

No. 777,351.

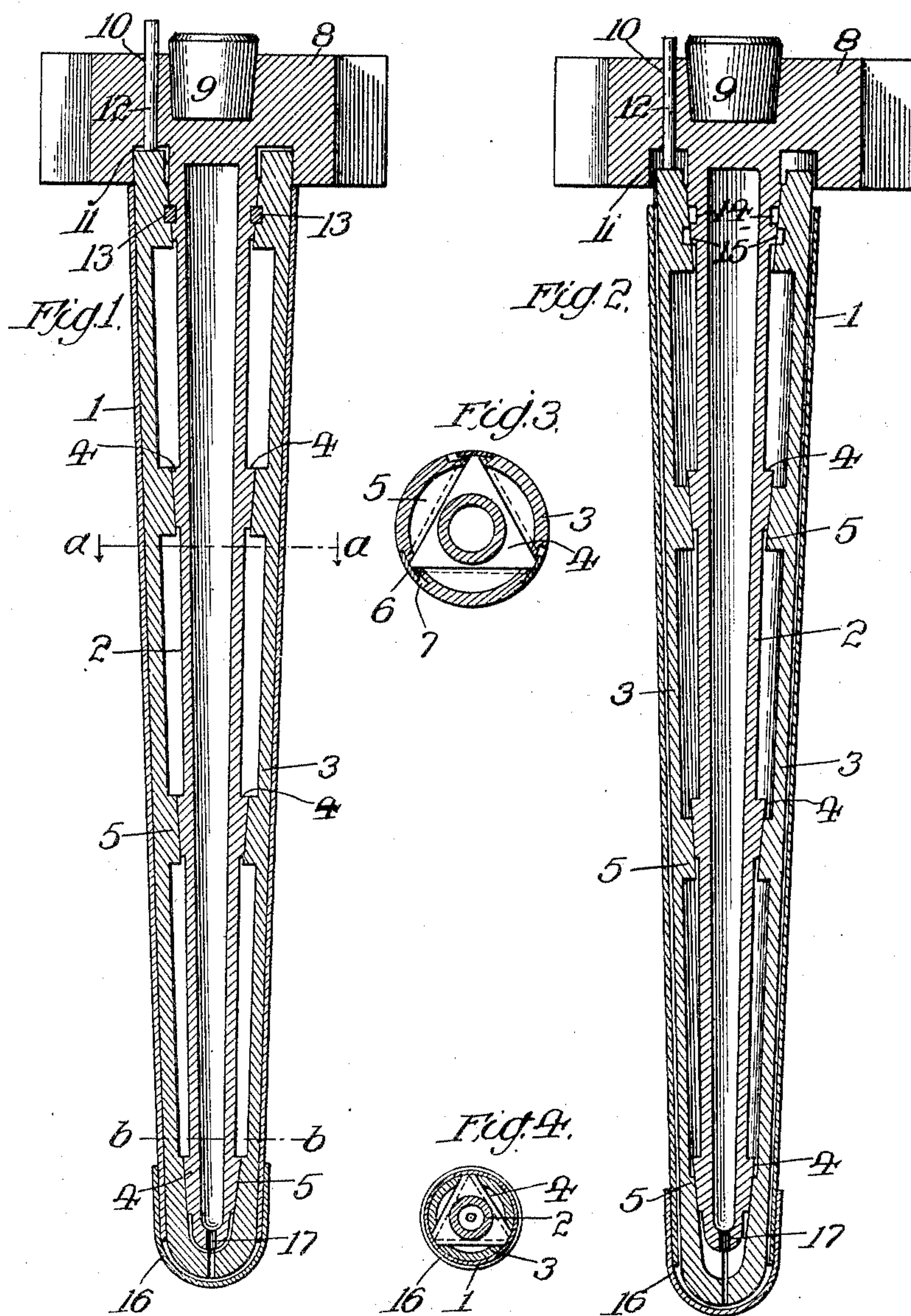
PATENTED DEC. 13, 1904.

A. A. RAYMOND.
PILE CORE FOR CONCRETE PILE FORMING.

APPLICATION FILED OCT. 3, 1904.

NO MODEL.

2 SHEETS—SHEET 1.



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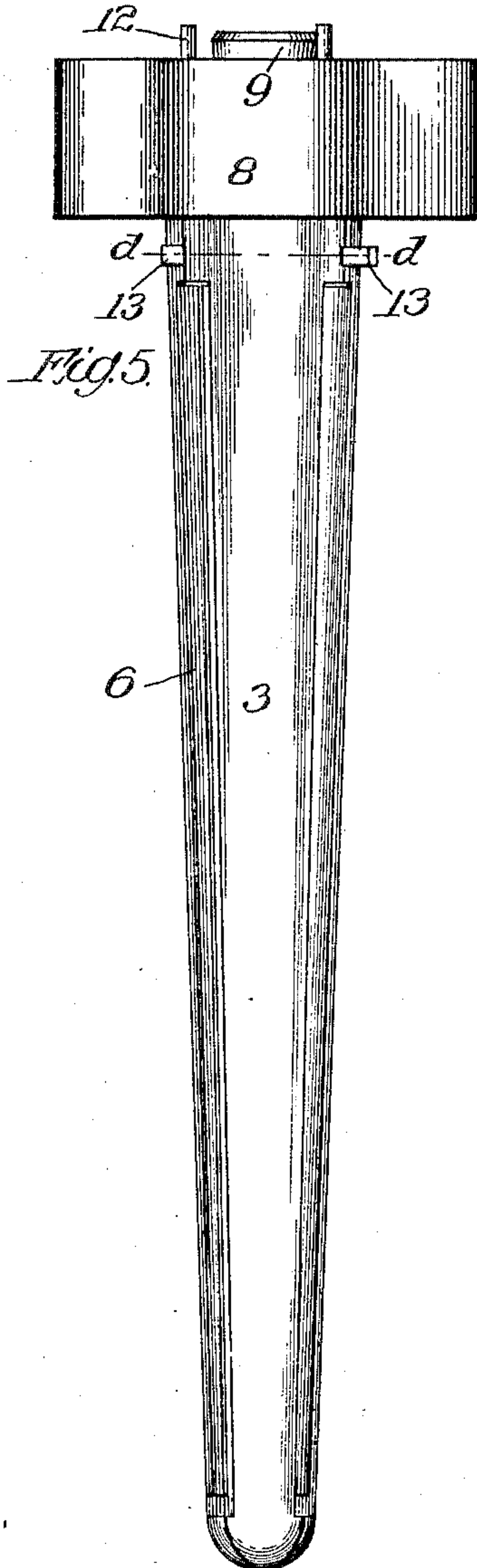


Fig. 5.

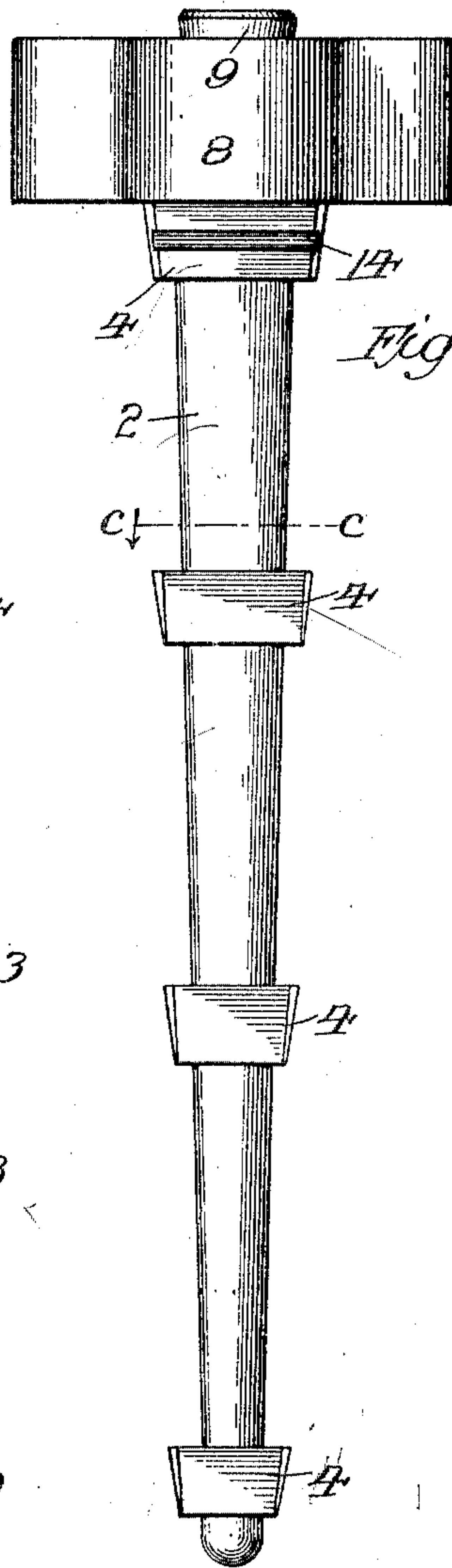


Fig. 6.

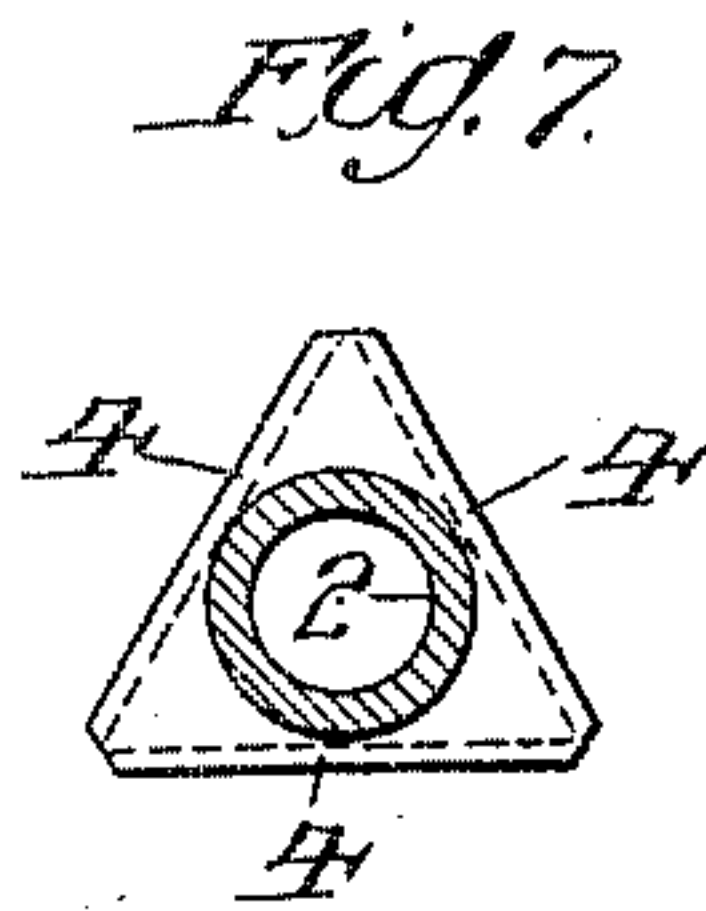


Fig. 7.

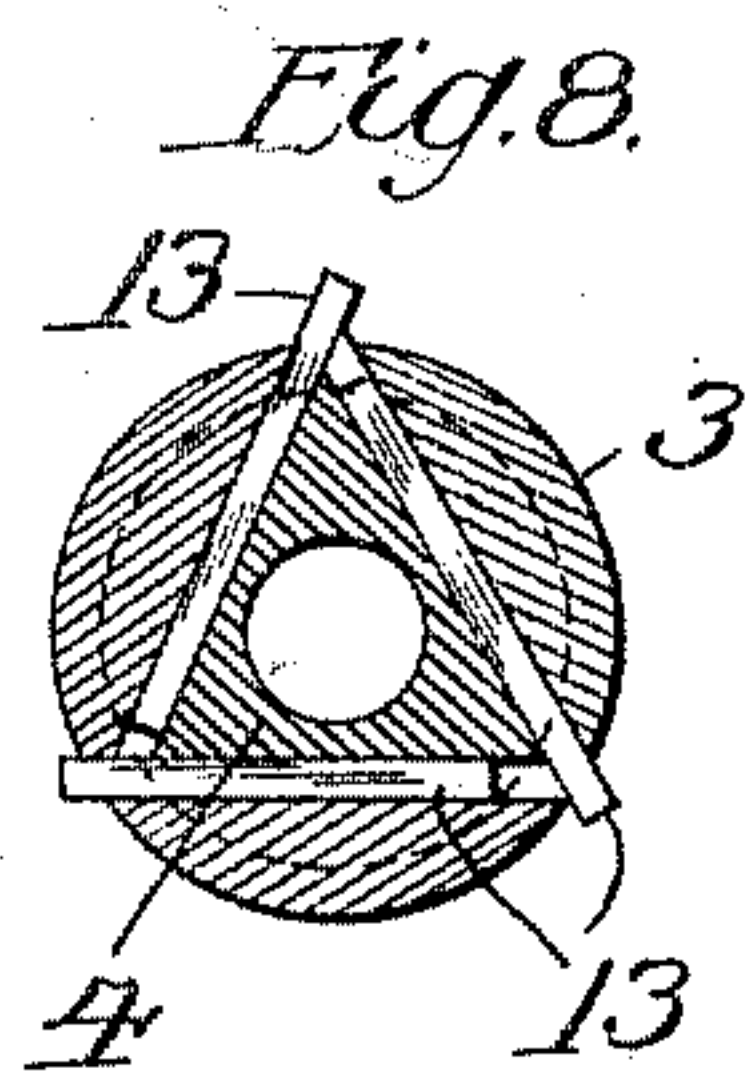


Fig. 8.

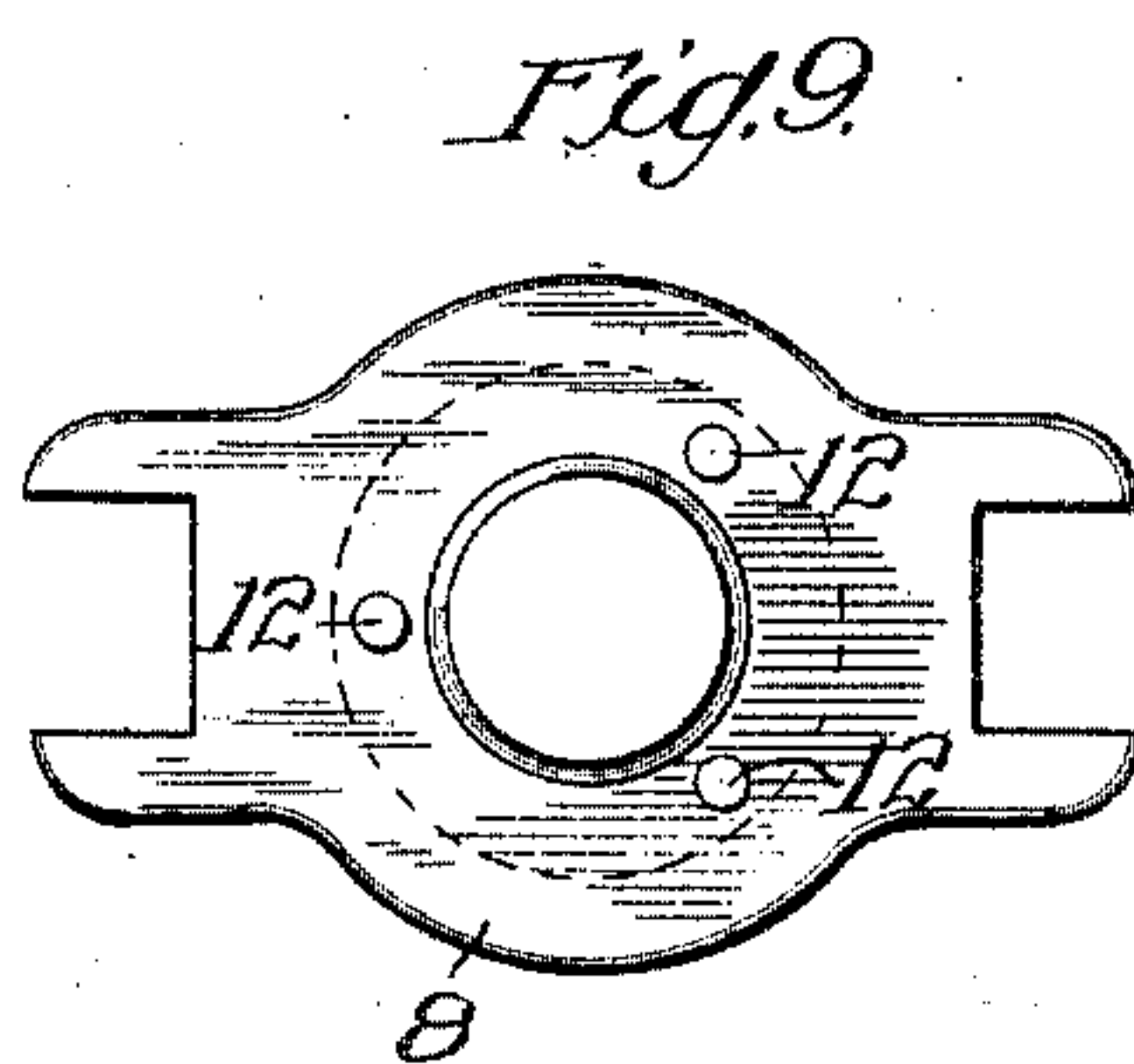


Fig. 9.

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UNITED STATES PATENT OFFICE.

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PILE-CORE FOR CONCRETE-PILE FORMING.

SPECIFICATION forming part of Letters Patent No. 777,351, dated December 13, 1904.

Application filed October 3, 1904. Serial No. 226,921. (No model.)

To all whom it may concern:

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

My invention relates to the art of concrete piles; and the object thereof is to provide an efficient and reliable core employed in the process of forming the concrete pile, such as illustrated in my prior patents, Nos. 589,026 and 700,707, respectively dated August 31, 1897, and May 20, 1902.

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

This application is filed as a continuation of or substitute for an application filed by me on September 3, 1902, Serial No. 121,936, but lapsed for non-payment of final fee.

In the drawings, Figure 1 is a central vertical section of my core and temporary shell or covering, the core being shown in expanded condition; Fig. 2, a similar view, but showing the core in contracted condition; Fig. 3, a cross-section on the line *a a* of Fig. 1; Fig. 4, a cross-section on the line *b b* of Fig. 1; Fig. 5, an elevation of my pile-core; Fig. 6, an elevation of the interior section of the core; Fig. 7, a cross-section on the line *c c* of Fig. 6; Fig. 8, a cross-section on the line *d d* of Fig. 5, and Fig. 9 a plan view of the head-piece of the core.

The object of the core about to be described is to force into the ground or place where the pile is to be formed a thin tapering shell or covering 1, which, as described in my said prior patents, may be made of any suitable material, such as thin sheet metal, wood-pulp, papier-mâché, &c. After this shell is forced into the ground the required distance the core is removed, leaving the shell in the ground to form a perfect mold and prevent the earth from caving in. The shell is then filled with suitable filling—such as concrete, cement, or the like—and a perfect tapering concrete pile results. An expansible core is necessary in forming a pile as above described, and to pro-

vide a simple and efficient core of this character is the object of my present invention.

My new and improved pile-core comprises an inner section 2 and a series of outer surrounding sections 3, which are three in number in the present instance, although such number may, if desired, be increased. It is desirable, however, to employ as many as three of such outer sections in order that they will properly collapse and become entirely disengaged from the inner walls of the shell or casing 1. The inner section 2 of the core consists of a tapering pipe, which is made hollow for sake of lightness and to permit fluid jetting, if desired, as hereinafter explained. At intervals along the sides of this pipe are arranged groups or series of wedges 4, formed or attached thereto. Each group has three wedges or wedge-surfaces, as seen in Fig. 7, corresponding in number to the outer sections 3. Any suitable number of these groups of wedges may be employed, depending upon the length of the pile-core or otherwise.

The inner side of the outer sections 3 of the pile-core is provided with a series of wedge-surfaces 5, arranged in proximity to the groups of wedges 4, with which they cooperate. The wedge-surfaces 4 and 5 are both downwardly and inwardly inclined, with the result that a downward movement of the inner section 2 relative to the outer sections 3 will expand such latter sections and force them outwardly against the temporary shell 1.

In order to cover the joints between the edges of adjacent outer sections 2, I employ a thin strip 6, made of suitable material, fastened along one edge of one of such sections and arranged to overlap the edge of the next adjacent section, which is cut away at 7 to receive it.

Formed preferably but not necessarily integral with the inner section 2 of the pile-core is a head 8, which, as shown, has a central socket to receive a removable block 9, of wood or other suitable material, to receive the impact of the hammer. The head is provided with three vertical holes 10, opening at their

lower ends upon the top end of the outer sections 3, which are arranged to fit in an annular recess 11 on the under side of the head. These holes 10 receive pins 12, which are adapted to be forced against the outer sections 3 to thereby move the latter downwardly relatively to the inner section 2, whereby the pile-core will become contracted and be in condition to be removed from within the temporary shell. After the core is driven the required distance the pins 12 are inserted. These pins will project slightly above the head 8 when the core is expanded and above the block 9 and may be driven by a light blow from the pile-driver hammer or in any other suitable way.

Suitable means are employed for the purpose of holding or locking the outer sections 3 to the inner section or core proper, and in the present instance I have shown a series of three keys 13, passing through grooves 14 and 15, extending across the wedges 4 and 5, respectively. When the core is expanded, as seen in Fig. 1, the respective grooves register, thereby permitting of the insertion of the keys, which lie partly in one groove and partly in the other groove. When the core is contracted, as seen in Fig. 2—that is, after the keys are removed and the pins 10 driven in—the grooves are out of register. Inasmuch as the outer sections are at least three in number their outer surfaces become entirely disengaged from the temporary shell 1 when the pile-core is contracted—that is to say, the pile-core collapses as to its entire circumference, or rather outer surface. The inner section forms no part of the surface which engages the temporary shell, inasmuch as it is completely surrounded by the three outer sections.

As above described, the pile-core and its shell are arranged to be driven by a pile-driver hammer; but, as hereinbefore alluded to, the parts may be let into the ground by jetting of water or other fluid, even air. When the pile-core and shell are driven, I fix a cap 16 at the lower end thereof, which is provided at the bottom with an opening when the core is sunk by jetting. For the purpose of jetting the inner section 2 of the pile, which is formed hollow, as described, has a central opening 17, registering with an opening 18, provided at the lower ends of the outer sections 3, which are curved toward each other to form the rounded end of the pile-core.

I claim—

1. A pile-core comprising an inner section and a plurality of outer sections entirely surrounding the inner section, said inner sections and the outer sections being movable relatively to each other; substantially as described.

2. An expansible pile-core comprising an inner section and a plurality of outer sections, which when expanded constitute the entire

outer surface of the core, said inner section and outer sections being movable relatively to each other, in combination with means for locking said sections in expanded condition; substantially as described.

3. A pile-core comprising an inner section, a plurality of outer sections surrounding the inner section and arranged substantially edge to edge, and a series of cooperating wedge-surfaces arranged on the inner section and the outer sections respectively; substantially as described.

4. A pile-core comprising an inner substantially tubular section, a plurality of outer sections surrounding the inner section, wedges arranged at intervals on the inner section, and corresponding in number to the outer sections, and cooperating wedges arranged on the inner surfaces of the outer sections; substantially as described.

5. A pile-core comprising an inner section consisting of a hollow tube or pipe having at intervals groups of wedge-surfaces 4, and a plurality of outer sections surrounding the inner section and also having at corresponding intervals groups of similar and cooperating wedge-surfaces 5; substantially as described.

6. A pile-core comprising an inner section and a plurality of outer sections substantially meeting at their edges and at their lower ends and surrounding the inner section as to its sides and lower end; substantially as described.

7. A pile-core comprising an inner section having wedge-surfaces 4, a plurality of outer sections having wedge-surfaces 5, the upper series of said wedge-surfaces 4 and 5 being respectively provided with grooves 14 and 15, respectively, and keys 13 adapted to enter said grooves when the latter are in register; substantially as described.

8. A pile-core comprising an inner section having a head provided with a series of holes 10, a plurality of outer sections movable longitudinally and relatively to the inner section, and a series of pins 12 arranged in said holes 10 and adapted to contact the upper end of said outer sections and cause them to be moved downwardly independently of the inner section, substantially as described.

9. A pile-core comprising an inner section having a head provided with an annular recess 11 and a series of vertical holes 10 entering said recess, a plurality of outer sections movable longitudinally and relatively to the inner section and whose upper ends are received by said recess and pins arranged in said holes and adapted to be forced against the upper ends of said outer sections; substantially as described.

10. A pile-core comprising an inner section provided with a jet-opening at its lower end, and a series of outer sections arranged around the inner section and movable relatively thereto, said outer sections forming at their lower

ends a jet-opening registering with the jet-opening of the inner section; substantially as described.

11. A pile-core comprising an inner section, 5 a plurality of outer sections having substantially contiguous edges and surrounding the inner section, and a series of cooperating wedge-surfaces arranged on the inner section and the outer sections respectively; substantially as described. 10

12. A pile-core comprising an inner section, a plurality of outer sections surrounding the inner section, a series of wedge-surfaces at intervals on the inner surface of said outer 15 sections, and corresponding wedge-surfaces on the outer surface of the inner section; substantially as described.

13. A pile-core comprising an inner section and a plurality of outer sections substantially 20 meeting at their edges and surrounding the inner section, said inner section and outer sections being movable relatively to each other; substantially as described.

14. A pile-core comprising a tubular inner 25 section having a jet-opening at its lower end, and a series of outer sections surrounding the inner section and movable relatively thereto; substantially as described.

15. A pile-core comprising a head having an 30 integral extension constituting the inner section of the core, and a plurality of outer sections surrounding the inner section; substantially as described.

16. A pile-core comprising a head having a 35 tubular integral extension constituting the inner section of the core, and a plurality of outer sections entirely surrounding the inner section; substantially as described.

17. A pile-core comprising a head having an 40 integral extension constituting the inner section of the core, and a plurality of outer sections surrounding the inner section, said head having on its under side an annular recess to receive the upper ends of said outer sections; 45 substantially as described.

18. A pile-core comprising a head having an integral extension constituting the inner section of the core, a plurality of outer sections surrounding such inner section, and means ar- 50 ranged between adjacent surfaces of the inner and outer sections for locking the core in expanded condition; substantially as described.

19. A pile-core comprising inner and outer 55 sections, movable longitudinally with respect

to each other, said inner section having on its outer surface a series of grooves 14 and the outer sections having on their inner surface adjacent said grooves 14 similar grooves 15, and keys 13 arranged to enter said series of 60 grooves 14, 15, when they are in register; substantially as described.

20. A pile-core comprising a plurality of outer sections, and an inner section consisting of a head and a tubular extension surrounded 65 by such outer sections; substantially as described.

21. A pile-core comprising a head having a tubular extension constituting the inner section of the core, and a plurality of outer sec- 70 tions around such inner section; substantially as described.

22. A pile-core comprising a head provided with an annular recess and having an extension constituting the inner section of the core, 75 and a plurality of outer sections arranged around such inner section and having their ends received by such recess; substantially as described.

23. A pile-core comprising a head provided 80 with an annular recess and having an extension constituting the inner section of the core, a plurality of outer sections arranged around such inner section and having their upper ends received by such recess, and means for lock- 85 ing the ends of the outer sections within such recess; substantially as described.

24. A pile-core comprising a head provided with a tubular extension constituting the inner section of the core and provided with an 90 annular recess, a plurality of outer sections arranged around such inner section and having their upper ends received by such recess, and means for locking such outer sections within the recess; substantially as described. 95

25. A pile-core comprising a head provided with a tubular extension constituting the inner section of the core and provided with an annular recess, a plurality of outer sections arranged around such inner section and hav- 100 ing their upper ends received by such recess, and means arranged between adjacent surfaces of the inner and outer sections for locking the outer sections within the recess and in expanded condition; substantially as de- 105 scribed.

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