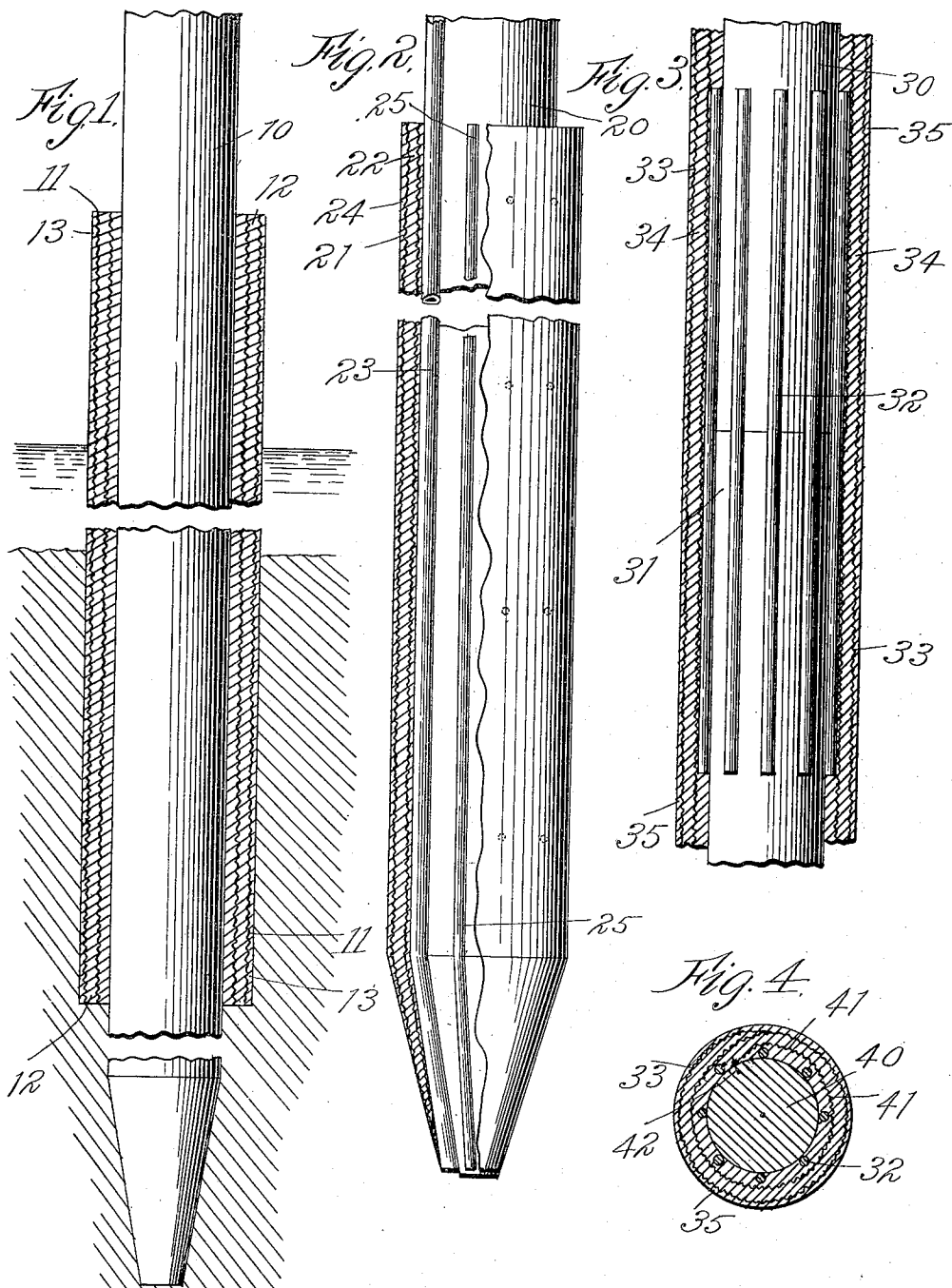


J. W. RIPLEY.
PILE CONSTRUCTION.

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1,124,955.

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UNITED STATES PATENT OFFICE.

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PILE CONSTRUCTION.

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To all whom it may concern:

Be it known that I, JOHN W. RIPLEY, a citizen of the United States, residing at Flushing, county of Queens, State of New York, have invented certain new and useful Improvements in Pile Construction, of which the following is a specification.

My invention relates to the construction of piling or analogous columns for use in docks, bridges, building construction and the like.

An important object of my invention is to provide for a reinforcement or strengthening of wooden piles.

Further objects are to protect wooden piles from the attack of sea worms and the like, to provide for the joining of two or more lengths of piling into a single pile as where great length is desired, and to provide improved means for sinking the piles.

The fundamental principle upon which my invention rests is the wrapping of metallic fabric such as wire mesh, expanded metal and the like together with concrete or the like about the wooden pile, preferably two or more layers of the metal fabric and concrete being employed. To provide for sinking the pile, I may inclose a flushing pipe or other conduit embedded in the wrapper just described. Where two or more lengths or sections of piling are to be formed into a single pile of great length, I employ reinforcing bars of metal or other suitable substance which are embedded in the wrapper.

In order that others skilled in this art may understand and practise my invention, I have hereunto annexed a sheet of drawing showing by way of example some of the preferred forms of the invention.

In said drawings Figure 1 is an elevation partly in section of a wooden pile provided with a wrapper of metal fabric and concrete or the like. Fig. 2 is a similar view partly in section illustrating a form of my invention in which the reinforcing wrapper extends substantially throughout the entire length of the pile, and in which is embedded a flushing conduit. Fig. 3 is a sectional elevation of a form of my invention in which two lengths of piling are joined by reinforcing bars, and a wrapper of reinforcing fabric and concrete or the like, and Fig. 4 is a transverse section of the form of my invention shown in Fig. 3,

also illustrating the manner in which the wrapper may be rolled, in all forms of the pile.

Referring now more specifically to the drawings 10 indicates the wooden center which has wrapped about it two or more layers of metal fabric 11 and concrete or the like 12, preferably with a thin outside layer 13 of cement, mortar or the like for filling in the open spaces left on the outside of the wrapper in the rolling of the wrapper upon the wooden center. In this form of my invention the wrapper extends preferably to about four feet below the mud line and to about two feet above the high water line, although I do not wish to limit the construction to these specific dimensions.

In Fig. 2, 20 is a wooden center upon which is wound two or more layers of metal fabric 21 and concrete or the like 22, a flushing conduit 23 being disposed next to the wooden center embedded in the wrapper. A thin outside layer 24 of cement or the like is preferably applied after the pile has been wrapped, to fill in any crevices left in the process of wrapping. Reinforcing bars or rods 25 may be employed, where additional strength is desired. In this form of pile the wrapper extends substantially throughout the entire length of the pile. In sinking the pile water may be supplied to the flushing conduit 23 at the top and discharged at the lower end of the pile to flush out the mud or bottom to permit the pile to sink in well known manner.

In Fig. 3 I have represented the joining of two lengths of piling to produce a single pile of great length. In this figure 30 and 31 represent the adjacent ends of the two lengths of wooden piling to be joined to form the wooden center of the finished pile, which are preferably cut off diametrically to form a butt joint. Reinforcing bars 32, preferably of metal, may be placed against the sides of the adjacent ends of the piling and about these are wound two or more turns of metal fabric 33 and concrete or the like 34, or the reinforcing rods may be otherwise suitably disposed in the wrapper. Preferably a thin outside layer 35 of cement, mortar or the like is applied after the wrapper has been rolled about the pile, to fill in the crevices left in the process of rolling.

In Fig. 4 it will be seen that the wooden center 40 has secured to it one end of a metal fabric 41 by nails, spikes or the like 42. These nails are preferably about two feet apart lengthwise of the pile, and a row of nails is driven through the first layer of metal fabric into the wooden center at intervals of about four inches around (shown in dotted lines in Fig. 2). After the end of the metal fabric which is provided with the cement has been secured to the pile, the pile may be rotated so as to become enveloped in the wrapper. This may be done by suitably journaling the wooden center and rotating it while a moving platform bearing the wrapper is fed under it; by rolling the wooden center along upon the wrapper on a stationary platform; or by rotating the wooden center in stationary journals and causing it to draw the wrapper. The outer end of the metal fabric may be suitably secured by nails or the like, and after the rolling has been completed, a thin outside layer of cement, mortar or the like may be applied to fill the crevices if desired. This method of construction may be followed in constructing all forms of the piling illustrated.

In the act of driving the pile, the hammer causes a vibration or temporary compression of some kind in the core, which has a tendency to loosen the nails or spikes which are driven through the first layer of fabric and concrete. The result of this might be to cause the nails or spikes to work out and leave perforations through which sea worms or other harmful agencies might penetrate to the core; but this is effectually prevented by the one or more layers of fabric and concrete which cover the nails or spikes. The natural taper of the core serves to check any tendency to creep, which an imperfectly applied wrapper might have, as any downward movement of the core in the wrapper would at once bind the two so tightly that further creeping would be impossible.

The form of piling shown in Fig. 1 is more especially designed to protect the wooden piling from the attack of sea worms and the like, although a material strengthening of the pile is at the same time given by the wrapper. In the form of piling shown in Fig. 2 the protection of the wooden center is likewise secured but the primary object of this form is to obtain a material increase in the strength of the pile.

In certain localities where it is necessary to use piling of extraordinary length, which by reason of its great length tapers to such thinness as to be materially weakened at the thin end, it is customary to increase the strength at the thin end by "lagging". By employing the principle illus-

trated in Fig. 3 this necessity is obviated as two or more shorter lengths of piling can be joined in that way to produce a pile of any desired length.

While I have shown the flushing pipe 23 only in the form of piling represented in Fig. 2, it may nevertheless be employed in the forms of piling shown in the other figures when desired. Furthermore the flushing conduit may be omitted in the form shown in Fig. 2, if desired.

In docks and bridges constructed with the improved form of pile herein shown, the "clamps" rest mostly upon the upper edge of the wrapper, so that any tendency of the wood core to rot between high and low water marks is not especially harmful, particularly if the reinforcing bars 25 are present.

The term concrete is not employed in a specific sense to indicate any particular kind of cementitious or concreted material, but as used by me refers broadly to any suitable form of material which may be employed in the manner described to form a protective or strengthening wrapper for the wooden center of the pile. As an example I may refer to a concrete formed of Portland cement, sand and stone.

I do not claim in this application the use of all the nails or spikes for securing the wrapper to the center, disposed wholly beneath an outer layer of mesh, as the same is more clearly disclosed and will be claimed in my co-pending application filed on July 29th, 1909, Serial No. 445,951, entitled Structural members.

What I claim is—

1. A pile comprising a wooden center, and a wrapper suitably secured thereto consisting of a plurality of alternate layers of metal fabric and concrete and reinforcing bars or rods embedded in the concrete.

2. A pile comprising a wooden center, a wrapper of a plurality of alternate layers of metal fabric and concrete suitably secured and continuously wound thereon, and reinforcing bars or rods embedded in the wrapper.

3. A pile comprising a wooden center in a plurality of lengths disposed end to end, and a reinforced concrete wrapper inclosing same, said lengths being fixedly secured together.

4. A pile comprising a wooden center in a plurality of lengths disposed end to end, and a wrapper inclosing same, consisting of reinforced concrete and reinforcing rods or bars embedded in the wrapper, said lengths being fixedly secured together.

5. A pile comprising a plurality of lengths of wooden piling disposed end to end, reinforcing bars or rods surrounding the adjacent ends, and a suitably secured wrapper consisting of a plurality of layers

of metal fabric and concrete continuously wound thereon and fixedly securing the lengths of piling together.

5 6. A pile comprising a plurality of lengths of wooden piling disposed end to end, reinforcing bars or rods surrounding the adjacent ends, and a suitably secured wrapper consisting of a plurality of alternate layers of metal fabric and concrete continuously wound thereon fixedly securing the
10 lengths of piling together and forming a substantially even outside surface for the pile.

15 7. A pile comprising a wooden core in a plurality of lengths disposed end to end with butt joints, and a reinforced concrete wrapper inclosing same, said lengths being fixedly secured together.

20 8. A pile comprising a wooden center in a plurality of lengths disposed end to end with butt joints, and a wrapper inclosing same consisting of reinforced concrete and reinforcing rods or bars embedded in the wrapper, said lengths being fixedly secured
25 together.

9. A pile comprising a plurality of lengths of wooden piling disposed end to end with butt joints, reinforcing rods or bars surrounding the adjacent ends, and a suitably secured wrapper consisting of a plurality of alternate layers of metal fabric and concrete continuously wound thereon and fixedly securing the lengths of piling together.

10. A pile comprising a plurality of lengths of wooden piling disposed end to end with butt joints, a suitably secured wrapper consisting of a plurality of layers of metal fabric and concrete continuously wound thereon, and reinforcing bars or rods embedded in said wrapper where the lengths of piling are joined, said wrapper adapted to fixedly secure the lengths of wooden piling together and provide a substantially even outside surface for the pile.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."