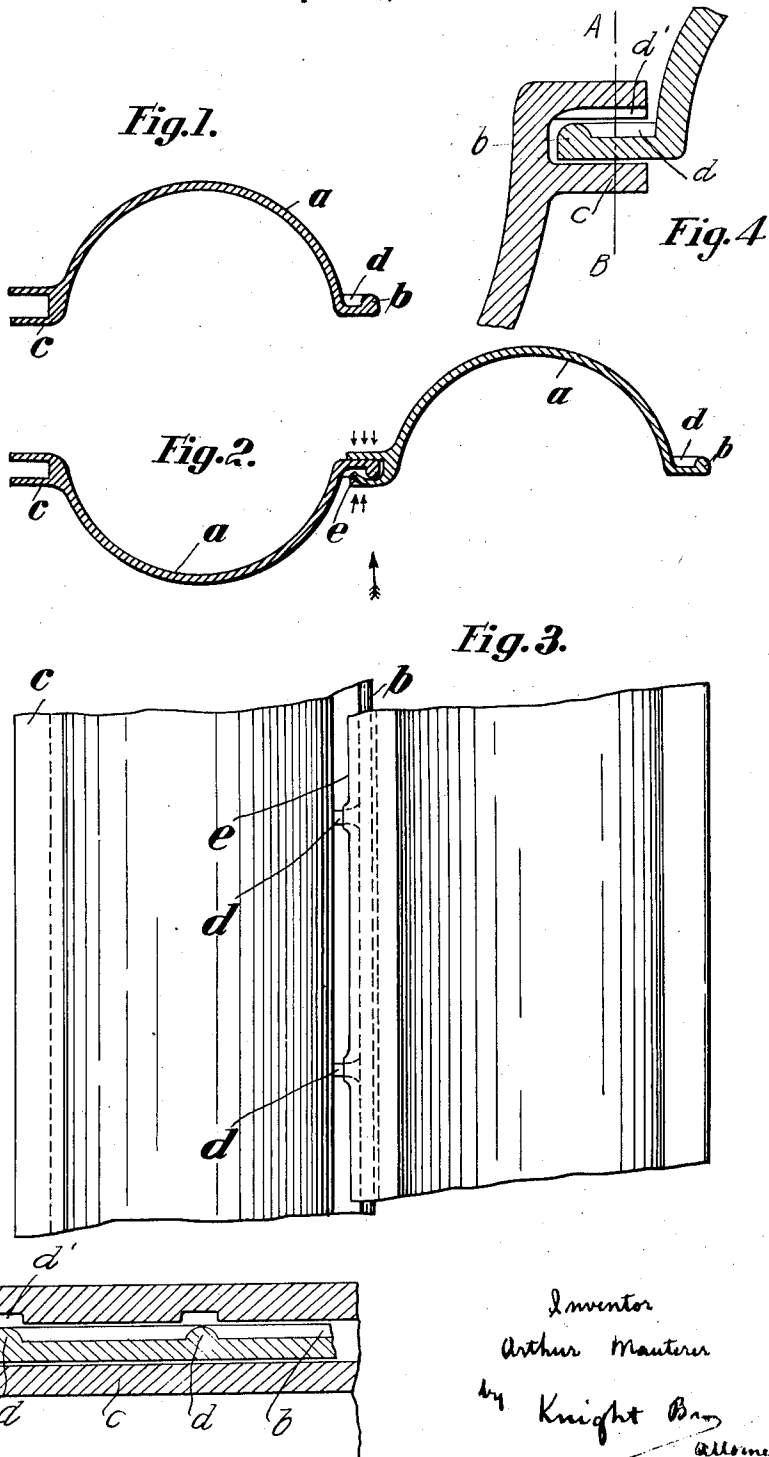


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METHOD OF MAKING PILES

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## UNITED STATES PATENT OFFICE.

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## METHOD OF MAKING PILES.

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This invention relates to the building of walls of iron piles. For the production of walls of this kind a great variety of types of rolled piles of various cross sections have been proposed, all of which however have serious disadvantages. Piles with a sickle-shaped or S-shaped cross section are also known. Piles with a double-curved or S-shaped cross section are difficult to roll. Piles with a single curved or sickle-shaped cross section frequently do not offer sufficient resistance to lateral bending stresses and are particularly difficult to ram in large lengths, this being largely due to the tendency of a pile that is being driven to pull an adjacent pile down with it.

part pile from being displaced relatively to each other during the ramming operation.

The invention is illustrated by way of example in the drawing in which—

Fig. 1 is a cross section of a sickle-shaped pile element,

Fig. 2 is a section through a bi-part pile with an S-cross section formed by joining two pile elements of sickle-shaped cross section together.

Fig. 3 is a side view of a bi-part pile viewed in the direction of the arrow of Fig. 2.

Fig. 4 is a fragmentary transverse section through the longitudinal joint between the pile sections.

Fig. 5 is a longitudinal section of the same corresponding to the line AB of Fig. 4.

The pile elements for producing walls of iron piles according to my invention consist of beams *a*, Fig. 1, of sickle-shaped cross section which may be provided at one edge with a protuberant part or rib *b* and may be formed at the other edge in the form of a trough or claw *c*. When the iron elements or beams, Fig. 1, are rolled, lateral protuberances *b* and projections *d* that extend crosswise, may be produced. These protuberances or projections must be shaped so that they allow the claw *c* of the second part of the pile to be slipped over them. When the claw of a second part has been slipped over the edge of the first part provided with protuberances or ribs *b*, lateral forces as indicated by the arrows in Fig. 2 are applied to the cheeks of the claw *c* so that the claw *c* firmly interlocks with rib *b* at the edge of the second part. This interconnecting operation can be carried out at the locality where the pile wall is to be built or it can be executed at the rolling mill by means of air-driven hammers. The edge *e* is thereby made to grip the lateral rib *b* and also the transverse projections *d* so that the two pile elements are fixed to each other not only by the friction between their interlocking members but also by a positive interlocking action. The projecting locking ribs *d* and co-operating recesses *d*<sup>1</sup> in the claw *c* may be produced when rolling the pile elements by simple means well known in the art. The shape of the projections and of the cross section of the pile elements and also of the interlocking members *b* and *c* may differ from the shapes shown in the drawing without departing from the scope.

The object of the present invention is to produce a pile which can be easily rolled like a pile with a sickle-shaped cross section but which at the same time offers greater resistance to lateral bending stresses. Furthermore, a pile constructed according to the present invention, can be rammed in as readily as one having an S-shaped cross section. This is accomplished by making the piles of two parts of sickle-shaped cross section and joining these parts together so as to form an S-shaped pile before it is rammed in. The two sickle-shaped pile elements are formed at their edges with interlocking members that are caused to interlock by the application of lateral forces. It has been found that bi-part piles produced in this manner have excellent ramming properties. Thus piles having a full-wave cross-section have two properties which render them superior to those which are provided with a half-wave cross-section. In the first place, the former has double the inertia of the latter. In the second place the resistance offered by the medium in which the piles are driven, is doubled for the former as compared to the latter while the sliding friction between a previously-driven pile and one in process of being driven, is substantially the same for piles of both types. It is in connection with these properties that the advantages to be derived by the hereinafter described method of making piles with cross-sections of compound curvature, will be apparent. I have found that a very advantageous form of bi-part pile is produced by providing the interlocking edges of the parts with projections or protuberances which assist the frictional forces at the joint in preventing the parts of the bi-

of the invention. The important feature consists in forming a pile with a cross section of two similar elements *a* which are joined together before ramming. In constructing a wall the claw *c* of the next pile to be driven will embrace an edge similar to *b* of the prior pile or an edge similar to *b* may be slipped into the claw *c* of a previously rammed pile. This will depend on the position of the pile wall.

It has been found in practice that by the afore described method very long piles can be easily rammed without any of the difficulties arising that have been encountered in driving piles with known cross sections. The novel method is particularly adapted to overcome the danger of deflections of the piles or of their interlocking members parting from each other. As has been pointed out above, this method affords a practicable way to make and use piles with a full-wave cross-section in place of those which have a half-wave cross-section. It therefore becomes feasible to overcome the objections which are inseparably connected with the use of piles of the latter type. To be particularly noted in this connection is the possibility of greatly reducing or practically eliminating the tendency on the part of a pile in process of being driven to drag down a previously-driven pile with which it is in slidable contact along one edge. This is so for the reason that a pile with a full-wave cross-section has double the inertia and double the resistance to overcome during the pile-driving operation as compared with the same factors connected with driving a pile which has a half-wave cross-section. Thus, inertia and driving resistance are doubled in the former as compared to the latter while the frictional engagement between successively driven piles is substantially the same for both types of piles.

I claim:

1. The method of constructing a metal pile having a full wave cross-section, which method consists in separately forming complementary parts of said pile with oppositely curved half-wave cross-sections, and in rigidly uniting said parts along adjoining longitudinal edges thereof with the half-wave cross-sectioned parts extending in opposite directions from the rigid joint between the adjoining edges of said complementary parts.

2. The method of constructing a metal

pile which method consists in separately rolling complementary parts of said pile with curved cross-sections, and in rigidly uniting one longitudinal edge of one of said parts with one longitudinal edge of the other of said parts, the other longitudinal edges of said parts being presented outwardly in opposite directions with respect to the rigid longitudinal joint between said parts and with the curved cross-sections of said parts disposed on opposite sides of a common plane through said oppositely and outwardly presented other longitudinal edges.

3. The method of constructing a metal pile which method consists in separately rolling complementary parts of said pile with oppositely curved cross-sections, and with one edge of each of said complementary parts adapted to interlock with one edge of the other of said complementary parts, in interlocking said edges with said complementary parts extending oppositely with respect to said interlocking edges and with said curved cross-sections disposed on opposite sides of a common plane, and finally in rigidly uniting said interlocking edges.

4. The method of constructing a metal pile, which method consists in separately rolling full length part-sections of the desired pile with half-wave cross-sections, in arranging said part-sections edge to edge along one edge of each part-section and with the other edge of each part-section presented away from the other part-section, said half-wave cross-sections being disposed on opposite sides of a plane common to the opposite edges of both of said part-sections to form a full wave cross-section of compound curvature, and finally in rigidly uniting the adjoining edges of said part-sections to form a pile having full-wave cross-section.

5. As an article of manufacture, a metal pile comprising two complementary parts, said parts being rolled separately to provide them with trough-shaped cross-sections and rigidly united along adjoining longitudinal edges with said complementary parts presented in opposite directions from the rigid joint therebetween and having the trough-shaped cross-sections of said complementary parts respectively disposed on opposite sides of a common longitudinal plane through said metal pile.

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