

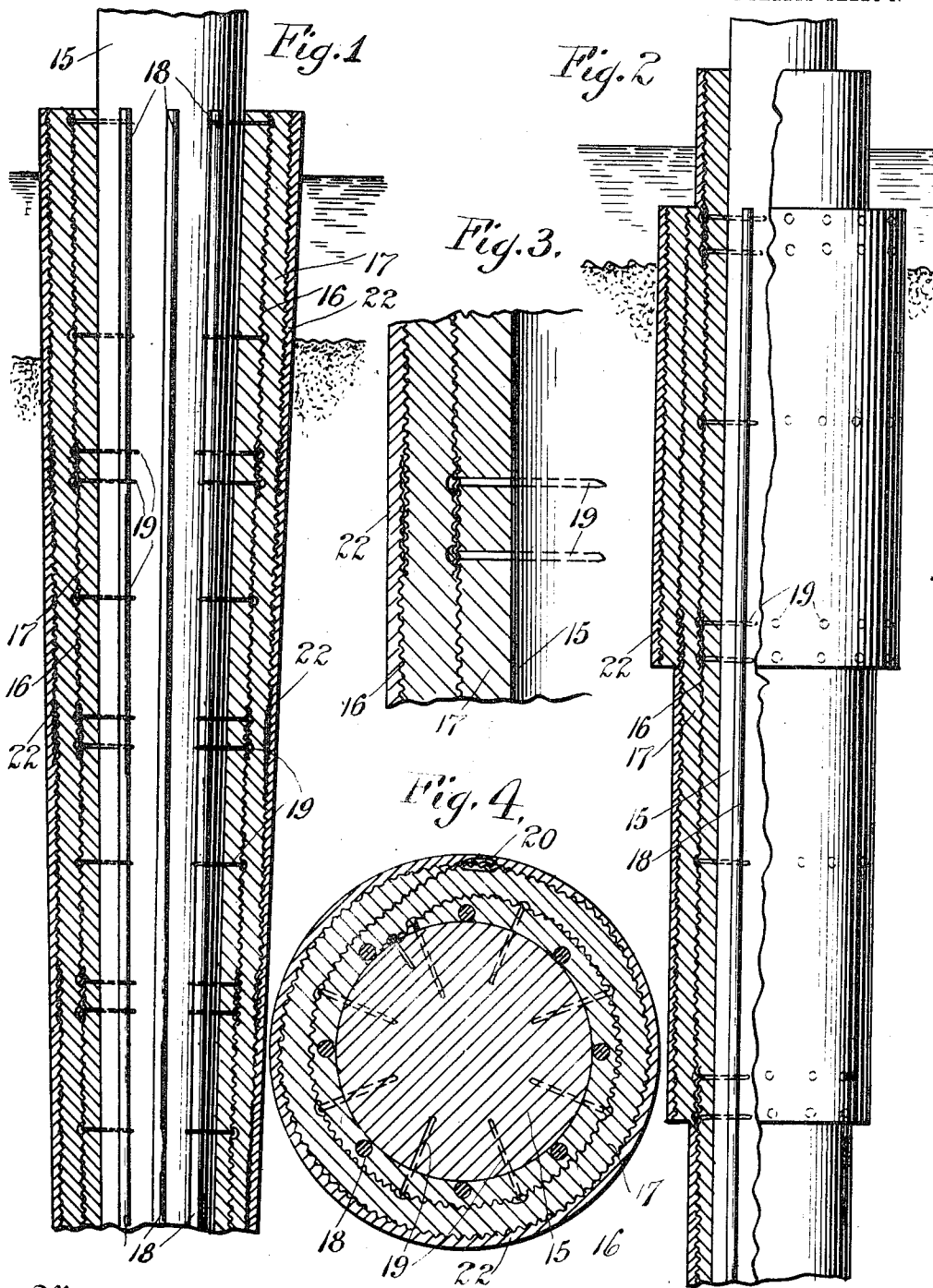
J. W. RIPLEY.
STRUCTURAL MEMBER.

APPLICATION FILED JULY 29, 1908. RENEWED APR. 12, 1911.

1,046,858.

Patented Dec. 10, 1912.

2 SHEETS—SHEET 1.



Witnesses:
Ray Ernst.
H H Knight

John W. Ripley, Inventor
By his Attorneys *Thurston & Bro.*

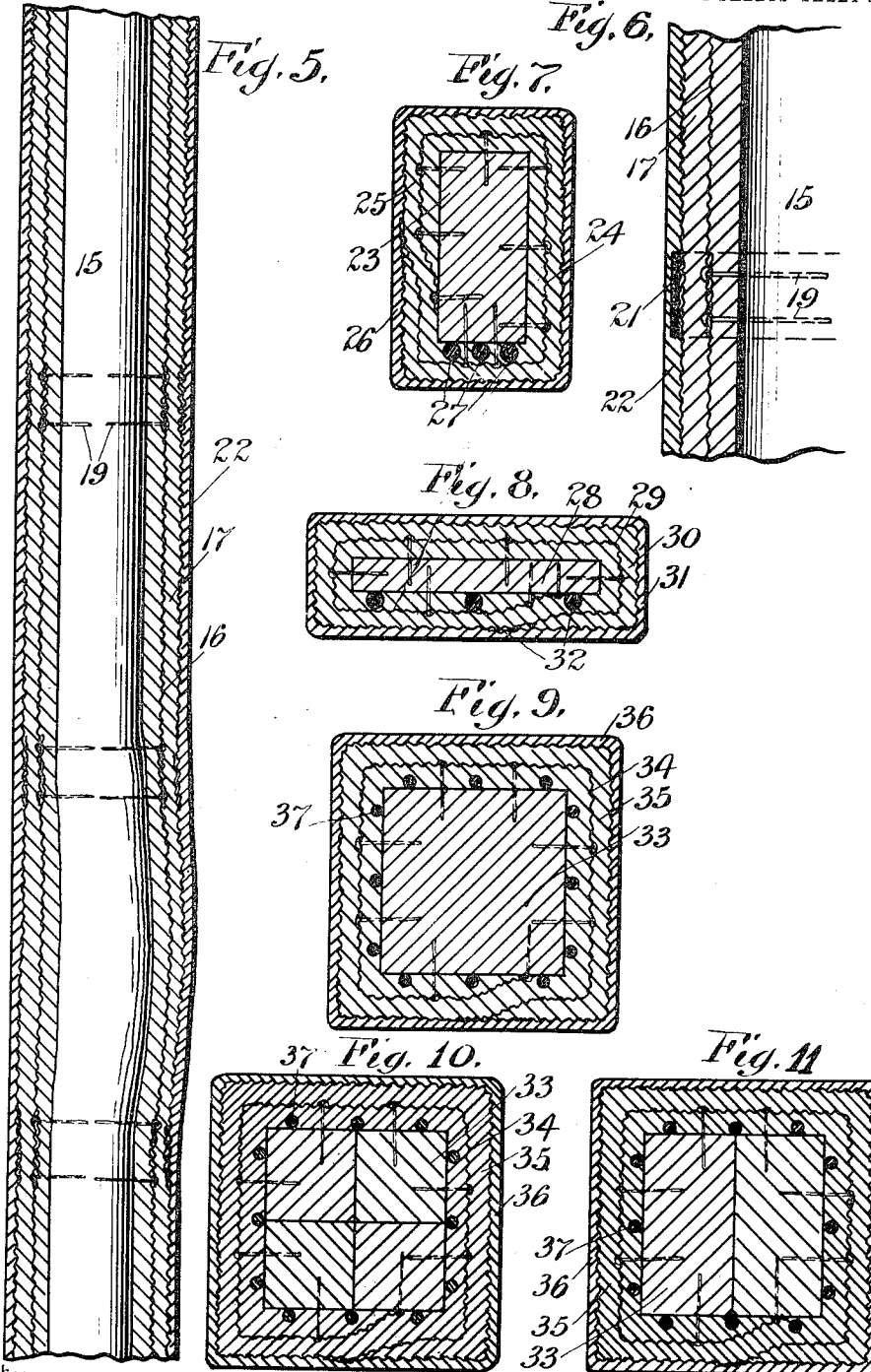
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John W. Ripley, Inventor
By his Attorney: [Signature]

UNITED STATES PATENT OFFICE.

JOHN W. RIPLEY, OF FLUSHING, NEW YORK, ASSIGNOR TO MONKS-RIPLEY PILE COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

STRUCTURAL MEMBER.

1,046,858.

Specification of Letters Patent.

Patented Dec. 10, 1912.

Application filed July 29, 1908, Serial No. 445,951. Renewed April 12, 1911. Serial No. 620,665.

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, and State of New York, have invented certain new and useful Improvements in Structural Members, of which the following is a specification.

My invention relates to the construction of structural members such as piling and analogous columns and posts, beams and girders, plank for use in docks, bridges, trestles, buildings and other structures and structural members in general.

An important embodiment of my invention comprises a combination pile, that is, a pile made up of a wooden core and a wrapper of two or more layers of metal fabric and concrete, with nails or spikes suitably driven to hold the wrapper to the core. A pile of this general character is set forth in my prior application filed June 2, 1908, Serial No. 436,271, in which the metal fabric is covered broadly without reference to its being in one piece or in a plurality of pieces. The present improvement under the broad terms of that application, relates to a specific form of the metal fabric, this being in a plurality of independent overlapping sections or zones for certain purposes which will hereinafter appear.

Among other important objects, my invention aims to provide a reinforced or strengthened structural member; to provide a member which may be used in marine construction without danger of attack from sea worms or other harmful agencies, and to provide a fire proof structural member.

Further objects and advantages of my invention will be apparent from the detailed description of some of its more important embodiments, shown in the accompanying drawings and described hereafter in detail.

In the drawings Figure 1 is a vertical section of a tapered combination pile, with the taper shown exaggerated. Fig. 2 is an elevation part in section of a shouldered combination pile. Fig. 3 is a detail view in vertical section showing a method of joining two of the independent overlapping sections of reinforcing metal fabric. Fig. 4 is a transverse section through a combination pile, showing a preferred method of wrap-

ping. Fig. 5 is a vertical section of a combination pile with an irregularity in the wooden core. Fig. 6 is a detail view showing in vertical section a modified form of fastening the outer edge of the reinforcing metal fabric. Fig. 7 is a transverse section of a combination girder. Fig. 8 is a transverse section of a combination beam or plank, and Figs. 9, 10 and 11 are transverse sections of three forms of square combination piles or columns.

Referring now more specifically to said drawings, it will be seen from Figs. 1 to 6 inclusive, that the combination pile comprises a wooden core 15 (preferably a wooden piling with natural taper) about which is disposed a wrapper comprising two or more layers of metal fabric 16 and concrete 17, with or without reinforcing bars or rods 18, as desired. The metal fabric 16 is employed in independent overlapping sections or zones, as clearly shown in the drawings, and to hold the wrapper firmly to the pile, I drive nails or spikes 19 through the first or inner layer of metal fabric and concrete, and well into the wooden core, preferably two rows of nails or spikes being driven through the overlapping portions of adjacent sections of the fabric, as shown in Fig. 3, and one or more rows being driven through the intermediate portion of each independent section of the fabric. The outer edge of each section of the metallic fabric 16 may be secured in any suitable manner as by seizing or lacing with wire 20, as shown in Fig. 4, and a band of metal 21 may surround the overlapping or other portions of the independent sections of the metal fabric, if desired, as shown in Fig. 6. After the pile has been wrapped and secured, a thin outside layer of cement or mortar 22 may be applied to cover or fill in any cracks or crevices so as to prevent rusting of the metal fabric.

In the act of driving the pile, the hammer causes a vibration of 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 are outside of the nails or spikes. It is with this end in view, that I seize or
 5 lace the outer end of the fabric to the portion immediately beneath it, rather than to drive nails or spikes at this place, because a single nail or spike working out would be
 10 sufficient to permit the damage above referred to.

The use of metal fabric in a plurality of independent lengths or sections has many important advantages.

For purpose of illustration the pile shown
 15 in Fig. 1 is represented as having a core with a relatively larger taper than those shown in Figs. 2 and 5. The pile shown in Fig. 5 is represented as having a bulged or uneven portion in the core. In such in-
 20 stances as these two, the wrapping of the core with metal fabric in one piece would be considerably more difficult than the wrapping in a plurality of independent sections. In the case of the tapered pile shown in Fig.
 25 1 for example, the difference in diameters of the top and bottom of the pile is so great that the disalignment of the metal fabric in taking two or more turns about the core, would be considerable. By sub-dividing the
 30 metal fabric the wrapping is greatly facilitated, as the difference in diameters of the core at the top and bottom of each section of metal fabric is so small that the disalignment of any one section of the pile is im-
 35 material. By this construction I am enabled to more readily make the wrapper taper in conformity with the tapering of the core and to draw all parts of the wrapper tightly about the core, and the overlapping
 40 portions form a double reinforcement at the joints of the wrapper.

In the pile shown in Fig. 5, the irregularity or bulge of the core 15 might be a considerable hindrance to the proper wrapping
 45 of the core if a single piece of metal fabric were employed, but by the use of a sectional metal fabric, the wrapping of such an uneven core becomes a simple matter and the finished combination pile may be straighter
 50 than the core.

A still further advantage which the use of a sectional metal fabric provides, is represented in Fig. 2. It is sometimes desired to increase the bearing surface of piling. In
 55 this form of my invention, the core 15 has a part of its wrapper shouldered, which is obtained by taking an unequal number of turns with the metal fabric and concrete. While the wrapper illustrated in Fig. 2 is
 60 shown as having decided shoulders, and diminishing in diameter in steps toward the bottom, the principle may be applied in such a manner as to produce a tapered end with almost negligible shoulders so as to be vir-
 65 tually an even cone. In this way I can in-

crease the bearing surface of the pile in a very simple manner. Of course, if for any purpose it were desired to have the pile larger at the bottom and growing smaller toward the top, the same principle could be applied.

The piles constructed in accordance with my invention may, of course, be provided with any of the known devices, such as flushing pipes for sinking, conical tips at the base, connecting caps at the top, and the like, or the base of the combination pile may be more tapering than the rest of it. The combination pile, however, possesses the advantages of both the wooden pile and the concrete pile. It is as strong and permanent as a concrete pile, and since the wooden core usually extends above the wrapper it is susceptible to the usual methods of connection with the timbering of docks, trestles and the like used in building with wooden piles.

Fig. 7 shows a girder which has a wooden core 23 wrapped in the manner above described, by two or more turns of metal fabric 24, and concrete 25, with a thin outside layer of cement or mortar 26. The reinforcing bars 27 may be embedded in the wrapper below the core to take the stress.

In Fig. 8 a beam or plank is constructed by wrapping a wooden core 28 by two or more turns of metal fabric 29 and concrete 30 with a thin outside layer of cement or mortar 31, and a considerable number of reinforcing bars 32 embedded in the wrapper beneath the core.

Figs. 9, 10 and 11 illustrate the production of square combination columns or piles. The wooden core 33 may be in any number of sections as illustrated in these three figures, and wrapped by one or more turns of metal fabric 34 and concrete 35, with a thin outside layer of cement or mortar 36. Reinforcing bars 37 may be embedded in the wrapper next to the core if desired. The metal fabric in the construction shown in Figs. 7 to 11 inclusive, may be in one or a plurality of sections, and the wrapper may be secured in the manner described above with reference to the construction of combination piles.

The term "metal fabric" I have employed, is intended to cover wire netting, wire cloth, wire mesh, expanded metal or metal in any form adapted to this use. The wooden core may be any form of wooden piling, timber, beam or plank in one piece or otherwise, which is suitable to serve in the manner herein set forth. The concrete may be of any desired mixture, selected to suit the requirements in each particular location or use. Silica cement and hydraulic cement are known to be peculiarly well adapted to use in sea water, and a concrete made of silica cement or hydraulic cement,

sand and cinders, is accordingly suitable for use in piles constructed in accordance with my invention.

Claims—

- 5 1. A structural member comprising a wooden core inclosed in a wrapper consisting of overlapping sections of metal fabric and concrete. 70
2. A structural member comprising a wooden core inclosed in a suitably secured wrapper consisting of a plurality of layers of overlapping sections of metal fabric and concrete continuously wound thereon. 75
- 10 3. A structural member comprising a wooden core, a wrapper of a plurality of layers of metal fabric and concrete, nails or spikes driven through the inner layer of metal fabric and concrete into the wooden core, wire seizing fastening the outer edge of the metal fabric, and a thin outside layer of cement or mortar. 80
- 15 4. A structural member comprising a wooden core, a wrapper of a plurality of layers of overlapping sections of metal fabric and concrete, nails or spikes driven through the overlapping and intermediate portions of the inner layer of metal fabric and the concrete into the wooden core, and means for fastening the outer edge of the sections of metal fabric. 85
- 20 5. A structural member comprising a wooden core, a wrapper of a plurality of layers of metal fabric and concrete, reinforcing rods embedded in the wrapper, nails or spikes driven through the inner layer of metal fabric and concrete into the wooden core, and means for fastening the outer edge of the metal fabric. 90
- 25 6. A pile or column, comprising a wooden core of unequal cross sectional areas at different parts, and a suitably secured wrapper of a plurality of layers of overlapping sections of metal fabric and concrete. 95
- 30 7. A pile or column, comprising a wooden core of unequal cross sectional areas at different parts, a suitably secured wrapper of a plurality of layers of overlapping sections of metal fabric and concrete, and reinforcing rods embedded in the wrapper. 100
- 35 8. A pile or column, comprising a wooden core of unequal cross sectional areas at different parts, a wrapper of a plurality of layers of overlapping sections of metal fabric and concrete, nails or spikes driven through the overlapping and intermediate portions of the inner layer of metal fabric and concrete into the wooden core, and means for securing the outer edge of the sections of metal fabric. 105
- 40 9. A pile or column, comprising a tapering wooden core, a wrapper of a plurality of layers of metal fabric in overlapping sections and concrete, and suitable means for securing the wrapper on the core. 110
- 45 10. A pile or column, comprising a tapering wooden core, a wrapper of a plurality of layers of metal fabric in overlapping sections and concrete, nails or spikes driven through the overlapping and intermediate portions of the inner layer of metal fabric and concrete, and wire seizing for securing the outer edge of the sections of metal fabric. 115
- 50 11. A pile or column, comprising a tapering wooden core, a wrapper tapering throughout the major portion of the pile length in conformity therewith and composed of a plurality of layers of overlapping sections of metal fabric and concrete. 120
- 55 12. A pile or column, comprising a tapering wooden core, a wrapper tapering throughout the major portion of the pile length in conformity therewith and composed of a plurality of layers of metal fabric and concrete, and nails or spikes driven through the inner layer of metal fabric and the concrete into the wooden core. 125
- 60 13. A pile or column, comprising a tapering wooden core, and a suitably secured wrapper tapering throughout the major portion of the pile length in conformity therewith and composed of a plurality of layers of overlapping sections of metal fabric and concrete. 130
- 65 14. A pile or column, comprising a tapering wooden core, a wrapper tapering throughout the major portion of the pile length in conformity therewith and composed of a plurality of layers of overlapping sections of metal fabric and concrete, and nails or spikes driven through the overlapping and intermediate sections of the metal fabric and the concrete into the wooden core.
15. A pile or column, comprising a tapering wooden core, a wrapper tapering throughout the major portion of the pile length in conformity therewith and composed of a plurality of layers of overlapping sections of metal fabric and concrete, and nails or spikes driven through the overlapping and intermediate sections of the metal fabric and the concrete into the wooden core.
16. A pile or column, comprising a suitable wooden core, and a suitably secured wrapper of metal fabric in overlapping sections and concrete, the number of layers in one section of the wrapper varying from the number of layers in another section forming shoulders
17. A pile or column comprising a suitable wooden core and a suitably secured wrapper of metal fabric in overlapping sections and concrete, the number of layers in a section of the wrapper increasing from the bottom of the pile to the mud line to form bearing shoulders for the pile.
18. A pile or column, comprising a suitable wooden core, a suitably secured wrapper of metal fabric in overlapping sections and concrete, the number of layers in one

section of the wrapper varying from the number of layers in another section forming shoulders, and reinforcing rods embedded in the wrapper.

- 5 19. A pile or column, comprising a suitable wooden core, a suitably secured wrapper of metal fabric in overlapping sections and concrete, the number of layers in one section of the wrapper varying from the number of layers in another section forming shoulders, reinforcing rods embedded in the wrapper and nails or spikes driven through the inner layer of the wrapper and into the wooden core.
- 10 20. A pile or column comprising a wooden core, a protecting or reinforcing wrapper of a plurality of layers of metal fabric and concrete, and nails passing through the inner layer of the wrapper into the wooden core, all the nails which enter the wooden core being disposed wholly beneath an outer layer of the metal fabric.
- 15 21. A pile or column comprising a wooden core, a protecting or reinforcing wrapper of a plurality of layers of metal fabric and concrete continuously wound thereon, nails or spikes passing through the inner layer of the wrapper into the wooden core for securing the wrapper to the core, and wire lacing or seizing for securing the outer edge of the metal fabric to the portion beneath it, all of said nails or spikes which pass into the core being disposed wholly beneath an outer layer of the wrapper and prevented thereby from working out in the act of driving the pile.
- 20 22. A structural member comprising a wooden core inclosed in a wrapper consisting of transverse sections or zones of metal fabric and concrete.
- 25 23. A structural member comprising a wooden core inclosed in a suitably secured wrapper consisting of a plurality of layers of transverse sections or zones of metal fabric and concrete continuously wound thereon.
- 30 24. A structural member comprising a wooden core, a wrapper of a plurality of layers of transverse sections or zones of metal fabric and concrete, nails or spikes driven through the inner layer of metal fabric and concrete into the wooden core, and means for fastening the outer edge of the sections of metal fabric.
- 35 25. A pile or column comprising a wooden core of unequal cross-sectional areas at different parts, and a suitably secured wrapper of a plurality of layers of transverse sections or zones of metal fabric and concrete.
- 40 26. A pile or column comprising a wooden core of unequal cross-sectional areas at different parts, a suitably secured wrapper of a plurality of layers of transverse sections or zones of metal fabric and concrete thereon,

and reinforcing rods embedded in the wrapper.

27. A pile or column comprising a wooden core of unequal cross-sectional areas at different parts, a wrapper of a plurality of layers of transverse sections or zones of metal fabric and concrete, nails or spikes driven through the inner layer of metal fabric and concrete into the wooden core, and means for securing the outer edges of the sections of metal fabric.

28. A pile or column comprising a tapering wooden core, a wrapper of a plurality of layers of metal fabric in transverse sections or zones and concrete, and suitable means for securing the wrapper on the core.

29. A pile or column comprising a tapering wooden core, a wrapper of a plurality of layers of metal fabric in transverse sections or zones and concrete, nails or spikes driven through the inner layer of metal fabric and concrete, and means for securing the outer edges of the sections of metal fabric.

30. A pile or column comprising a tapering wooden core, a wrapper of a plurality of layers of metal fabric in transverse sections or zones and concrete, nails or spikes driven through the inner layer of metal fabric and concrete and wire seizing for securing the outer edges of the sections of metal fabric.

31. A pile or column comprising a tapering wooden core, and a suitably secured wrapper tapering throughout the major portion of the pile length in conformity therewith and composed of a plurality of layers of transverse sections or zones of metal fabric and concrete.

32. A pile or column comprising a tapering wooden core, a wrapper tapering throughout the major portion of the pile length in conformity therewith and composed of a plurality of layers of transverse sections or zones of metal fabric and concrete, and nails or spikes driven through the inner layer of metal fabric and concrete into the wooden core.

33. A pile or column comprising a suitable wooden core and a suitably secured wrapper of metal fabric in transverse sections or zones and concrete, the number of layers in one section of the wrapper varying from the number of layers in another section forming shoulders.

34. A pile or column comprising a suitable wooden core and a suitably secured wrapper of metal fabric in transverse sections or zones and concrete, the number of layers in the sections of the wrapper increasing from the bottom of the pile to the mud line to form bearing shoulders for the pile.

35. A pile or column comprising a suitable wooden core, a suitably secured wrapper of metal fabric in transverse sections or

zones and concrete, the number of layers in one section of the wrapper varying from the number of layers in another section forming shoulders, and reinforcing rods embedded in the wrapper.

36. A pile or column comprising a suitable wooden core, a suitably secured wrapper of metal fabric in transverse sections or zones and concrete, the number of layers in one section of the wrapper varying from the number of layers in another section forming shoulders, reinforcing rods embedded in the wrapper and nails or spikes driven through the inner layer of the wrapper and into the wooden core.

37. A pile or column comprising a wooden core, a wrapper of metal fabric and concrete, nails or spikes driven through the inner edge of the metal fabric and into the wooden core, said nails being disposed

beneath a subsequent or outer layer of the metal fabric and concrete, and means for securing the outer edge of the metal fabric to a preceding portion of the metal fabric.

38. A pile or column comprising a wooden core, a wrapper of metal fabric and concrete, nails or spikes driven through the inner edge of the metal fabric and into the wooden core, said nails being disposed beneath a subsequent or outer layer of the metal fabric and concrete, and wire seizing for securing the outer edge of the metal fabric to a preceding portion of the metal fabric.

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Witnesses:

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