

No. 848,395.

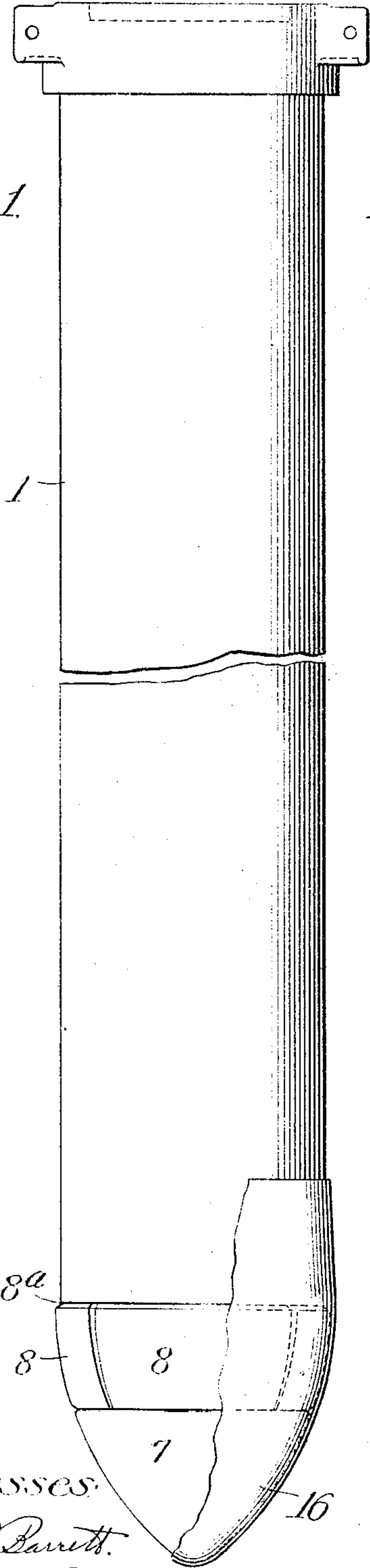
A. A. RAYMOND.
PILE CORE.

PATENTED MAR. 26, 1907.

APPLICATION FILED SEPT. 11, 1905.

2 SHEETS—SHEET 1.

Fig. 1

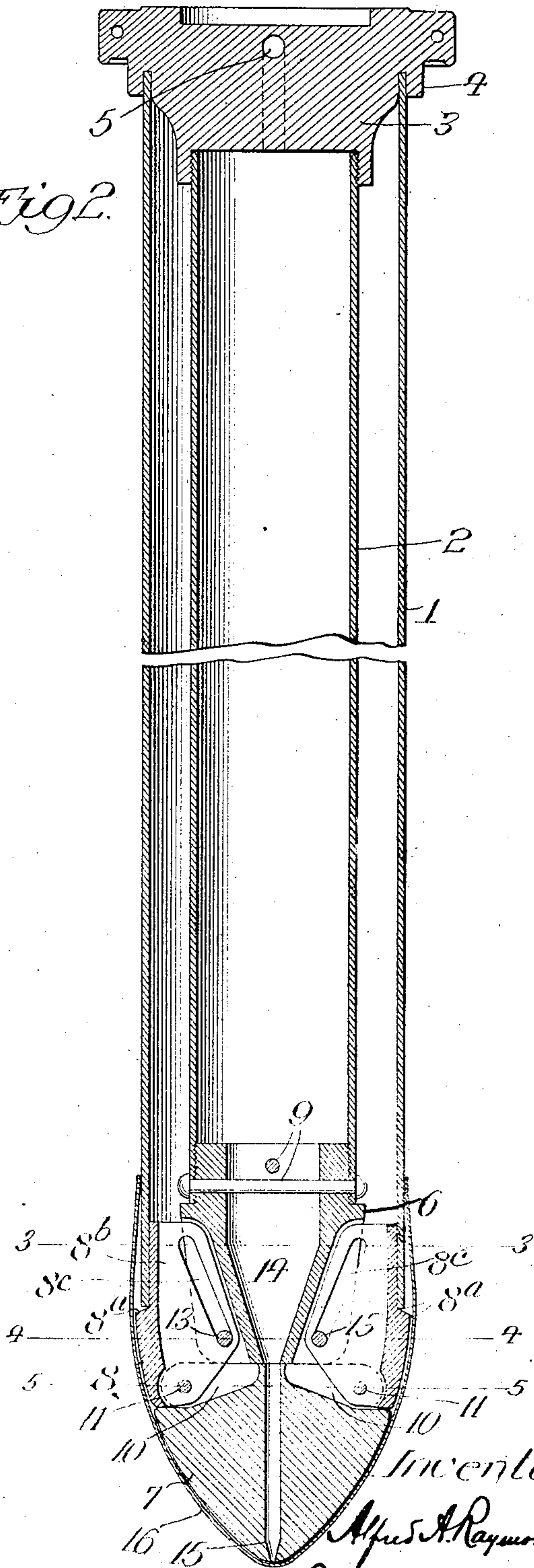


Witnesses:

Edw. P. Barrett.

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Fig. 2



Inventor

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his Attys

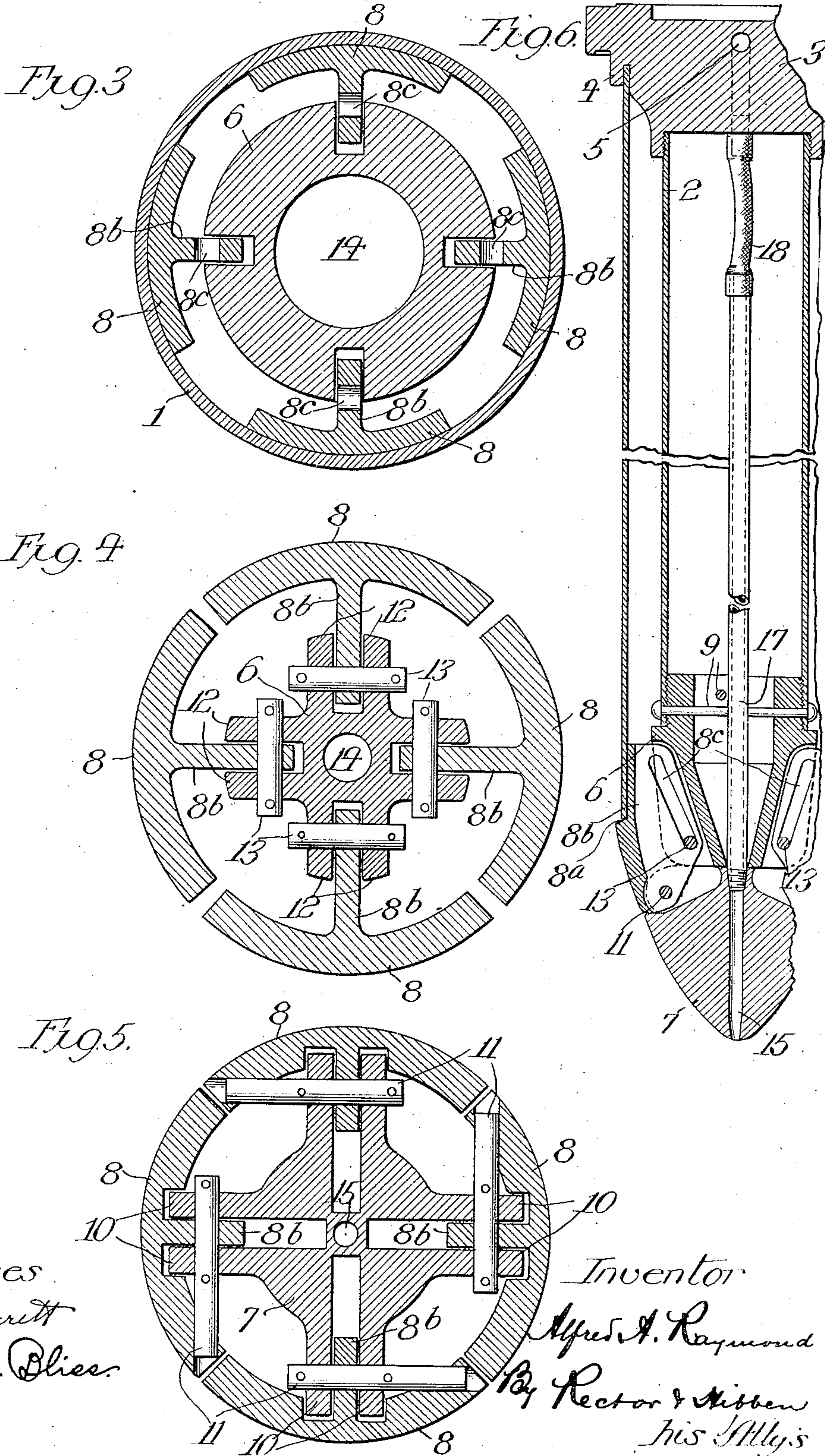
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UNITED STATES PATENT OFFICE.

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PILE-CORE.

No. 848,395.

Specification of Letters Patent.

Patented March 26, 1907.

Application filed September 11, 1905. Serial No. 277,954.

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 relates to a core for sinking shells or pipes into the ground for the purpose of receiving the cement or concrete which is to be introduced therein (after the pile-core has been withdrawn) for the formation of a concrete pile.

The object of my invention is to provide the core which thus drives or sinks the shell or pipe into the ground with a collapsible point or shoe which in the sinking operation is expanded and in the operation of withdrawing such core is contracted or collapsed to such compass as to be readily withdrawable through the shell or pipe.

Other features of advantage and utility in my form of core will be apparent from the description hereinafter given.

In the drawings, Figure 1 is a side elevation of the pile shell or pipe, together with the core in place ready for driving or sinking; Fig. 2, a central longitudinal section of such pipe and core; Figs. 3, 4, and 5, transverse sections on the lines 3 3, 4 4, and 5 5, respectively, of Fig. 2; and Fig. 6, a longitudinal section of a construction of pile-core in which a jetting-pipe separate from the core-pipe is employed.

In the present and preferable embodiment of my invention as herein shown I make provision for sinking or introducing the pipe and its core into the ground by driving or by jetting, or by both; but it will be understood that my invention is not to be limited in its broader aspect to any particular manner of driving or sinking or any particular construction in this respect.

As herein shown, the covering which is to inclose the sides of the pile and which is to receive the concrete which forms such pile is a shell or pipe 1 of suitable diameter and length, according to the desired length and diameter of the concrete pile. The pile-core which is inserted within the shell when the parts are assembled in the driving operation, as illustrated in Figs. 1 and 2, comprises in the present instance a pipe 2, somewhat

shorter than the shell and carrying at its upper end a driving head or cap 3, which in the present instance is provided on its lower end with a screw-threaded socket receiving the screw-threaded upper end of the core-pipe 2 and having a flange 4 receiving and fitting over the upper end of the pile-shell. In case the pile is to be sunk or introduced into the ground or soil by the jetting process the driving head or cap may be provided with a suitable lateral opening, such as the opening 5, to be connected in the well-known manner to a source of jetting fluid, such as water, air, or steam. The lower end of the core-pipe is secured to the point or shoe, which in the present instance is made of a plurality of parts or sections, some of which are collapsible upon the others in order to enable such point or shoe to be withdrawn inwardly to clear the lower ends of the pile-shell, and thereby be permitted to be withdrawn together with its core. As shown in Figs. 2 to 5, the point or shoe comprises a hollow block 6, a point proper, (marked 7,) and a series of segments 8, together with operating connections between such point and the block.

As herein shown, the block is secured in suitable manner to the lower end of the core-pipe, in the present instance both by screw-threading therein and by the rivets 9, for the purpose of securely fastening said parts together. The segments 8, which as herein shown are four in number, form practically a continuation of the outer surface of the point proper, and the same are recessed at their upper ends, so as to form the shoulders 8^a, the pile-shell fitting such recessed or reduced portion of the segments and resting against such shoulders, as clearly indicated in Fig. 2. Moreover, these segments form practically a continuous surface circumferentially which is exposed to the soil in the driving or sinking operation. The segments are arranged to be expanded to the position indicated in Fig. 2 and also to be collapsed, so as to withdraw their outer or largest diameter within the inside diameter of the pile-shell, such contraction and expansion of the segments being accomplished automatically by the act of driving or withdrawing the core-pipe, as the case may be.

Referring to the connections of the segments with the block 6 and the point 7 to ac-

5 accomplish the results hereinbefore referred to, each segment is in the present instance inde-
 10 pendentlly pivoted to the upper end of the point proper, to which end each segment is
 15 provided centrally with an inwardly-extending radial flange or web 8^b , which at its lower
 end is received between parallel and sub-
 20 stantially radial lugs 10, which are formed from the body of and on the top surface of
 25 the point proper. This flange is pivotally held between said lugs by means of the trans-
 verse pivot-pin 11. Inasmuch as the seg-
 30 ments are independently connected with the point, a series of four of these pivotal connec-
 35 tions are provided, as clearly illustrated in Fig. 5. Each flange 8^b is received between
 40 parallel ribs or flanges 12, projecting laterally from the block 6; but such block and the seg-
 45 ments are arranged to have an independent movement, to which end a pin 13 is passed
 50 through each pair of flanges 12, near the lower end thereof, and the same is received within
 the longitudinal and elongated slot 8^c . The
 55 flanges 12, as shown in Fig. 2, are of increasing width from top to bottom, or, in other
 words, the bottom of the channel between
 60 such flanges is inclined downwardly and inwardly, so that the walls of the hollow block are at such points truncated conical, as
 65 clearly indicated in section in Fig. 2. Like-
 wise the inner face or edge of the flange 8^b of each segment is correspondingly inclined,
 while the slot 8^c of each segment has sub-
 70 stantially the same inclination.

75 The parts being constructed and assembled as above described, it will be observed that
 80 when the core-pipe is in its lowermost position its series of pins 13 will be resting at the
 85 lower ends of the series of slots 8^c , with the re-
 90 sult that the segments are outwardly pressed or expanded to their full extent to the posi-
 95 tion, for instance, as indicated in Fig. 2. At this time the pile-shell is positioned around
 100 and encompasses the reduced upper ends of the segments, which are outwardly expanded
 105 against the lower inner ends of such pile-shell, and, moreover, the lower edges of this
 110 shell are arranged to rest and to be stopped against downward movement relative to the
 115 shoe by the shoulders 8^a . When, however, the pile-shell, together with its core, has been
 120 driven or sunk into the ground the proper distance, the core-pipe is withdrawn up-
 125 wardly in suitable manner, and in the act of
 130 withdrawal the entire shoe is contracted or collapsed free of the lower end of the pile-
 shell, thereby enabling the entire core, com-
 135 prising also the shoe or point, to be removed from the pile-shell without displacing or with-
 140 drawing the latter in any measure. In this
 145 act of withdrawal of the core-pipe the up-
 ward movement of the pipe, together with the
 150 block 6, fastened thereto, raises the series
 of pins 13, which in traveling upwardly
 155 in the series of slots 8^c simultaneously and

160 uniformly draw the segments inwardly until such pins take their position at the upper
 ends of such slots, at which time the seg-
 165 ments are collapsed or contracted to their full extent and at which time such segments
 170 are withdrawn entirely within the internal diameter of the pile-shell. By preference, the
 shoulders 8^a are beveled or inclined down-
 175 wardly, so as to enable the segments to be moved inwardly without undue friction with
 the lower end of the pile-shell. The entire
 180 core is now in position to be withdrawn, leaving the pile-shell in position in the ground to
 be filled with cement or concrete, it being
 185 understood that the transverse diameter of the point proper at its upper end is slightly
 190 less than the internal diameter of the pile-shell.

195 As hereinbefore stated, the pile-shell and core may be sunk or introduced into the
 200 ground in suitable manner, as by driving or jetting, or by both, and in case it is desired to
 use the jetting process the block 6 is pro-
 205 vided with a longitudinal passage 14, and likewise the point 7 is provided with a longi-
 210 tudinal passage 15, communicating at its upper end with the lower end of the passage 14
 215 and terminating at its lower end at the extreme lower end of the point or shoe, as
 220 clearly indicated in Fig. 2, it being under-
 225 stood that the jetting fluid is introduced in suitable manner within the core-pipe 2, from
 230 whence it flows downwardly through the passages 14 and 15 to the soil, to enable the
 235 pile-shell and core to be easily sunk or intro-
 240 duced into the ground by such process alone or by such process assisted by driving. When
 245 the pile-shell and core are driven or sunk into certain kinds of soil, particularly soft soils,
 250 mud, sand, and the like, it is desirable to use an outer covering around the projecting por-
 255 tion or point of the core and also around the lower end of the pile-shell for the purpose of
 260 preventing entrance of such soft soils into the spaces or cracks between the segments and
 265 also to prevent the soil from filling up the conical space when the core is withdrawn.
 270 To this end I provide a covering (marked 16) shaped to fit the lower end of the pile-shell
 275 and the point or shoe, the latter in practice, in fact, causing the proper shaping of such
 280 covering. This covering may be made of any suitable material—such as thin sheet-
 285 metal, papier-mâché, fiber paper, or the like—sufficient to prevent the entrance of the
 290 soil into the space between the segments and also sufficient to retain its shape after the
 295 core proper and its shoe are withdrawn.

300 Referring to Fig. 6, a special jetting-pipe 17 may be employed within the core-pipe
 305 and the same may be suitably secured, as by screw-threading, into the jetting-passage 15
 310 in the point proper. This particular construction or place of fastening the lower end
 315 of this jetting pipe is preferable inasmuch as

the escape of jetting fluid between the block and the point proper is prevented, it being understood, moreover, that in the operation of withdrawing the core the block is arranged to slide upwardly upon the jetting-pipe. In order to provide for this independent movement of the core proper with respect to the jetting-pipe, such pipe extends only part way of the length of the core-pipe and is connected with the jetting-passage in the driving-cap by means of a suitable flexible connection, such as the hose-pipe 18, which will permit of the described independent movement.

I claim—

1. A pile-core adapted to sink a pile-shell and provided at its lower end with a collapsible point or shoe, said core and shoe being withdrawable from the shell.
2. A pile-core adapted to sink a pile-shell and insertible therewithin in the sinking operation, such core being provided at its lower end with a shoe formed of a plurality of parts arranged to collapse and being withdrawable together with its shoe from the shell.
3. A pile-core adapted to sink a pile-shell and insertible therewithin in the sinking operation, such core being provided at its lower end with an expansible and contractible shoe expanded by the act of pressing the core downwardly and contracted by the act of withdrawing the same upwardly, said core and shoe being withdrawable from the shell.
4. A pile-core adapted to sink a pile-shell and insertible therewithin in the sinking operation, such core being provided at its lower end with a collapsible point or shoe on which the lower end of the pile-shell fits, said core and shoe being withdrawable from the shell.
5. A pile-core adapted to sink a pile-shell and insertible therewithin in the sinking operation, such core being provided at its lower end with a point or shoe having collapsible segments arranged to be expanded against the lower end of the pile-shell in the sinking operation.
6. A pile-core adapted to sink a pile-shell and provided at its lower end with a collapsible point or shoe, comprising a point proper, a block secured to the core proper and a series of expansible and contractible segments cooperating with the point proper and the block.
7. A pile-core adapted to sink a pile-shell and provided at its lower end with a collapsible point or shoe, comprising a point proper, a block secured to the core and a series of expansible and contractible segments pivoted upon the point proper and having independent movement with respect to the block.
8. A pile-core adapted to sink a shell and provided at its lower end with a collapsible point or shoe, comprising a point proper, a block secured to the core proper and a series of expansible and contractible segments piv-

oted upon the point proper and arranged to collapse inwardly upon the block.

9. A pile-core adapted to sink a pile-shell and provided at its lower end with a collapsible point or shoe, comprising a point proper, a block secured to the core proper and a series of expansible and contractible segments cooperating with the point proper and the block, said point having its greatest diameter less than the internal diameter of the pile-shell.

10. A pile-core adapted to sink a pile-shell and provided at its lower end with a collapsible point or shoe, comprising a point proper, a block secured to the core proper and a series of expansible and contractible segments pivoted upon the point proper and having a pin-and-slot connection with the block.

11. A pile-core adapted to sink a pile-shell and provided at its lower end with a collapsible point or shoe, comprising a point proper, a block secured to the core proper and a series of expansible and contractible segments having radial flanges or webs pivoted upon the point proper and cooperating with the block to permit a movement of the latter longitudinally and independently of the segments.

12. A pile-core adapted to sink a pile-shell and provide at its lower end with a collapsible point or shoe, comprising a point proper, a block secured to the core proper and a series of expansible and contractible segments having radial flanges provided upon the point proper and having a pin-and-slot connection with the block.

13. A pile-core adapted to sink a pile-shell and provided at its lower end with a collapsible point or shoe, comprising a point proper, a block secured to the core proper and a series of expansible and contractible segments having radial flanges pivoted upon the point proper and having angular slots, and pins on the block and movable in the slots.

14. A pile-core adapted to sink a pile-shell and provided at its lower end with a collapsible point or shoe, comprising a point proper, a block secured to the core proper and a series of expansible and contractible segments having radial flanges pivoted at their lower ends to the upper end of the point proper and having toward their upper ends a pin-and-slot connection with the block.

15. A pile-core adapted to sink a pile-shell and provided at its lower end with a collapsible point or shoe, comprising a point proper, a block secured to the core proper and a series of expansible and contractible segments having radial flanges pivoted upon the point proper and having angular slots, said block having lateral flanges formed by sockets or grooves inclined downwardly and inwardly to receive the flanges of the segments, and pins in the block-flanges received by said slots.

16. A pile-core adapted to sink a pile-shell and provided at its lower end with a collapsible point or shoe, comprising a point proper, a block secured to the core proper and a series of expansible and contractible segments having radial flanges pivoted upon the point proper and having angular slots and inner edges inclined downwardly and inwardly, said block having pairs of lateral flanges and sockets therebetween corresponding in inclination with the inner edges of the segments, and pins in the block-flanges and received by said slots.
17. A pile-core adapted to sink a pile-shell and provided at its lower end with a collapsible point or shoe comprising a point proper, a block secured to the core proper, and a series of collapsible segments cooperating with the point and block, said segments being reduced at their upper ends to receive the pile-shell.
18. A pile-core adapted to sink a pile-shell and provided at its lower end with a collapsible point or shoe comprising a point proper whose greater diameter is less than the internal diameter of the pile-shell, a block secured to the lower end of the core proper, and a plurality of segments reduced at their upper ends to receive the pile-shell and having shoulders upon which the lower end of the pile-shell rests.
19. A pile-core adapted to sink a pile-shell and insertible therewithin in the sinking operation, said core comprising a body portion having a collapsible shoe or point at its lower end, and a driving-head at its upper end.
20. A pile-core adapted to sink a pile-shell and insertible therewithin in the sinking operation, said core comprising a body portion having a collapsible shoe or point at its lower end and at its upper end a driving-head arranged to fit over the upper end of the pile-shell.
21. A pile-core adapted to sink a pile-shell and insertible therewithin in the sinking operation, said core comprising a tubular body portion having affixed to its lower end a collapsible shoe or point on which the lower end of the pile-shell fits and having at its upper end a driving-head.
22. A pile-core adapted to sink a pile-shell and insertible therewithin in the sinking operation, said core comprising a hollow tubular body portion having affixed to its lower end a collapsible shoe or point provided with a jetting-passage, and means for supplying jetting fluid to the tubular body portion.
23. A pile-core adapted to sink a pile-shell and insertible therewithin in the sinking operation, said core comprising a hollow tubular body portion having affixed to its lower end a collapsible shoe or point provided with a jetting-passage, and having at its upper end a driving-head having a jet-inlet passage for supplying the jetting fluid to the tubular body portion.
24. A pile-core adapted to sink a pile-shell and comprising a pipe arranged within and concentric of the shell, and a collapsible shoe at the lower end of the pipe.
25. A pile-core adapted to sink a pile-shell and comprising a pipe arranged within and concentric of the shell, and a collapsible shoe at the lower end of the pipe and consisting of a point proper, a block and a plurality of segments operatively connected therewith, said block and point being of less diameter than the shell and the segment being arranged to be expanded radially against the lower end of the shell.
26. A pile-core adapted to sink a pile-shell and insertible therewithin in the sinking operation, said core comprising a hollow tubular body portion having affixed to its lower end a collapsible shoe or point consisting of a point proper provided with a jetting-passage, collapsible segments or sections operatively connected with said tubular body portion, and a jetting-pipe extending longitudinally of said body portion of the core and secured in the jetting-passage of the point.
27. A pile-core adapted to sink a pile-shell and insertible therewithin in the sinking operation, said core comprising a hollow tubular body portion having affixed to its lower end a collapsible shoe or point consisting of a point proper provided with a jetting-passage, a hollow block secured to the lower end of said tubular body portion, collapsible segments connecting the block to the point, and a jetting-pipe extending longitudinally of said body portion and arranged within the jetting-passage of the point.
28. A pile-core adapted to sink a pile-shell and insertible therewithin in the sinking operation, said core comprising a hollow tubular body portion having affixed to its lower end a collapsible shoe or point consisting of a point proper provided with a jetting-passage, collapsible segments or sections operatively connected with said tubular body portion, a jetting-pipe extending longitudinally of said body portion of the core and secured in the jetting-passage of the point, a cap arranged on the upper end of said body portion and provided with a jetting-passage, and a flexible jetting connection between said jetting-pipe and the jetting-passage in said cap.
29. A pile-core adapted to sink a pile-shell and insertible therewithin in the sinking operation, such core being provided at its lower end with a collapsible point or shoe on which the lower end of the pile-shell fits, and a covering fitting over said point or shoe.
30. A pile-core adapted to sink a pile-shell and provided at its lower end with a collapsible point or shoe, comprising a point proper, a block secured to the core proper, a series of expansible and contractible segments cooperating

erating with the point proper and the block, and a covering fitting over said point proper and the segments.

5 31. A pile-core adapted to sink a pile-shell and insertible therewithin in the sinking operation, said core being provided at its lower end with a collapsible point or shoe comprising a point proper having a central jetting-passage, a hollow block secured to the core
10 proper, a series of expansible and contractible segments cooperating with the point proper and the block, a jetting-pipe extending centrally and longitudinally of the core proper and communicating at its lower end
15 with the jetting-passage in the point proper, said jetting-pipe extending part way of the length of the core proper, a driving-cap secured to the upper end of the core proper

and provided with a jetting-passage, and a flexible pipe connecting said jetting-passage 20 and the jetting-pipe.

32. A pile-core adapted to sink a pile-shell and provided at its lower end with a collapsible point or shoe, comprising a point proper, a block secured to the core, a series of ex- 25 pansible and contractible segments pivoted upon the point proper and having independent movement with respect to the block, and a covering fitting over the point proper and said segments and the lower end of the pile- 30 shell.

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