M. M. UPSON & H. R. DAY.

CORE FOR FORMING CONCRETE PILES.

APPLICATION FILED OCT. 1, 1913.

1,192,247.

Patented July 25, 1916.

3 SHEETS—SHEET 1.

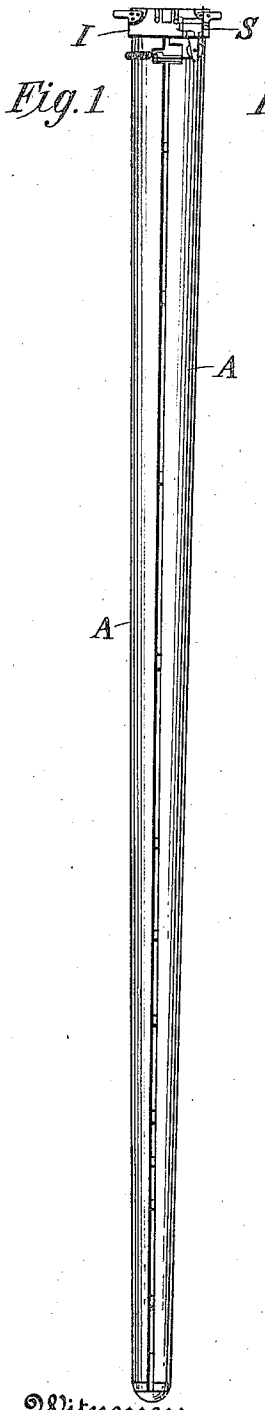



Fig. 1

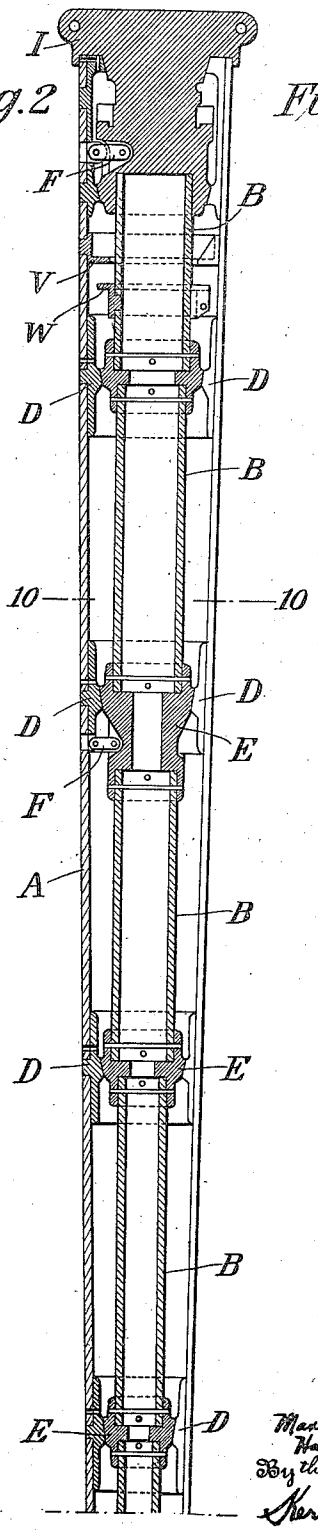



Fig. 2

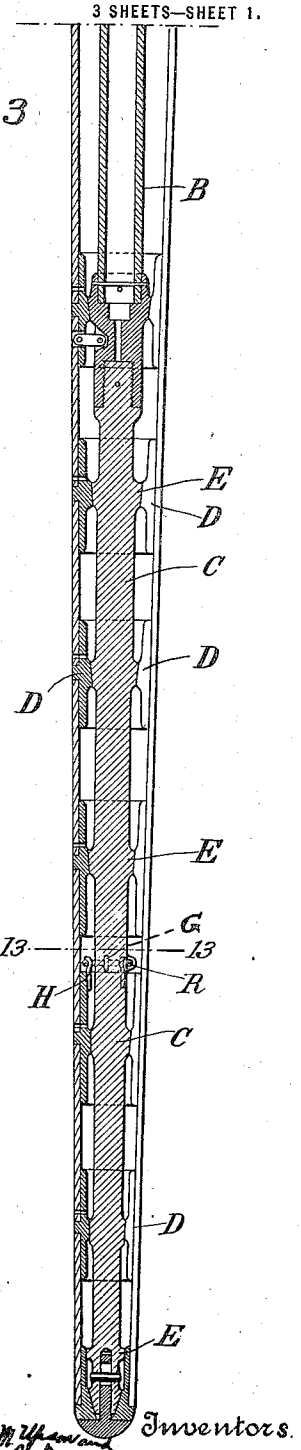



Fig. 3

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3 SHEETS—SHEET 2.

Fig. 4

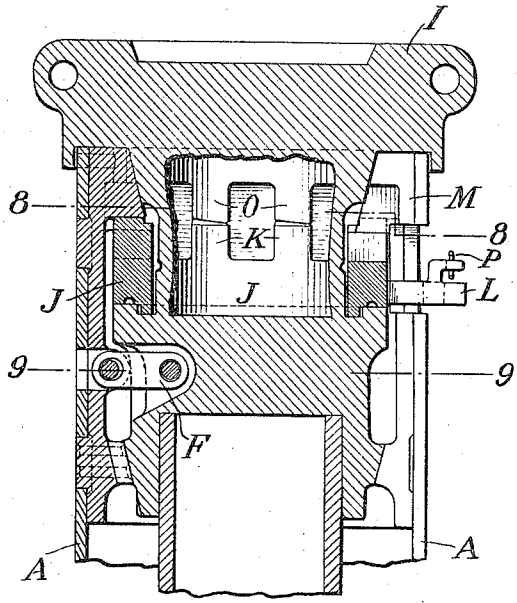



Fig. 5

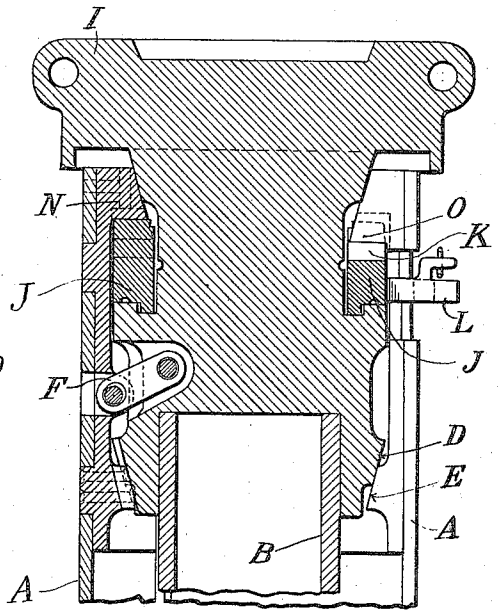



Fig. 6

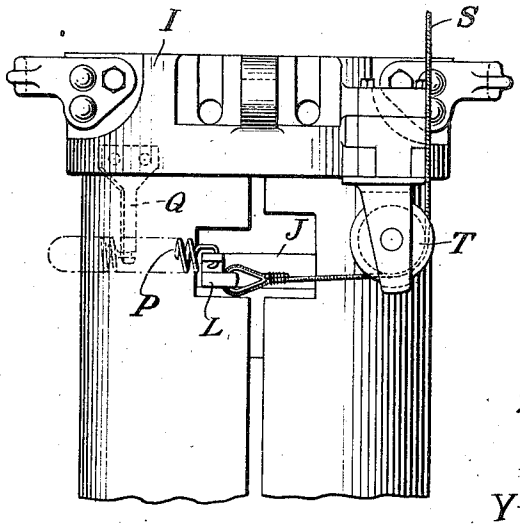
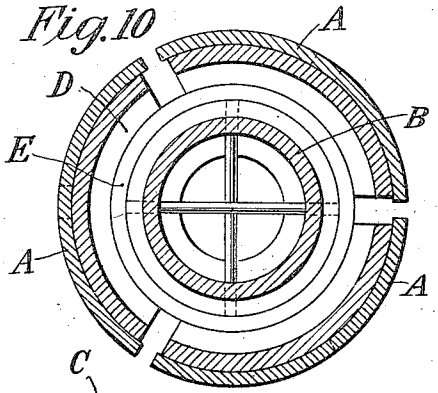



Fig. 10



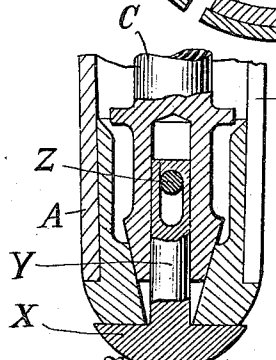




Fig. 11

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3 SHEETS—SHEET 3.

Fig. 7

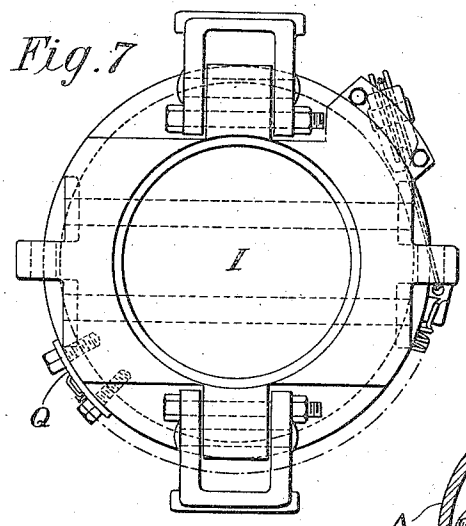



Fig. 13

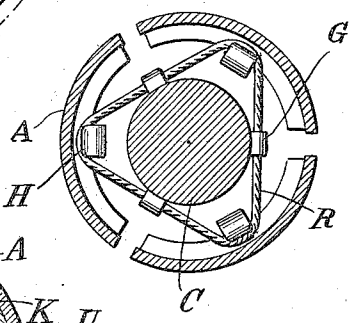



Fig. 8

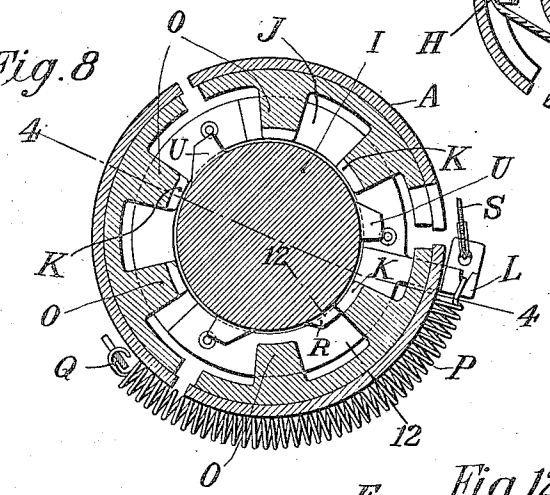



Fig. 12

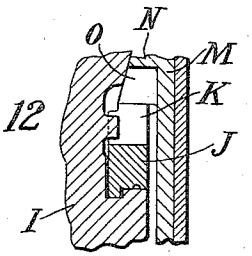
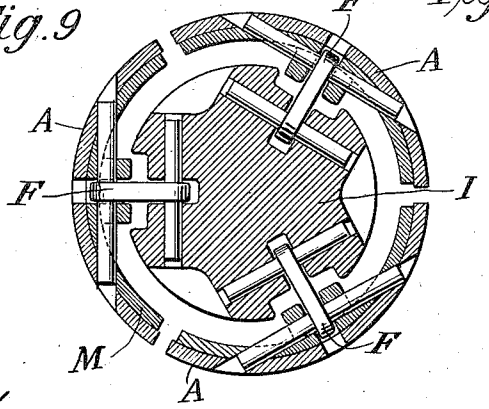



Fig. 9




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# UNITED STATES PATENT OFFICE.

MAXWELL MAYBELL UPSON, OF ENGLEWOOD, NEW JERSEY, AND HARRY R. DAY, OF BROOKLYN, NEW YORK, ASSIGNORS TO RAYMOND CONCRETE PILE COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

## CORE FOR FORMING CONCRETE PILES.

1,192,247. Specification of Letters Patent. Patented July 25, 1916.

Application filed October 1, 1913. Serial No. 792,742.

*To all whom it may concern:*

Be it known that we, MAXWELL M. UPSON and HARRY R. DAY, citizens of the United States, residing at Englewood, in the county of Bergen and State of New Jersey, and at Brooklyn, in the county of Kings and State of New York, respectively, have invented certain new and useful Improvements in Cores for Forming Concrete Piles, of which the following is a full, clear, and exact description.

It has been customary heretofore in the precess of forming concrete pile foundations, to drive a hollow shell or casing of paper, sheet metal or other suitable material, together with a sectional expansible core filling the same, which latter, after the shell has been driven into the ground, is withdrawn from the shell, the empty space being then filled with a solid mass of concrete, which, on hardening, forms a concrete pile.

The invention, subject of this application for Letters Patent, is embodied in an expansible core adapted to be used for this purpose, and consists in improvements in the construction of the same designed to render it more durable, efficient and easy of manipulation.

The improvements reside chiefly in the provision in such cores, when composed of two substantially concentric members capable of limited longitudinal movement relatively to each other, of means whereby the expansion of the outer sectional member is secured by wedging action and of horizontally operating means for maintaining the relative displacement necessary for such purpose; in the combination with the sectional and wedging members respectively, of an interposed means for absorbing the shock caused by the relative motion of the outer and inner members under the action of the driving hammer; in a point or end of novel construction, designed to afford an extended lateral contact surface for the travel of the ends of the contracting and expanding sectional members and to prevent injury to the shell while being driven, and in other details of construction to be more fully hereinafter described.

The said improvements and the novel features of construction peculiar to the device are illustrated in the accompanying drawings, in which—

Figure 1 is a view in elevation of the improved collapsible core in its entirety. Fig. 2 is a vertical central section of the upper portion of the same on an enlarged scale. Fig. 3 is a similar view of the lower portion. Fig. 4 is a vertical section of the head of the core and parts adjacent thereto, on the line 4—4 of Fig. 8, and with portions broken away. Fig. 5 is a similar but unbroken section showing the two members in different relative positions. Fig. 6 is a view in elevation of the same parts viewed from the right, or in the direction of the arrow in Fig. 7. Fig. 7 is a top plan view of the core. Fig. 8 is a broken section on the line 8—8 of Fig. 4. Fig. 9 is a horizontal section on line 9—9 of Fig. 4. Fig. 10 is a similar section on the line 10—10 of Fig. 2. Fig. 11 is an enlarged section of the lower end or point of the core, showing the sectional member collapsed. Fig. 12 is an enlarged sectional detail on line 12—12 of Fig. 8 of a part of the means for securing the relative vertical movement between the two core members. Fig. 13 is a cross section on line 13—13 of Fig. 3.

The core comprises in the main, an outer sectional member forming a collapsible casing and made up of three parts or sections A, and an inner wedging member composed of tubular sections B and solid sections C secured together in alinement. The sections A of the outer member are formed or provided with beveled surfaces D and the inner member with corresponding inclined projections E at suitable intervals, the construction in this respect being essentially that heretofore used in this art. The said sections A are moreover connected at two or more points to the inner or wedging member B by plates or links F which limit the expansive movement of the sections under the wedging action of the inner member and preserve the gradually tapered form of the core as a whole. These connecting plates or links may be placed without difficulty in the upper and larger parts of the core, but as the space in the narrower portion is not equally available for this purpose, the wedging member is formed or provided at one or

more points in such portion with depending hooks or projections G, and the outer member with upward projections H (Figs. 3 and 13), over which a tying means, such as a steel cable R, is placed, so as to bind the wedging and the outer members together.

In devices of this kind it has been found very desirable to maintain the two members herein described in fixed relation to one another after they have been brought to the position in which the outer member of the core is fully expanded. This has been accomplished by modifications of the form of the wedging surfaces and by other expedients designed to prevent the rebound following the impact of the driving hammer from moving one member relatively to the other, but a greatly improved means for securing this result is afforded by the use of the horizontally operating locking device which forms an important feature of this invention and which is illustrated in Figs. 4, 5, and 8. By reference to these figures it will be seen that the wedging or inner member of the core is composed in part of tube sections surmounted by a solid head I. In the contracted portion of the said head which enters the upper end of the sectional member there is a recess in which lies an annular plate J having a series of upwardly projecting lugs K and a lateral lug L projecting through an opening in one of the sections A. To the inner walls of the said sections A and near the upper ends of the same, are secured plates M conforming in shape to the sections and provided with interior flanges N having depending lugs O.

A spiral spring P is connected at one end to a lug Q depending from the head I, and at the other end to the lug L, and tends, normally, to turn the plate J until one of the lugs thereon encounters a stop R projecting from the head I. When the plate J is in this position its lugs K lie immediately under the lugs O and the outer or sectional member is fully expanded and its upper end in contact with the head I. The plate J assumes this position automatically whenever the wedging member is forced downward into the sectional member sufficiently to fully expand the latter and contact with its upper edge. Thus in the operative condition of the device the two members are locked and thereby fixedly maintained in their proper relative positions.

To raise the wedging member for the purpose of collapsing the other, it is necessary to turn the plate J so that its lugs will register with the spaces between the lugs O. This may be effected by a cord S connected to the lugs L and running over a pulley T, and by means of which the plate J may be shifted until the lugs K encounter stops U in which position the said lugs are free to enter the spaces between lugs O.

As is well known by those who use devices of this kind, after the core and its surrounding shell or pile casing have been driven home, considerable force is frequently required to raise the wedging member for collapsing the outer sectional member, and as a result of the inertia of the latter, a severe strain is imposed upon any connections that may exist between the two when they suddenly take up the full weight of the outer section. To relieve these parts of such shock, rigid projections V, W, are secured to the wedging and sectional members respectively to serve as buffers and absorb the forcing of the impact between the two members. These projections may be angle irons bolted, riveted or otherwise firmly united to the several sections A and to the wedging member B respectively, and they are so spaced as to collide before the link or other connections between the two members are subjected to an injurious shock or strain.

In order to provide for a smooth exterior surface at the lower end of the core, that the paper or other shell may not be punctured or injured by the edges of the sectional casing, the end or point of the core is a casting having a rounded head X and a stem Y, which latter enters a slot or recess in the end of the wedging member C and is connected therewith by a bolt Z passing through a slot in the stem Y, as shown in Figs. 3 and 11. The head X, around the base of the stem Y, presents to the ends of the sections A a flat and somewhat extended surface over which the said ends travel in expanding and collapsing under the action of the wedging member. When the outer member is fully expanded, the edges of the ends of the sections are flush with those of the head X, as shown in Fig. 3, but on collapsing, the head moves out of the recess in the end of the wedging member C and the ends of the sections A close up around the stem Y, as shown in Fig. 11.

The device above described is used in any manner well understood in the art, as a temporary core for a pile shell or casing of a material not in itself capable of resisting the impact of a pile driver necessary to force it into the ground. In the usual operation the core is expanded completely by forcing the wedging member down into the sectional member until the rotary locking device operates; thereafter it is introduced into the shell or casing and completely fills the same. Thereafter the core operates as a solid body completely filling the interior of the shell or casing, and the pile is driven in the usual way. The subsequent operation of collapsing the core, removing it from the shell and filling the latter with concrete, will be understood without further description in view of the common practice in this art.

In respects not specifically noted herein

the device is or may be constructed in the usual manner and provided with those appliances which have been found in practice, useful and necessary. So far as concerns the chief characteristic features of the improvement, the details of construction are not important, as these may be greatly varied without departure from the invention as defined by the broader claims.

What we regard as of our invention, and desire to secure by Letters Patent, is:

1. A core for the purpose set forth, comprising in combination, a sectional outer member, a wedging member longitudinally movable therein for effecting the expansion and collapse of the same, and a locking means movable rotatively about the axis of the core into and out of locking position to respectively prevent and permit longitudinal movement of the said wedging member.

2. A core for the purpose set forth, comprising in combination, a sectional outer member, a wedging member longitudinally movable therein, a rotary locking device between the two members, and an actuating spring for automatically operating said device when the two members are brought to the relative positions necessary to secure expansion of the outer member.

3. A core for the purpose set forth, comprising in combination, an inner wedging member and an outer sectional member, adapted to be expanded by a given movement of the wedging member into the same, and a locking device consisting of a series of lugs movable around the wedging member and coöperating with a corresponding series of lugs on the sectional member.

4. A core for the purpose set forth, comprising in combination, an expansible and collapsible member composed of radially movable sections, a wedging member movable longitudinally in the other in one direction to expand the same, radial links pivoted at their inner ends to the wedging member and at their ends to the sections of the other member to limit the expanding movement of the sections, and to positively cause collapsing movement of the sections when the wedging member is moved in the direction opposite to the first-mentioned direction, outwardly projecting devices rigidly mounted on the wedging member, and inwardly projecting members rigidly mounted on the radially movable sections adjacent to and overhanging the said outwardly projecting devices on the wedging member to receive the impact of said devices when the wedging member is raised to lift the core as a whole.

5. A core for the purpose set forth, comprising in combination, a wedging member, a collapsible sectional member, and a head connected with lost motion to the lower end of the wedging member and presenting a flat upper surface to the end of the sectional member.

6. A core for the purpose set forth, comprising in combination, a rigid wedging member and a collapsible member surrounding the same, a head connected to the lower end of the wedging member and capable of lost motion with respect thereto, the said head presenting a flat bearing surface to the end of the collapsible member, the diameter of the head being that of the end of the collapsible member when fully expanded.

7. A core for the purpose set forth, comprising in combination, an inner wedging member, a surrounding sectional collapsible member and a head having a stem connected to but capable of a limited movement within the lower end of the wedging member, the said head presenting a bearing surface to the ends of the sections of the collapsible member.

In testimony whereof we affix our signatures in the presence of two subscribing witnesses.

MAXWELL MAYBELL UPSON.
HARRY R. DAY.

Witnesses:
M. LAWSON DYER,
THOMAS J. BYRNE.