

No. 851,486.

PATENTED APR. 23, 1907.

J. T. PYLE.
PILE STRUCTURE.
APPLICATION FILED AUG. 16, 1906.

3 SHEETS—SHEET 1.

Fig. 1

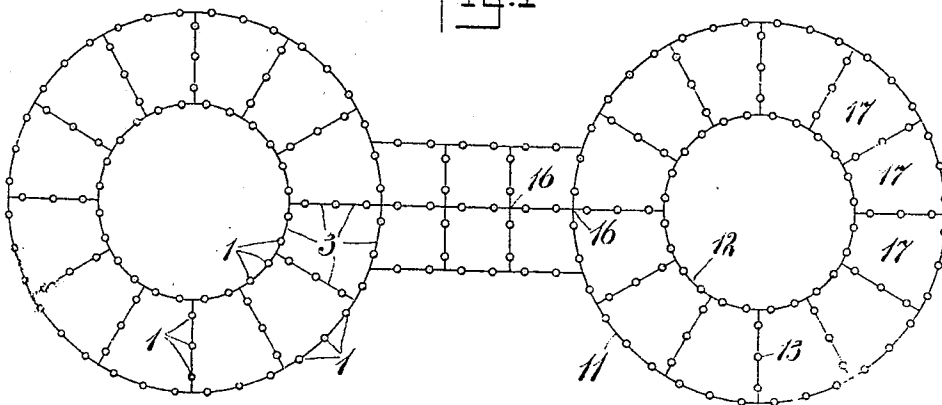
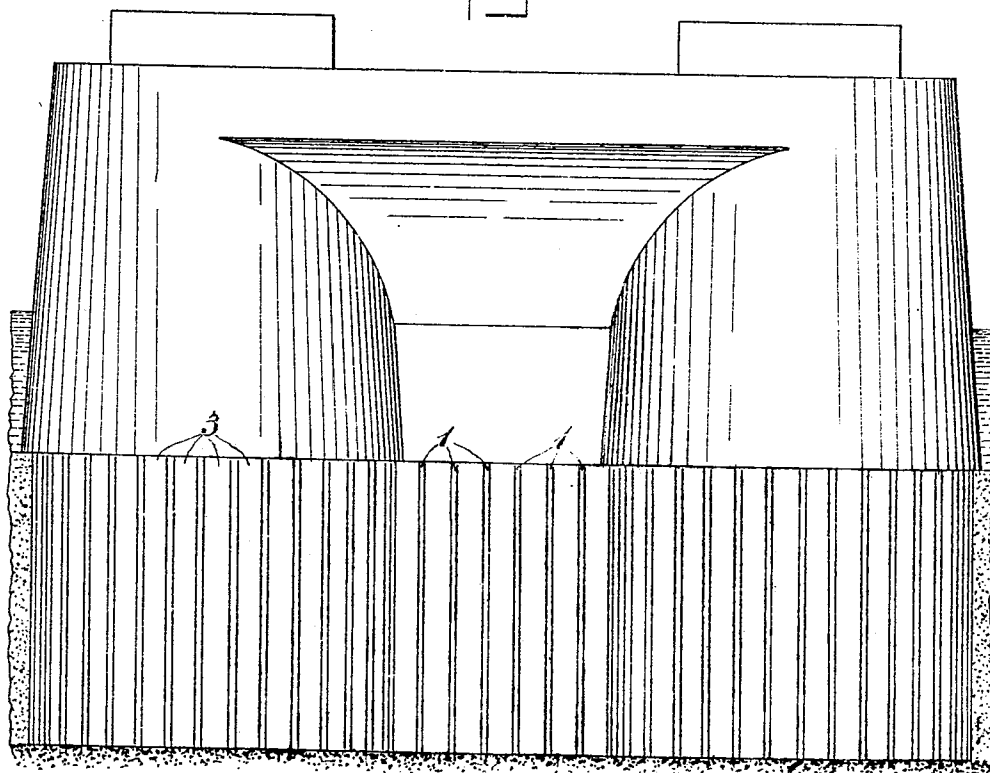


Fig. 2



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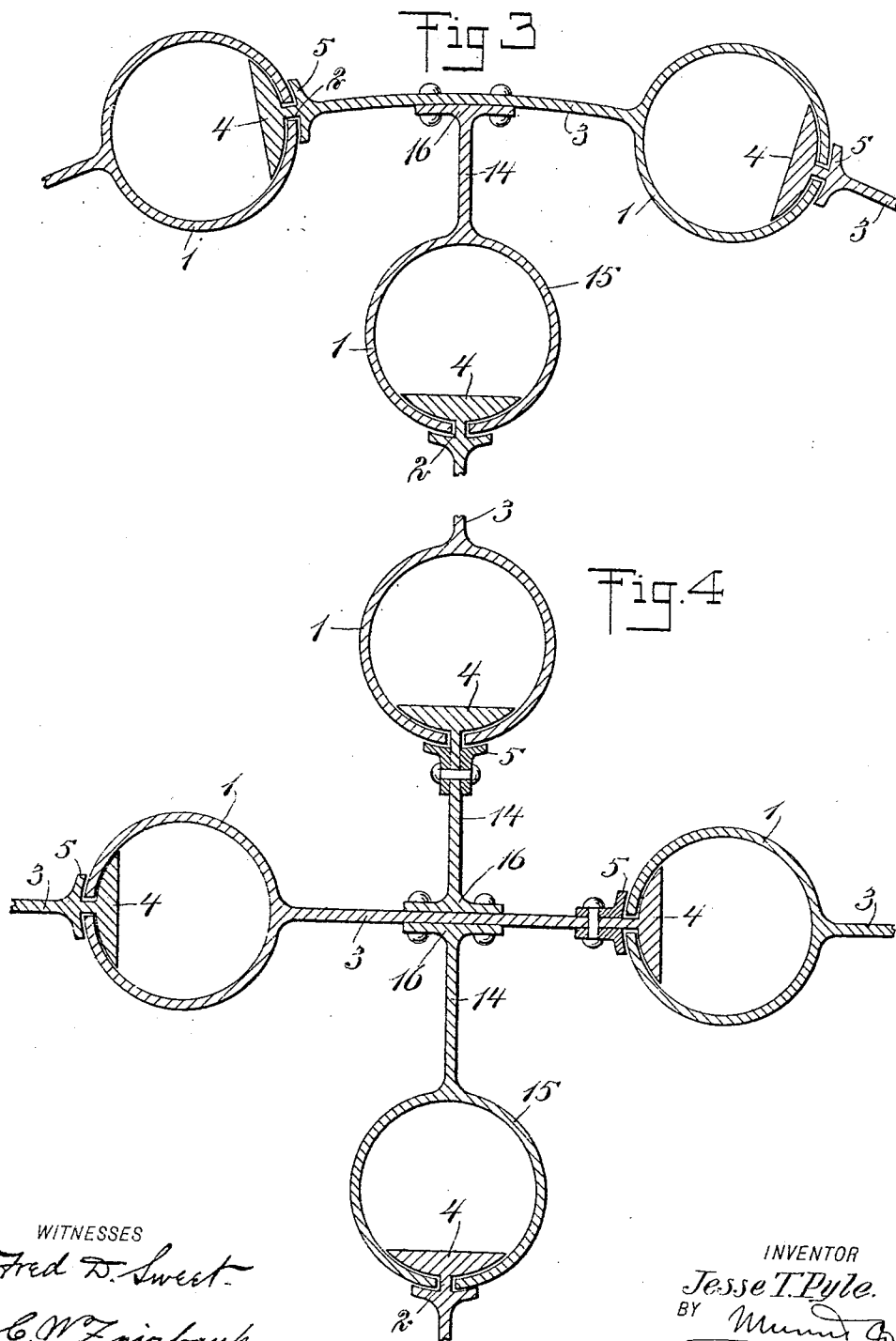
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3 SHEETS—SHEET 2.



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3 SHEETS—SHEET 3.

Fig. 5

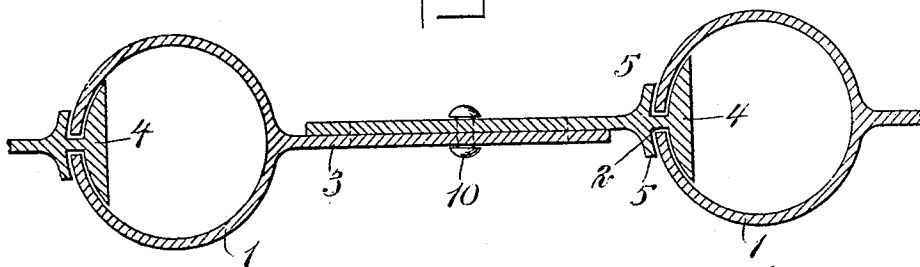


Fig. 6

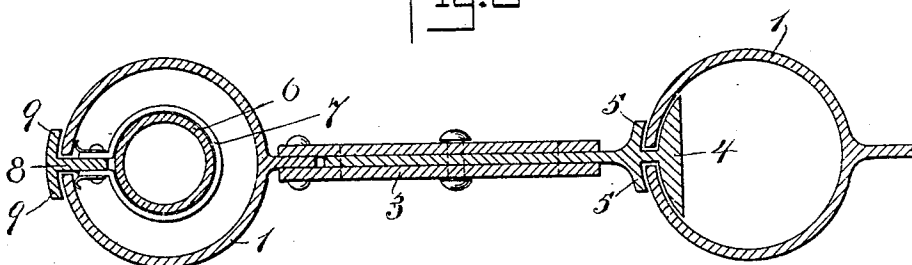
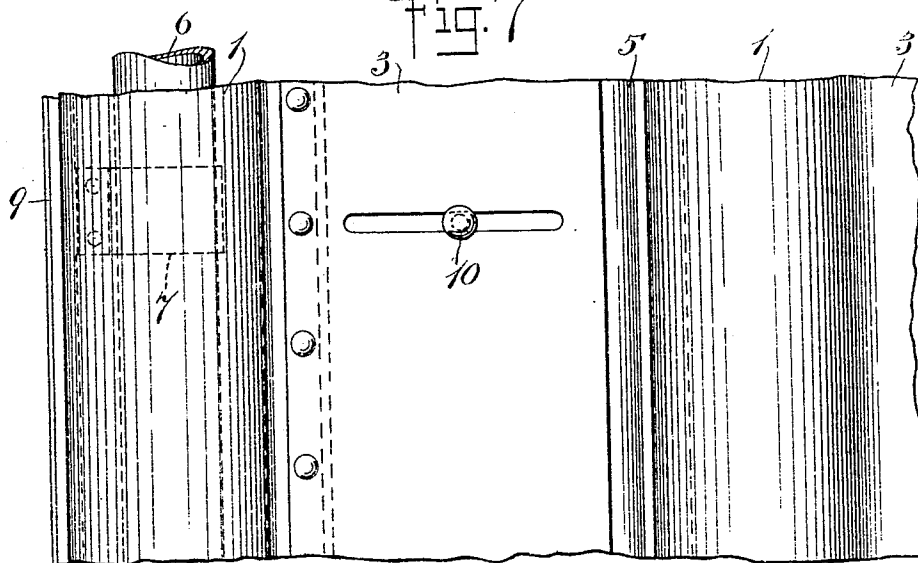


Fig. 7



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UNITED STATES PATENT OFFICE.

JESSE THEODOR PYLE, OF AMARILLO, TEXAS

PILE STRUCTURE.

No. 851,436.

Specification of Letters Patent.

Patented April 23, 1907.

Application filed August 16, 1906. Serial No. 330,823.

To all whom it may concern:

Be it known that I, JESSE THEODOR PYLE, a citizen of the United States, and a resident of Amarillo, in the county of Potter and State of Texas, have invented a new and Improved Pile Structure, of which the following is a full, clear, and exact description.

This invention relates to certain improvements in structure formed of sheet piling driven into sand or soft earth and having the enclosed material removed, whereby the pile may be filled with concrete to serve as a foundation for bridges, buildings and the like. The walls of the structure are made up of a large number of sections which are driven into the sand or soft earth one at a time and each succeeding one upon being driven becomes locked to the one last inserted.

It is particularly old to employ separable sections of this kind in the construction of piers, and it is further old to form these sections in a large circle or ring and excavate the material from inside the said enclosure, but a single ring of this kind is entirely inadequate, if not inoperative, where it is desired to drive piling to a considerable depth, as a single row is not sufficient to withstand the enormous pressure upon the outside after the enclosed material is removed and before the concrete is inserted.

By the use of my improved sections, piles may be driven to any depth desired and there is no liability of the piles caving in before the concrete is packed in place.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures, in which

Figure 1 is a diagrammatical plan of a bridge pile showing the arrangement of sections; Fig. 2 is a side elevation thereof; Fig. 3 is a horizontal section of one of the T-shaped sections employed; Fig. 4 is a horizontal section of another form; Fig. 5 illustrates one form of the extensible web; Fig. 6 illustrates a second form of the extensible web, and also the means for holding the jet tube in the first section inserted; and Fig. 7 is a side elevation of the form shown in Fig. 6.

The simplest form of section which I employ, comprises a tube 1 having a slot 2, extending along one side throughout its entire

length, and having a web 3, extending from the tube along its entire length on the side opposite to the slot. At the end of the web is a head 4, whose shape in cross section is substantially a sector of a circle, and adapted to fit the inside of the tube of the next adjacent section, while a flange adjacent the head passes through the slot of this section.

On the web 3 and adjacent the head 4 are two flanges 5 which may be integral with the web or of separate pieces rigidly secured thereto, which flanges extend in the arc of a circle and spaced from the surface of the head at a distance slightly greater than the thickness of the wall of the adjacent tube. These flanges fit the outer wall of the tube adjacent the slot therein and serve to prevent the web of one section from extending more than the desired distance into the slot of the tube on the next adjacent section. These sections are driven into the sand one at a time, and as each one is driven a jet tube 6 is inserted into the tube 1 of the section and the material within the tube is either forced or pumped out of said tube. It will be noted that after the first tube is inserted, the slot in the second will be closed by the head 4 of the first while the second is being inserted and the material may be easily removed from the tube of said second and each succeeding section, but at the time the first section is driven, it is necessary to provide certain means for closing the slot to prevent sand from coming into the tube as fast as it is removed by the jet tube 6.

In Figs. 6 and 7, I have shown a jet tube 6, having a plurality of bands 7 surrounding the same, and each band attached to a short web 8, having flanges 9 fitting the outer surface of the tube. As the first section is driven into the sand it carries the jet tube with its bands 7 and slot-closing means 8 and 9, so that the sand may be removed from the section and other sand prevented from entering the slot. After the first section is inserted, this particular means is no longer necessary in connection with the other sections and a simple jet tube is freely inserted within the tube of the second and each succeeding section to remove the material therefrom. As soon as one section is driven and the material removed from the tube, the latter is filled with concrete to strengthen and rigidly hold the

same in place. These sections are usually driven in the arc of a circle and as the last section is about to be inserted it is often found that the distance between the sections on the opposite sides of the remaining gap is greater or less than the normal width of a section, and to accommodate for this, I provide certain sections having extensible webs, whereby the distance between the tube and the head of said section may be made greater or less to exactly fill the space between the adjacent sections. This may be accomplished by making a section of two separate parts and secured together the overlapping portions of the web by rivets passing through slots in the overlapping portions, as illustrated in Fig. 5, or one portion of the section may have two adjacent web members between which a web member of the other portion of the section is adapted to slide, the three members being held together by rivets passing through slots as in the form above described.

The modification of the extensible web is clearly illustrated in Figs. 6 and 7.

A single ring of these sections is entirely inadequate and even dangerous. When it is desired to sink a pile to any considerable depth and to strengthen the pile, I preferably drive sections to form two concentric rings 11 and 12, as shown in Fig. 1, said rings being spaced and held rigid by radial partitions 13. Both of the rings, and also the partitions are made up of the unit sections above described, but in order to secure the partitions 13 to the concentric rings 11 and 12, I provide a form of section shown in Fig. 3, in which the web 3 has a branch web 14 rigidly secured at an angle thereto, whereby the tube 15 is driven simultaneously with the tube 1 and junction between two rows of sections at an angle with each other is thereby perfected.

In certain forms of piers it is sometimes desirable to have two rows of sections intersecting each other, as shown at 16 in Fig. 1, and I provide the form of section shown in Fig. 4 to be used in cases of this kind. This form of section has two branch webs 14 attached to the main web 3, and one of said branch webs 14 has a tube 15, as in Fig. 3, while the other branch web carries a head 4, said head and tube being at substantially the same distance apart as are the head and tube of the normal unit section.

In driving the sections to form a pier of the shape shown in Fig. 1, the material is excavated from each of the enclosed spaces 17 as soon as the walls forming one of said spaces are completed and the space filled with concrete. The space within the inner ring of sections is likewise excavated and filled with concrete, so that the completed pier is a solid mass of concrete having the sections embedded therein, said section having been employed merely as a coffer-dam to

hold the surrounding material in place while the concrete pier was being filled out.

It is evident that the improved form of sections above described may be employed for placing the concrete foundations in sand at any depth, and is particularly useful where quicksand is encountered. The sections may be employed either for placing concrete piers, bridges, or foundations of buildings, or for any other similar purpose. For coffer-dam work the sections are employed as in the building of concrete piers but the spaces 17, enclosed by the sections, are not filled with concrete, and the row of sections surrounds the place where it is desired to place any suitable structure on the river or lake bed, and when said structure is perfected, the sections may be removed without the same having been injured in any way, and said sections may be again employed for similar work.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. A device of the class described, comprising an outer wall of separable sections, an inner wall of separable sections, and a plurality of partitions composed of similar sections and connected to both of said walls to strengthen and reinforce the same.

2. A device of the class described, comprising an outer ring of separable sections, an inner ring of separable sections, and a plurality of radial partitions composed of similar sections and connected to both of said rings to strengthen and reinforce the same.

3. A device of the class described, comprising an outer ring of separable sections, an inner ring of separable sections, and a plurality of radial partitions composed of similar sections connected to the outer and inner rings and serving to brace and reinforce the same, the space between said rings adapted to be filled with concrete.

4. A device of the class described, comprising an outer ring of separable sections, an inner ring of separable sections, and a plurality of radial partitions, composed of similar sections connected to the outer and inner rings and serving to brace and reinforce the same, each of said sections comprising a tube having a slot extending the entire length thereof, a web on the opposite side of said tube from said slot, and a head on the end of the web adapted to fit within the tube of the next adjacent section.

5. A device of the class described, comprising an outer ring of separable sections, each of said sections comprising a tube having a slot extending the entire length thereof, a web on the opposite side of said tube from the slot, and a head on the end of the web adapted to fit within the tube of the next adjacent section, an inner ring of separable sections similar to the sections of the outer ring,

the webs of certain of the sections of the
outer and inner rings being provided with
branch webs, and sections similar to those
above described for connecting the branch
5 webs of the inner ring with the branch webs
of the outer ring.

In testimony whereof I have signed my

name to this specification in the presence of
subscribing witnesses.

JESSE THEODOR PYLE.

Witnesses:

J. N. FREEMON,

C. A. ROBERTS,

AMY TUSON.