No. 700,707. Patented May 20, 1902.

A. A. RAYMOND.

PILE.

(Application filed July 25, 1901.)

(No Model.)

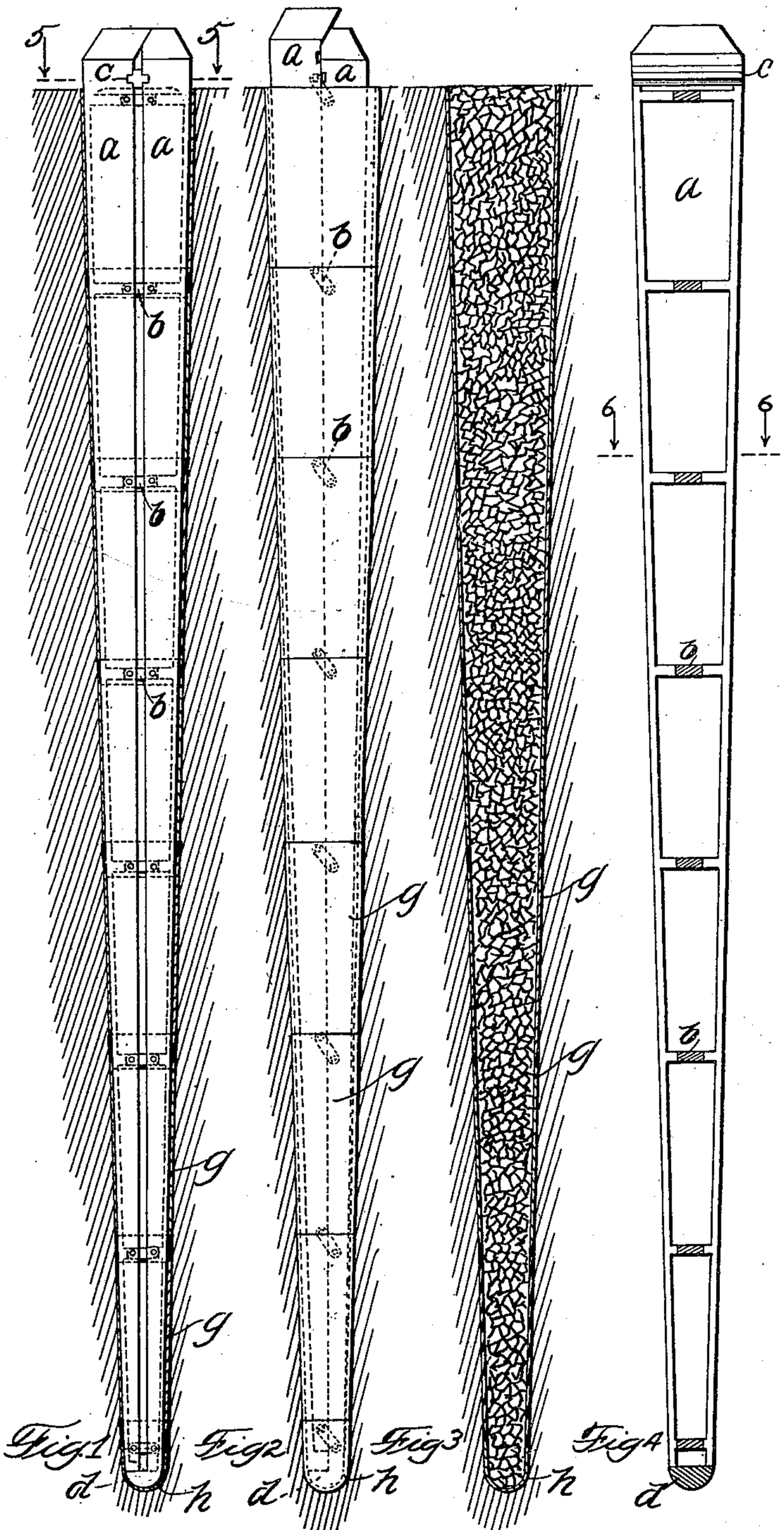

Fig. 1 Fig. 2 Fig. 3 Fig. 4

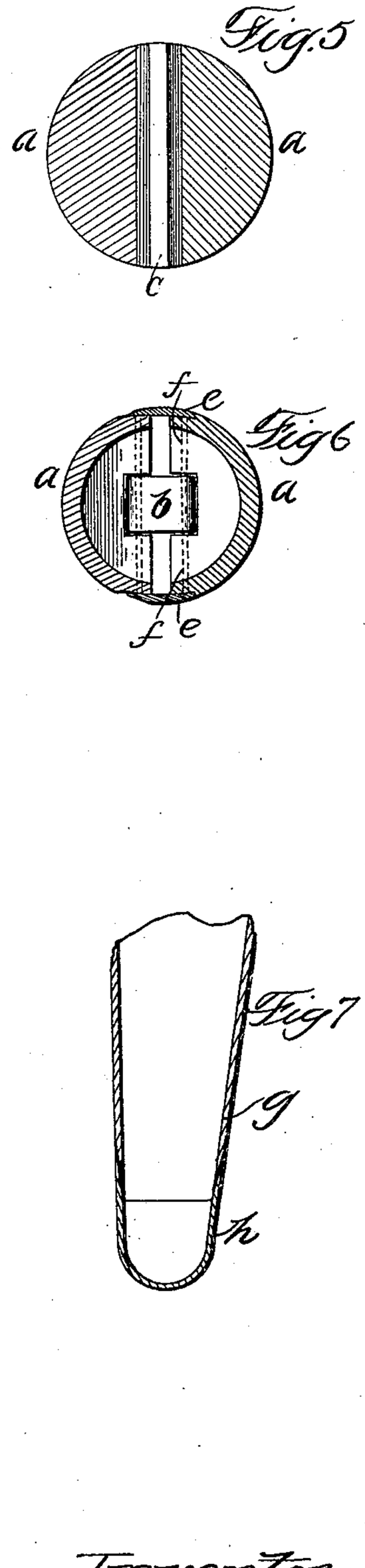

Fig. 5

Fig. 6

Fig. 7

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UNITED STATES PATENT OFFICE.

ALFRED A. RAYMOND, OF CHICAGO, ILLINOIS.

PILE.

SPECIFICATION forming part of Letters Patent No. 700,707, dated May 20, 1902.

Application filed July 25, 1901. Serial No. 69,615. (No model.)

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 a certain new and useful Improvement in Piles, (Case No. 1,) of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to piles of such a nature as exhibited in my Patent No. 589,026, granted to me August 31, 1897. In the device of my said patent I have provided a pile-core comprising two similar semicircular core-shells, which shells are preferably in the form of rings in cross-section. A bar provided with a series of wedging-surfaces is interposed between the semicircular core-sections and when reciprocated in one direction serves to spread the same apart and when moved in the opposite direction permits said core-sections to approach each other. A casing is provided for receiving the pile-core. When the casing is in place upon its core, the core and casing are driven into the ground, the core furnishing the necessary resistance to penetrate the earth, which the shell itself cannot always do. After the core and its casing have been driven to the requisite depth the wedging device, that had previously been actuated to spread the sections of the core apart, is now moved to permit the said sections to approach, whereupon the core may be withdrawn. After the core is withdrawn the interior of the shell is filled with concrete or other suitable solid substance, that forms the pile proper. I prefer to employ as a filling a composition of cement and crushed stone or any other filling adapted to harden with age. This filling can be tamped into the jacket to make it solid and to be built above the ground, as well as within the ground. Even though the jacket should corrode or waste away, especially if the piling is driven below the water-line, the filling will withstand long usage.

I have found that it is somewhat difficult to always adjust the relative positions of the sections of the core and that the core casing or shell is frequently likely to be punctured by the core as it is driven within the ground, especially if the core casing or shell is made of wood-pulp or papier-mâché.

It is the object of my present invention, therefore, to improve the structural characteristics of the temporary core and the pile-casing.

I form the core in sections that are jointed together or otherwise so associated as to permit relative longitudinal movement thereof, means being interposed between the core-sections, so that when a relative longitudinal movement in one direction is effected the core-sections will spread apart and fill the core-casing, and when moved in the other direction the core-sections will approach and permit the removal of the temporary core after the casing has been driven to the desired depth. I prefer to join the sections of the pile-core by means of hinges that are pivotally connected to both sections of the core, so that when these hinges occupy a horizontal position or a position at right angles to the axis of the core the core-sections will be spread farther apart to fill the shell or casing, and when one section of the core is lifted the hinges, by occupying an oblique position, will cause the core-sections to approach each other, so that the core then becomes smaller than the bore of the shell and may readily be withdrawn.

The improved casing of my invention may be said to consist of a structure having joints or lengths that are relatively movable, so that if for any reason the temporary core should engage one part of the casing with too great force this part of the casing may give by moving longitudinally with respect to the remainder of the casing, so that the casing need not be punctured.

I particularly prefer to employ a casing having its lower tip portion formed in a longitudinally movable or separable section, so that as the core is driven into the casing, although the casing may expand at various points throughout its length, the tip of the core will not force its way through the tip of the casing, as this latter part will give. By reason of this construction I am enabled to provide a pile-casing that will not be punctured as it, with its contained core, is driven into the ground. The pile-casing by being

punctured, as sometimes happened heretofore, permits the access of water into the casing, so that the filling within the casing is impaired.

I will explain my invention more fully by reference to the accompanying drawings, in which—

Figure 1 is a longitudinal view of a pile-casing in longitudinal section with a temporary core in full elevation, both constructed in accordance with my present invention and shown inserted within the ground, the pile-core being fully expanded. Fig. 2 is a view in elevation of the pile-casing with its contained core, the core being collapsed and in condition to be withdrawn from the casing. Fig. 3 is a view illustrating the completed pile, the core having been withdrawn and the casing filled with stone and cement or what other filling may be desired. Fig. 4 is a view from the interior of the temporary pile-core and showing one-half of the same. Fig. 5 is a sectional view on line 5 5 of Fig. 1. Fig. 6 is a sectional view on line 6 6 of Fig. 4. Fig. 7 is an enlarged sectional view of the lower part of the pile-casing.

Like parts are indicated by similar characters of reference throughout the different figures.

The temporary pile-core is made in two sections *a a*, relatively movable longitudinally, united by hinges *b b*, each pivoted at one end to a section. These hinges when occupying a horizontal position, as illustrated in Fig. 1, fully separate the core-sections to fill the pile-casing. To maintain the core-sections in this separated relation, I provide a key *c*, that has tongues engaging corresponding grooves in the opposed sections of the core. When this key is removed, one of the sections may be moved with respect to the other, so as to occupy the position illustrated in Fig. 2, the hinges occupying oblique positions. The upper ends of the core-sections are provided with opposed oblique faces, so that when the core-sections are collapsed they may occupy the position illustrated in Fig. 2. One of the core-sections is provided with a transverse extension *d*, upon which the companion core-section may be bottomed. If desired, plates *e e* may be employed, secured to one of the core-sections and movable transversely with respect to the companion core-section for covering the pintles *f f*, by which the hinges are secured to the core-sections and the gap that intervenes between the core-sections when they occupy the position illustrated in Fig 1.

The pile-casing is formed in relatively longitudinally-movable lengths *g g*, formed, preferably, separate physically, but which are joined together to form the casing by a sliding engagement, the sections telescoping each other, the tip portion *h* being similarly joined to the remainder of the pile-casing. I have illustrated one means of joining the sections of the pile-casing where the meeting faces of the adjacent ends of the pile-casing are oblique, these surfaces slanting downward and inward toward the pile, so that water may not ooze into the cavity in the pile-casing.

The temporary pile-cores and the casings or shells are conical, so that the ground may be entered, and after the piles are in place further depression thereof may be resisted by reason of the wedging action.

Other means may be employed for forming the pile-casing in lengths relatively movable longitudinally without departing from the spirit of my invention, and other means may be employed for permitting a separation or collapse of the sections of the pile-core upon their longitudinal movement with respect to each other without departing from the spirit of my invention, and I do not wish, therefore, to be limited to the precise construction herein set forth; but,

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In an expanding pile-core, the combination with the longitudinal sections thereof, of hinges uniting the said sections and permitting relatively longitudinal movement thereof, whereby the said sections may be separated or collapsed, substantially as described.

2. In an expanding pile-core, the combination with the longitudinal sections thereof, of hinges uniting the said sections and permitting relatively longitudinal movement thereof, whereby the said sections may be separated or collapsed, and a key for maintaining the sections of the pile-core in a separated relation, substantially as described.

3. In an expanding pile-core, the combination with the longitudinal sections thereof, of hinges uniting the said sections and permitting relatively longitudinal movement thereof, whereby the said sections may be separated or collapsed, one of the said sections being provided with a transverse section *d* upon which the other section may bottom when the said sections are in a separated relation, substantially as described.

4. In an expanding pile-core, the combination with the longitudinal sections thereof, of hinges uniting the said sections and permitting relatively longitudinal movement thereof, whereby the said sections may be separated or collapsed, and a key for maintaining the sections of the pile-core in a separated relation, one of the said sections being provided with a transverse section *d* upon which the other section may bottom when the said sections are in a separated relation, substantially as described.

5. A pile-casing having its tip longitudinally movable with respect to the remainder of the pile-casing, and having telescoping engagement therewith, substantially as described.

6. A tapering pile casing or shell formed in relatively longitudinally movable lengths, substantially as described.

7. A tapering pile casing or shell formed in relatively longitudinally movable telescoping lengths, substantially as described.

8. A tapering pile-casing having a tip exterior to said casing and longitudinally movable relatively thereto, substantially as described.

9. A tapering pile-casing having its tip longitudinally movable with respect to the remainder of the pile-casing, and having telescoping engagement therewith, substantially as described.

10. The combination with an expanding pile-core, of a shell or casing adapted to surround said core, and a tip against which said core is adapted to press, said shell and tip being longitudinally movable relatively to each other, substantially as described.

11. The combination with an expanding pile-core, of a tapering shell or casing adapted to surround said core, and a tip against which said core is adapted to press, said shell and tip being longitudinally movable relatively to each other, substantially as described.

12. The combination with a shell or casing, of an expanding pile-core composed of longitudinal sections, means interposed between said sections, whereby upon the relatively longitudinal movement of the same the sections of the pile-core may be expanded or collapsed, and a tip against which said core is adapted to press, covering the end of said casing and longitudinally movable relatively thereto, substantially as described.

13. A tapering pile casing or shell formed in relatively longitudinally movable lengths, in combination with a filling of concrete or similar material, substantially as described.

14. A composite pile composed of a tapering sectional shell or casing filled with concrete or similar material, substantially as described.

In witness whereof I hereunto subscribe my name this 1st day of April, A. D. 1901.

ALFRED A. RAYMOND.

Witnesses:

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