W. B. TEMPLETON.

METAL SHEET PILING.

APPLICATION FILED DEC. 15, 1911.

Patented Nov. 18, 1913.

1,078,970.

3 SHEETS—SHEET 1.

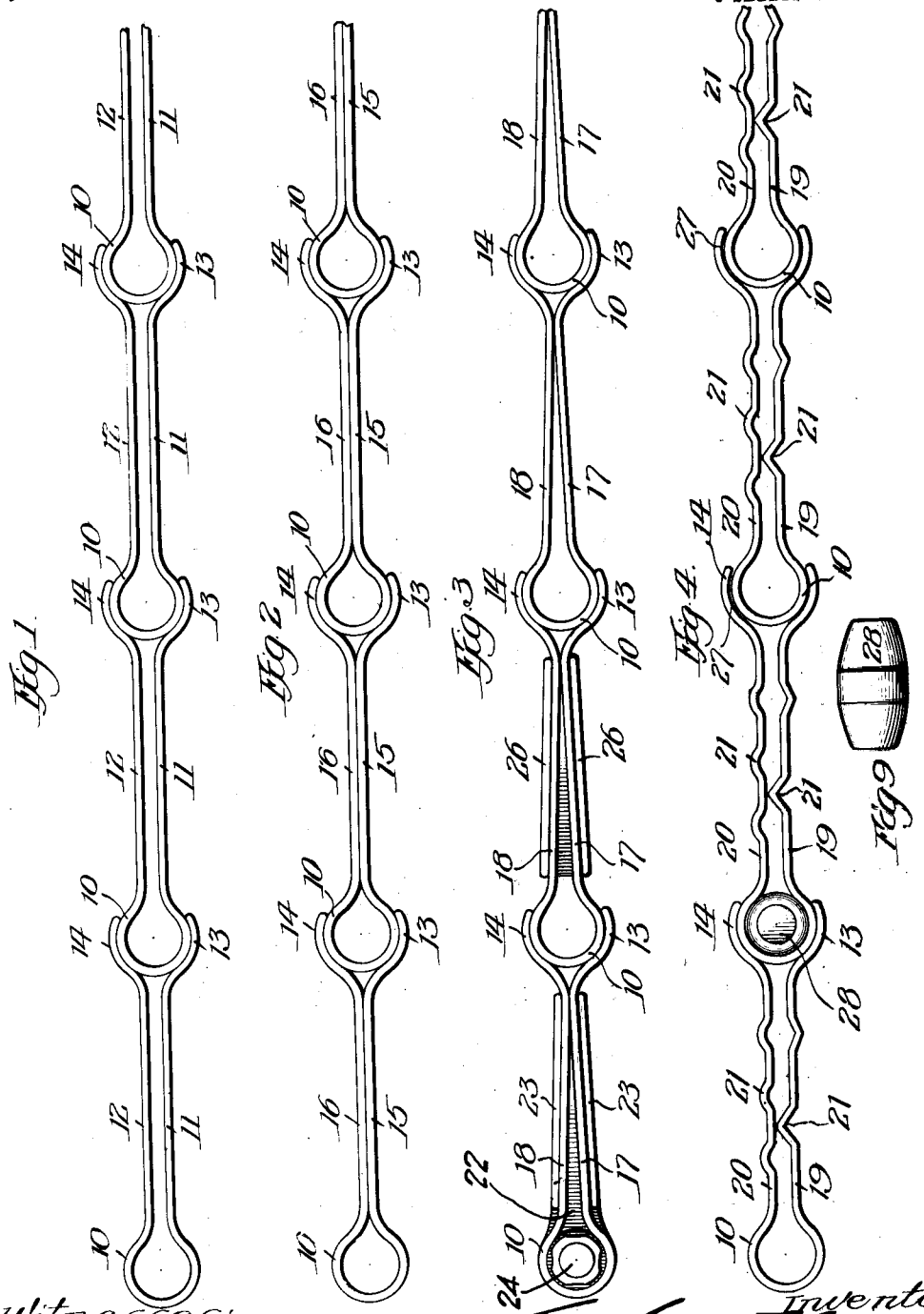


Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 9.

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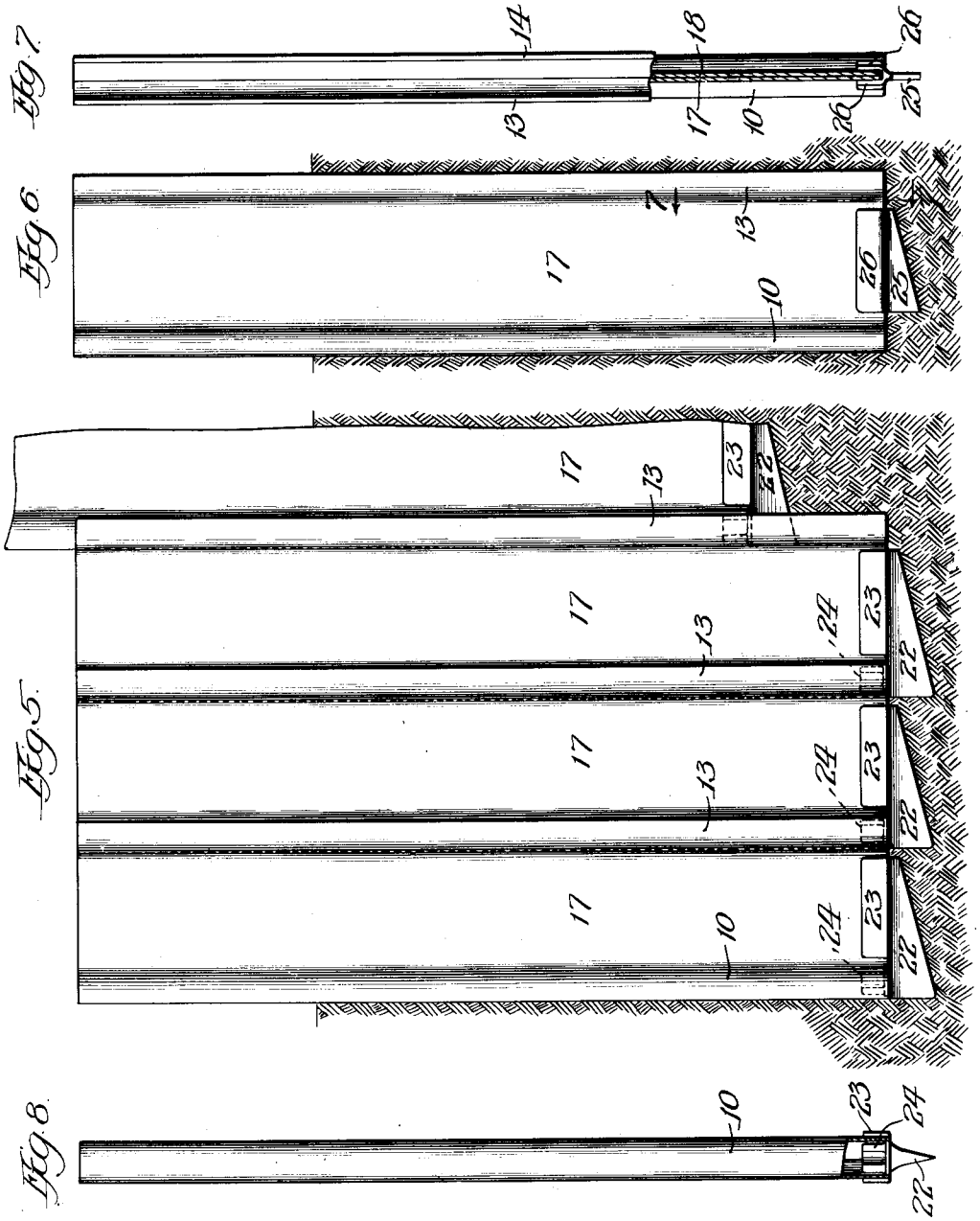
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3 SHEETS—SHEET 2.



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3 SHEETS—SHEET 3.

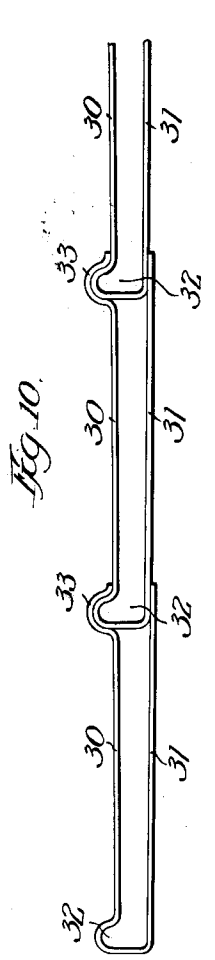


Fig. 10.

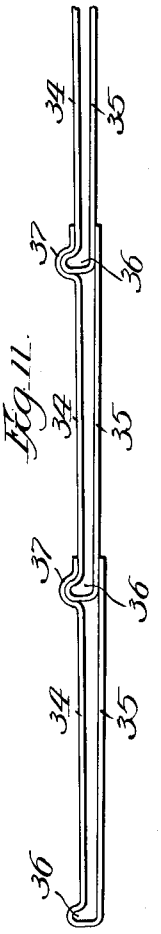


Fig. 11.

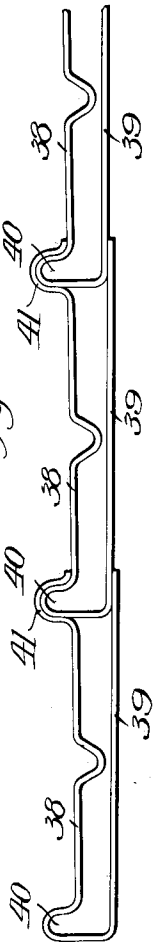


Fig. 12.

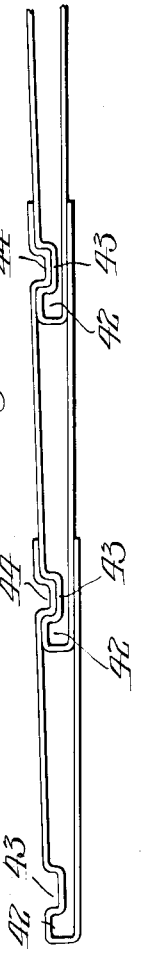


Fig. 13.

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UNITED STATES PATENT OFFICE.

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METAL SHEET-PILING.

1,078,970. Specification of Letters Patent. Patented Nov. 18, 1913.

Application filed December 15, 1911. Serial No. 666,022.

To all whom it may concern:

Be it known that I, WALTER B. TEMPLETON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Metal Sheet-Piling, of which the following is a specification.

My invention relates to the construction of interlocking sheet piling employed in constructing cofferdams, foundations, retaining walls, and similar work, and, while not limited to such uses more particularly relates to the construction of metal sheet piling used in sewer and trench work combining the strength and rigidity with a minimum amount of metal, necessary in a metal sheet piling competing with the ordinary well known wooden sheeting.

One object of my invention is to provide a novel interlocking sheet piling made of rolled metal plates or sheets and composed of integrally formed piling units having the opposite longitudinal side edges thereof arranged to interfit tightly in interlocking engagement with the interlocking members co-acting to form water tight joints between the adjacent piling units in constructing a continuous wall.

Another object of this invention is to provide hollow interlocking metal sheet piling units, formed integrally of a comparatively thin and wide rolled metal plate or sheet, the plate or sheet being bent and doubled upon itself to form a hollow head or interlocking member along one longitudinal edge of the piling unit, bring the marginal side edges of the plates or sheets into proximity so as to form an undercut or recessed groove or interlocking member adjacent to the opposite longitudinal edge of the piling unit, and to form a double web member connecting the so-formed interlocking members.

A further object of my invention is the production of a hollow sheet piling in which great strength and resistance to side pressure is combined with a minimum amount of metal.

A still further object of my invention is to provide an interlocking metal sheet piling having improved means whereby the driving operations are facilitated and the effective depth to which the piling is driven is increased and by means of which the piling units are maintained in alinement in a more effectual manner during the driving operations.

Further objects of the invention will appear as is more fully described hereinafter.

Referring to the accompanying drawings, forming part of this specification: Figure 1 is a plan showing the ends of a series of hollow sheet piling units constructed and arranged and assembled in interlocking engagement in forming a continuous wall in accordance with my invention. Fig. 2 is a similar plan showing a modification in which the adjoining faces of the double members forming the web of the piling units are substantially in contact, instead of being separated as in Fig. 1. Fig. 3 is a similar plan showing a further modification in the construction of the piling units made in accordance with this invention. Fig. 4 is a plan similar to Fig. 1 showing another modification in which the web member of the piling units is grooved or corrugated so as to stiffen and strengthen the piling sections. Fig. 5 is a side elevation showing a plurality of piling sections as assembled in interlocking engagement in forming a sheet piling wall and showing the novel driving shoe forming part of my invention. Fig. 6 is an elevation similar to Fig 5 and showing a modified form of driving shoe as applied thereto. Fig. 7 is a side elevation of the piling construction shown in Fig. 6, a part thereof being in section, the section being taken on the line 7—7 of Fig. 6. Fig. 8 is a side elevation partly in section of the construction shown in Fig. 5. Fig. 9 is a side elevation of a metal plug or rod which may be used in expanding the hollow head or interlocking member to bring the engaging interlocking members more tightly into contact in sealing the joints between interlocking piling sections or units. Fig. 10 is a plan showing the ends of a series of hollow sheet piling units of modified form, as constructed and assembled in interlocking engagement in accordance with this invention. Fig. 11 is a similar plan showing another modified form of sheet piling constructed in accordance with this invention. Fig. 12 is a plan similar to that shown in Fig. 1, showing a still further modification in the construction of the piling units also made in accordance with this invention. Fig. 13 is a similar plan showing a further modified form of piling in which the

hollow piling section has substantially straight sides on both sides thereof.

By reference to the accompanying drawings, it will readily be seen that my novel sheet piling is constructed with the idea of forming each section or piling unit integrally from a rolled metal plate or sheet of uniform thickness and the desired length, the plate being bent and doubled upon itself to provide a hollow head or interlocking member adjacent to one longitudinal edge and an undercut or recessed open groove adjacent to the opposite edge of the piling unit within which the hollow head of an adjoining piling unit or section is held in interlocking engagement, the interlocking members of the piling units being connected by means of a double formed web member.

In the construction shown in Fig. 1, the thin metal plate is bent to form a substantially circular hollow head member 10 along one edge of the web members 11 and 12. The longitudinal side edges of the plate are located on the same side of the piling section and terminate in arc shaped bends 13 and 14, these bends forming an undercut or recessed groove or interlocking member, the internal diameter of which is substantially the same as the outside diameter of the hollow head or interlocking member 10. In this construction the portions 11 and 12 of the double web member are separated so as to form, with the hollow head member and the recessed interlocking member, a piling unit which is hollow. This hollow double wall construction is of particular advantage where it is desired to exclude moisture, as the pressure on the outside of the hollow piling will force the double wall of the piling members tightly into engagement with the hollow head members and make a rightly sealed joint between the piling units.

In Fig. 2 a construction very similar to that shown in Fig. 1 is shown. In this construction the adjacent faces of the web members 15 and 16 are brought substantially into contact so as to in a sense strengthen and support each other.

In Fig. 3 the construction is somewhat similar to that shown in Fig. 1, except that the metal is not bent so sharply in forming the hollow head members with the result that the web members 17 and 18 converge from the hollow head members to the point where the bends are begun in forming the hollow recessed groove on the opposite edge of the piling members.

In Fig. 4 the construction is very similar to that of Fig. 1, except that the hollow head members are slightly smaller than the engaging recessed groove in which they are fitted when in interlocking engagement, and that the web members 19 and 20 are provided with grooves or corrugations 21 for the purpose of stiffening and strengthening the webs vertically, this construction being preferable where the driving must be done in hard soil.

In Figs. 5 to 8 inclusive, the piling construction of Fig. 3 is shown in elevation, a driving shoe 22 being applied to each piling unit. This driving shoe is provided with upstanding flanges or ribs 23 spaced apart to form a recess in which the webs of the piling sections are inserted in applying the driving shoes, the flanges on the shoes being shaped to conform to the alinement of the double web members. Extending to the same side as the flanges 23 in the same plane therewith, is a hub or boss 24 which is substantially circular in outline and is adapted to fit snugly within the hollow head 10 of the piling units. The driving shoes 22 are provided preferably with a sharpened toe portion which is triangular in outline, the shoe being applied in practice in such manner that the deepest point in the shoe is located on the pile being driven at the side next to the last driven pile. In this way the pile is caused to climb toward the driven piles, overcoming the tendency of the piles while being driven to pull away from the driven pile. In the shoe construction shown in Figs. 6 and 7 the hub or boss 24 is omitted, in this construction the shoe having the triangular toe portion 25 and the two upstanding flanges 26, which are arranged to embrace the web of the piling units.

In Fig. 10 the double web members 30 and 31 extend in substantially parallel lines, and a hollow head 32 is formed adjacent to one edge of the piling member, undercut recesses 33 being formed adjacent to the opposite side edge of the so-formed piling member or unit. In this construction, as in the preceding constructions, the hollow head in one piling unit engages with the undercut recess in the adjoining piling unit when the piling is driven in assembled relation.

In Fig. 11 the double web members 34 and 35 extend in parallel lines and are located so as to be substantially in contact, a hollow head 36 being formed on one marginal edge of the piling unit and an undercut or recessed groove 37 being formed on the opposite marginal edge of the so-formed piling unit. In this construction, as before, the head on one piling unit is engaged by the walls of the recessed groove in the adjacent piling unit in driving the piling.

In Fig. 12, which is very similar to that shown in Fig. 10, one or both of the web members 38 and 39 will be provided with longitudinally extending corrugations or grooves to stiffen the piling members. The piling unit has a hollow head 40 and an undercut or recessed groove 41 on its opposite

marginal edges which are constructed in a similar manner to that shown in Fig. 10.

In Fig. 13 a hollow piling member is shown having a hollow head 42 and a recessed groove 43 in one marginal edge of the piling, a recess or groove 44 in the opposite marginal edge of the piling forming one interlocking member in this form of piling. The outer faces of the web members are substantially plane surfaces.

The driving shoe shown in connection with the preceding figures is applicable for use in connection with the piling sections shown in Figs. 10 to 13, the flanges on the shoes and the heads formed thereon being modified to conform to the configuration of these constructions.

In driving, if it is found that the friction generated between the surfaces of the bulb and the groove makes such driving difficult it may be found preferable to form the bulb slightly smaller than the groove, as is shown at 27 in Fig. 4. This, of course, will not provide a tight joint, but to secure this I may ram some solid such as clay into the hollow head or employ one or more plugs 28 of a size slightly larger than the interior of the bead, any number of these plugs being adapted to be driven down to expand the rib into contact with the walls of the groove. If the plies are to be removed after having performed their duty the plugs may be driven out of the bottom of the piles and the sections removed with ease. Or it may be found desirable to insert a rod into the round opening in the bead, driving this down to properly expand the sides into contact with the female member. In such cases, of course, the rod will be pulled out first when the units are to be removed.

It will be understood that I have shown herein only the most preferable of many forms in which the piles might be made, and I do not therefore, wish to be limited to the exact construction herein shown and described.

I claim:

1. A wall composed of a plurality of units, each unit being formed from a sheet of metal doubled on itself, said unit having an expansible interlocking portion on one edge and a substantially non-contractible interlocking portion on the opposite edge, the non-contractible edge being shaped to conform to the interior of the expansible edge, whereby a substantially water-tight joint is provided without the addition of packing material, substantially as described.

2. A wall composed of a plurality of units, each unit being formed from a sheet of metal doubled on itself, said unit having an expansible interlocking portion on one edge and a substantially non-contractible interlocking portion on the opposite edge, the non-contractible edge being shaped to conform to and completely fill the expansible edge when the units are interlocked, substantially as described.

3. A wall composed of a plurality of units, each unit being formed from a sheet of metal doubled on itself, said unit having an expansible interlocking portion on one edge and a substantially non-contractible interlocking portion on the opposite edge, the non-contractible edge being shaped to cause a slight separation of the folded sides when the units are interlocked, substantially as described.

4. Interlocking metal sheet piling composed of piling units integrally formed of a metal plate, said plate being bent and doubled to form expansible interlocking members on opposite side edges of a double connecting web member, the interfitting interlocking members of adjacent piling units enlarging to expand and tighten the contacting surfaces thereof in interlocking engagement.

5. Interlocking metal sheet piling composed of piling units integrally formed of a metal plate, said plate being bent and doubled upon itself to form hollow expansible interlocking members on opposite edges of a double connecting web member, the interfitting interlocking members of each adjacent piling unit interfitting and expanding to tighten the contacting surfaces thereof in interlocking engagement.

6. Interlocking metal sheet piling composed of piling units integrally formed of a metal plate, said plate being bent and doubled upon itself to form the side walls of a hollow expansible head and a recessed groove on opposite sides of a laminated connecting web, the side walls of the head and the recessed groove of adjacent piling units interfitting and enlarging to expand and tighten and make waterproof the contacting surfaces thereof in interlocking engagement.

7. Interlocking metal sheet piling composed of piling units integrally formed of a metal plate, said plate being bent and doubled upon itself to form hollow expansible interlocking members on opposite side edges of a laminated and corrugated connecting web member, the interlocking members of adjacent piling units interfitting and expanding to tighten the contacting surfaces thereof into interlocking engagement.

8. Interlocking metal sheet piling comprising in combination a piling unit integrally formed of a metal plate, said plate being bent and doubled upon itself to form hollow enlarged expansible interlocking members on opposite side edges of a laminated connecting web member, and a driving shoe adapted to grasp the web of the

piling unit during the pile driving operation.

9. Interlocking metal sheet piling composed of piling units integrally formed of a metal plate, said plate being bent and doubled upon itself to form hollow expansible interlocking members on opposite side edges of a laminated connecting web member, the interlocking members of adjacent piling units interfitting and expanding to tighten the contacting surfaces thereof in interlocking engagement, and independent means for expanding the engaging interlocking members of adjoining piling members.

10. Interlocking metal sheet piling composed of piling units integrally formed of a metal plate, said plate being bent and doubled upon itself to form the side walls of an enlarged hollow, expansible head, and an enlarged recessed groove on opposite side edges of a double connecting web member, the side walls of the head and the recessed groove of adjacent piling units interfitting and expanding to tighten the contacting surfaces thereof in interlocking engagement, and independent means for expanding the enlarged heads within the engaging recessed grooves of the interlocking piling units.

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