

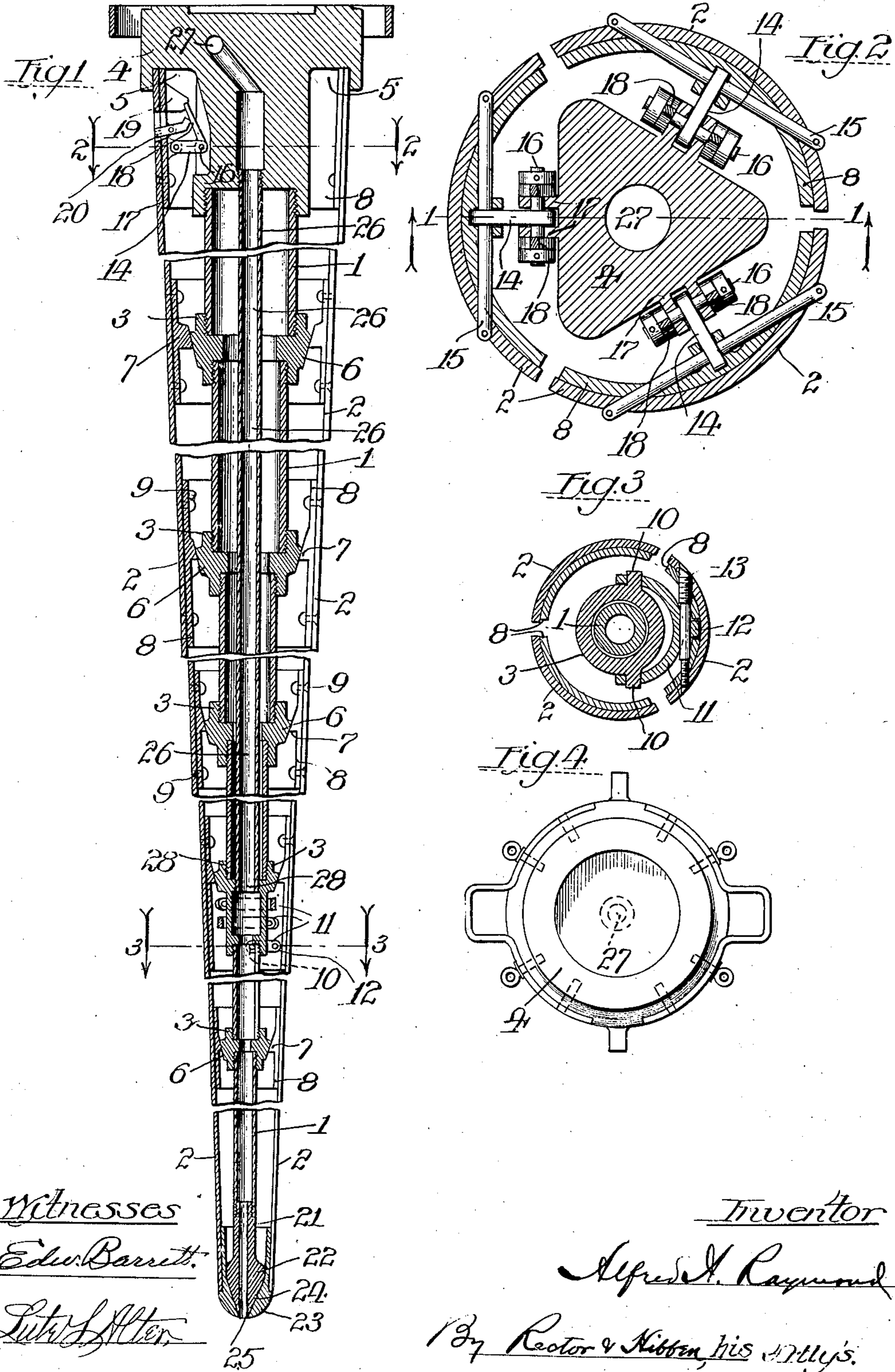
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PATENTED FEB. 26, 1907.

A. A. RAYMOND.

PILE CORE.

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Witnesses

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PILE-CORE.

No. 845,120.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, ALFRED A. RAYMOND, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Pile-Cores, of which the following is a specification.

My invention has relation to cores employed in the process of making concrete piles as practiced in accordance with my Letters Patent of the United States No. 589,026, issued to me on August 31, 1897; and the object thereof is to provide an expandible and contractible core which shall be efficient and reliable in operation for the purposes intended.

The features of advantage and utility of my improved pile-core will be apparent from the description hereinafter given.

In the drawings, Figure 1 is a longitudinal section of my pile-core, taken in the line 1 1 of Fig. 2; Fig. 2, a cross-section on the line 2 2 of Fig. 1; Fig. 3, a cross-section on line 3 3 of Fig. 1, and Fig. 4 a top plan view of the core.

The process of making or forming concrete piles, to which this invention relates, is fully explained in my patent aforesaid, No. 589,026, as well as in a subsequent patent No. 700,707, issued to me on May 20, 1902; and reference is made thereto for an understanding of the details of such process. It will suffice to say in the present instance that my process consists, in general terms, in sinking or driving into the ground or other place an outer shell by means of a core which, after such shell is sunk or driven to the required or desired depth, is withdrawn, leaving in the ground the hollow shell, which is thereupon filled with concrete or the like. The result of the process is the formation of a concrete pile corresponding with the shell. My present invention relates wholly to the core which is thus employed for sinking the shell into the ground.

My present pile-core belongs to the same type and character of core as that described and claimed in a prior application filed by me on September 3, 1902, Serial No. 121,936, inasmuch as the same comprises a plurality of outer sections surrounding an inner section or core proper, and such present core is intended and designed as an improvement upon the core of that application.

Referring particularly to Fig. 1 of the drawings, my present improved pile-core comprises an inner section 1 and a series or plurality of outer substantially surrounding sections 2, which in the present instance are three in number, although such number may, if desired, be increased, as found desirable or expedient. The inner section or core proper as herein shown is built up from a series of pipes or tubes connected together by means of castings 3 or the like constituting pipe-couplings and also wedges for expanding the outer sections, as hereinafter explained. These pipes decrease in diameter from the top to the lower end of the pile-core, so that this inner section may be said to taper in general correspondence with the taper or inclination of the outer sections. The uppermost pipe is connected to a head 4, and in the present instance the latter screws upon such pipe. This head has a flanged top forming a recess 5, within which the upper ends of the outer sections 2 are received. This head is detachably secured or locked to the outer sections of the core in a manner hereinafter explained. The series of castings or pipe-couplings 3 have wedge-shaped outer surfaces 6, inclined upwardly and outwardly and arranged to bear against and cooperate with a corresponding series of wedge-surfaces 7, arranged on the inner face of the outer sections of the core and at intervals along its length. In the present instance these wedge-surfaces 7, which incline inwardly and downwardly (reversely to the wedge-surfaces 6) are formed on segmental plates 8, which are secured to the outer sections 2 in suitable manner, as by rivets 9.

The outer sections 2 of the core are connected to the inner section 1 by hinging thereto in the following manner: Referring more particularly to Fig. 3, the inner section has sets of bearing-lugs 10, there being three sets or pairs corresponding with the outer sections 2 in their number. Three yokes 11 are pivoted at their ends to their respective bearing-lugs. The stems 12 of these yokes are pivoted on their respective bearing-pins 13, which pass through and are secured to the segmental plates 8 and outer sections 2 of the core in the manner clearly indicated in Fig. 3. These bearing lugs and yokes are slightly distanced from each other—that is, they are not arranged on the same horizontal plane—

so as not to interfere with each other in their movements. When in actual practice the inner section is raised slightly after the engaging parts hereinafter described are unlocked, such inner section will move somewhat relatively to the outer sections, which, because of their hinged connections, will contract or collapse inwardly upon the inner section as the latter is further raised.

As indicated in Figs. 1 and 2, the outer core-sections are hinged to the head 4 in suitable manner, and, as shown, such head has three side recesses, so that the head in cross-section therethrough is triangular, as seen in Fig. 2. Links 14, pivoted at their outer ends to pins 15, secured to the outer core-sections 2, and at their inner ends to pins 16, secured to the head 4, constitute the connecting and hinging medium between the head and outer core-sections. The pins 16 bear in lugs 17, projecting from the recesses of the head, while the pins 15 bear in openings through the sections 2 and plates 17 riveted thereto.

To lock the core-sections in expanded condition, locking-dogs 18 are pivoted on the pins 16 and inclined upwardly so that their free ends will engage notched lugs 19, projecting inward from the plates 17. Unlocking latches or levers 20 are pivoted in side openings in the outer sections, with their inner ends arranged to bear against the locking-dogs and free the latter from their engagement with the lugs 19.

The lowermost pipe of the inner section of the core is provided with a casting or hollow end piece 21, having a wedge-surface 22 entering the hollow end of a point or tip 23, and bearing against the inclined or wedge surface 24 of such tip. This tip has a central opening 25 constituting a jet-orifice to be used in case it is desired to employ the jetting process alone for sinking the shell and core instead of driving the same or in connection with and in assistance to driving or pressure applied from above.

Arranged centrally within and concentric with the upper or larger end of the inner section 1 of the pile-core is a jet-pipe 26, connected with the head 4 and communicating with the passage 27 therein leading from a source of fluid supply, generally water, although air may be the jetting fluid employed in some instances. The lower end of the jet-pipe 26 extends downwardly through the inner core-section and is attached thereto at the point 28 where the bore becomes substantially of the same diameter as that of such jet-pipe. Below this point of attachment the hollow inner core-section itself serves as the jet conduit or passage, which finally communicates with the jet-orifice 25 in the tip.

As hereinbefore stated, the wedge-surfaces 6 on the pipe-couplings cooperate with the complementary wedge-surfaces 7 on the outer connections and serve as expanders, inas-

much as when the inner core-section is forced downwardly its wedge-surfaces bearing outwardly upon the other wedge-surfaces will expand the outer core-sections to proper position within the shell. (Not shown.)

Although I have described more or less precise forms and details of construction, I do not intend to be understood as limiting myself thereto, as I contemplate changes in form, proportion of parts, and the substitution of equivalents, as circumstances may suggest or render expedient, without departing from my invention and claims.

I claim—

1. A pile-core comprising an inner or central section made in parts, and a plurality of outer sections around such inner section; substantially as described.

2. A pile-core comprising an inner or central section built up from a series of tubular parts connected together, and a plurality of outer sections around such inner section; substantially as described.

3. A pile-core comprising an inner section built up from a series of tubular parts of decreasing diameter from the upper to the lower end, and a plurality of outer sections around such inner section; substantially as described.

4. A pile-core comprising an inner section made in separate parts, couplings connecting said parts, and a plurality of outer sections around such inner section; substantially as described.

5. A pile-core comprising an inner section made in separate parts of decreasing diameter from the upper to the lower end, couplings connecting said parts, and a plurality of outer sections around such inner section; substantially as described.

6. A pile-core comprising an inner hollow section, a tip secured to the lower end thereof and provided with a jet-orifice, a plurality of outer sections around such inner section, and a jet-pipe arranged within such inner section and communicating with the jet-orifice of said tip; substantially as described.

7. A pile-core comprising an inner hollow section, a tip secured to the lower end thereof and provided with a jet-orifice, a plurality of outer sections around such inner section, and a jet-pipe arranged within such inner section and secured thereto intermediate of the length of such inner section, said jet-pipe communicating with the jet-orifice of the tip through the lower end of the inner section itself; substantially as described.

8. A pile-core comprising an inner section, and a plurality of outer sections surrounding such inner section and hinged thereto; substantially as described.

9. A pile-core comprising an inner section having a series of lugs, yokes pivoted to such lugs, and a plurality of outer sections surrounding such inner section and connected with the yokes; substantially as described.

10. A pile-core comprising an inner section having wedge-shaped surfaces arranged at intervals along its length, a plurality of outer sections around the inner section, and arranged substantially edge to edge and wedge-shaped members secured to said outer sections and complementary to said wedge-shaped surfaces on the inner section; substantially as described.
11. A pile-core comprising an inner section having wedge-shaped surfaces, a plurality of outer sections around the inner section, and plates secured to the inner face of said outer sections and provided with wedge-shaped surfaces cooperating with those on the inner section; substantially as described.
12. A pile-core comprising an inner section made in separate parts, couplings connecting said parts and provided with wedge-shaped surfaces, and a plurality of outer sections arranged around such inner section and provided with wedge-shaped surfaces cooperating with those on the inner section; substantially as described.
13. A pile-core comprising an inner section made in separate parts, couplings connecting said parts and provided with wedge-shaped surfaces, a plurality of outer sections around such inner section, and plates secured to the outer sections and provided with wedge-shaped surfaces cooperating with those on the inner section; substantially as described.
14. A pile-core comprising an inner section built up from a series of tubular parts of decreasing diameter from the upper to the lower end, couplings connecting said parts and provided with wedge-shaped surfaces, and a plurality of outer sections arranged around such inner section and having wedge-shaped surfaces cooperating with those on such couplings; substantially as described.
15. A pile-core comprising a removable head, an inner section secured thereto, and a plurality of outer sections arranged around such inner section and substantially edge to edge; substantially as described.
16. A pile-core comprising a removable head, an inner section screwing therein, and a plurality of outer sections arranged around such inner section and substantially edge to edge; substantially as described.
17. A pile-core comprising a removable head, an inner section secured thereto, and a plurality of outer sections detachably secured to such head and having their longitudinal edges substantially abutting; substantially as described.
18. A pile-core comprising a head, an inner section secured thereto, and a plurality of outer sections hinged respectively to said head and to said inner section; substantially as described.
19. An expandible pile-core comprising a head, an inner section secured thereto, a plurality of outer sections around such inner section which is movable relatively to the outer sections, and means for holding said outer sections in expanded condition consisting of pivoted dogs arranged on said head and adapted to engage said outer sections; substantially as described.
20. An expandible pile-core comprising a head, an inner section secured thereto, a plurality of outer sections around such inner section which is movable relatively to the outer sections, and means for holding said outer sections in expanded condition consisting of pivoted dogs arranged on said head and legs arranged on said outer sections and engaged by such dogs; substantially as described.
21. An expandible pile-core comprising a head, an inner section secured thereto, a plurality of outer sections around such inner section which is movable relatively to the outer sections, and means for holding said outer sections in expanded condition consisting of pivoted dogs arranged on said head, legs arranged on said outer sections and engaged by such dogs, and pivoted latches for disengaging said dogs; substantially as described.
22. A pile-core comprising an inner section, a plurality of outer sections around such inner section and plates secured to the inner face of such outer sections, said plates and said inner section having cooperating surfaces; substantially as described.
23. A pile-core comprising a plurality of radially-movable sections which are segmental in cross-section, segmental plates secured to said sections, and means for moving said segmental plates to effect the expansion of said radially-movable sections; substantially as described.
24. An expansible pile-core comprising an inner section, a plurality of outer sections around such inner section and cooperating therewith in the expansion of the core, and plates secured to the inner face of such outer sections; substantially as described.
25. An expansible pile-core comprising a plurality of outer sections segmental in cross-section, an inner section within such outer sections and cooperating therewith in the expansion of the core, and segmental plates secured to the inner face of such outer sections; substantially as described.
26. A pile-core comprising a plurality of outer radially-movable sections, an inner section arranged within such outer sections and cooperating therewith in the expansion of the core, and plates secured to the inner face of such outer sections; substantially as described.
27. A pile-core comprising a plurality of outer radially-movable sections, an inner longitudinally-movable section cooperating therewith in the expansion of the core, and plates secured to the inner face of such outer sections; substantially as described.
28. A pile-core comprising a plurality of

outer radially-movable sections which are segmental in cross-section, segmental plates secured to the inner faces of such outer sections, said segmental plates being provided
5 with projecting wedge-surfaces, an inner longitudinally-movable section, and a series of enlarged annular portions carried by said inner section, said portions being adapted, in the longitudinal movement of said inner section,
10 to be thrust against the aforesaid wedge-surfaces to cause the outward radial movement of said outer sections.

29. A pile-core comprising a plurality of radially-movable sections, an inner section,
15 and plates secured to the inner face of such outer sections, said inner section and said plates having cooperating bearing-surfaces; substantially as described.

30. A pile-core comprising a plurality of
20 outer radially-movable sections which are segmental in cross-section, an inner longitudinally-movable section, and segmental plates secured to the inner face of such outer sections, said inner section and said plates
25 having bearing-faces cooperating in the expansion of the core; substantially as described.

31. A pile-core comprising a plurality of radially-movable sections, an inner section having outwardly-directed bearing-surfaces,
30 and plates secured to the inner face of the outer sections and having bearing-surfaces cooperating with those of the inner section; substantially as described.

32. A pile-core comprising a plurality of
35 outer radially-movable sections, and a longitudinally-movable conduit arranged within said outer sections, said conduit being adapted, in the longitudinal movement thereof, to cause the outward radial movement of said
40 outer sections.

33. A pile-core comprising a plurality of outer radially-movable sections, a conduit arranged within said outer sections and longitudinally movable relative thereto, the walls of
45 said conduit being provided with means adapted, in the longitudinal movement of said conduit, to effect the outward radial movement of said outer sections.

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