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CONCRETE PILE FOLLOWER AND METHOD OF MOUNTING THE SAME

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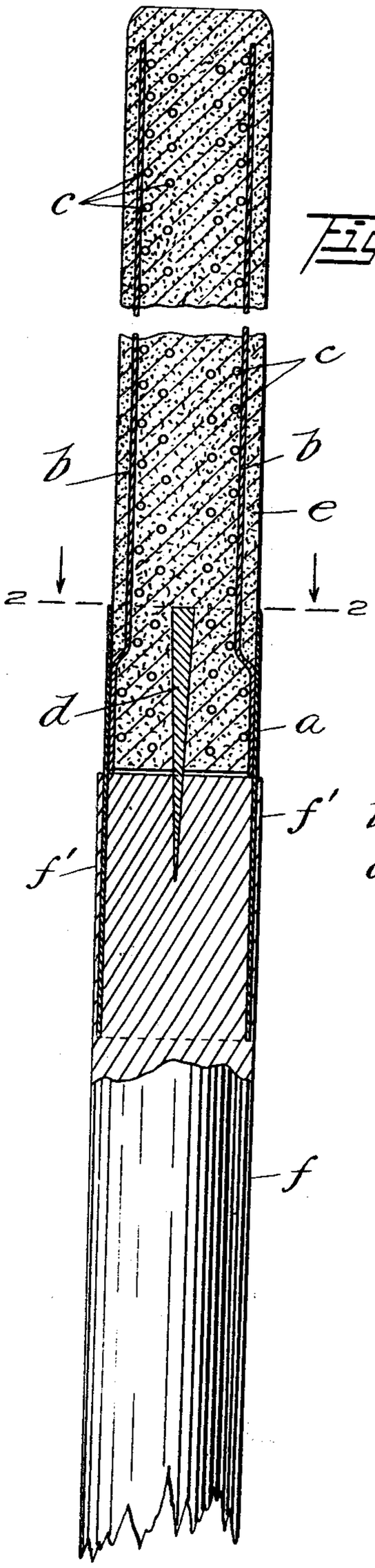

Fig. 1

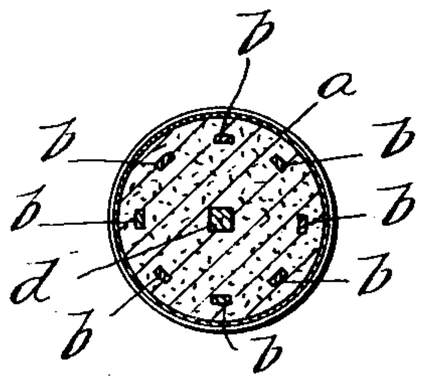

Fig. 2

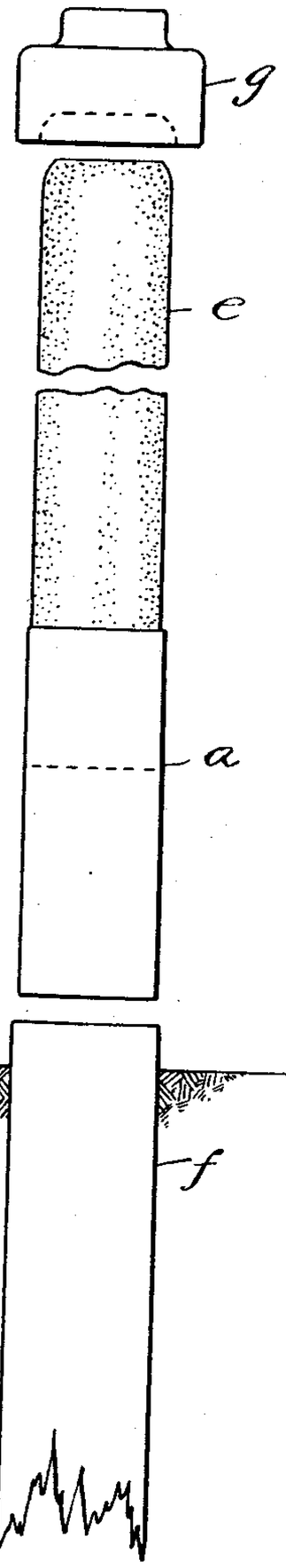

Fig. 3

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UNITED STATES PATENT OFFICE.

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CONCRETE PILE FOLLOWER AND METHOD OF MOUNTING THE SAME.

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My invention relates to improvements in concrete pile follower and method of mounting the same, and has for its object the construction of a strong, reinforced concrete pile member adapted to be mounted upon the top of a wooden pile member in the cheapest and most effective manner.

A more general object of my invention is to unite the multiple or composite sections of a pile structure by partially telescoping a relatively long connecting metallic sleeve over the unprepared end of a wooden pile member securely to unite a second pile member thereto through the sleeve by a driving and shearing fit of the metallic sleeve.

Hitherto a most important objection obtaining against composite piles has resided in the necessity for more or less accurately fitting and fastening the two or more members together. Moreover, certain types of such composite piles have the inherent disadvantage of presenting sections of marked difference in diameter where the members are joined.

My present improvements seek to avoid these and other disadvantages, while affording an exceptionally strong and serviceable connection between the different members and, in effect, carrying the attachment of the concrete reinforcement back to the wooden pile member. Moreover, by adopting substantially the construction herein disclosed and the procedure of mounting the same, which I shall outline, it is entirely unnecessary to shape the wooden pile member. Thus the driving of piles equipped with my improved follower is much more expeditiously and cheaply accomplished than with any other composite pile known to the art.

I may first briefly explain the concrete pile follower by stating that it comprises essentially a relatively long, metal sleeve and a concrete body of any desired length precast therein. In practice, of course, it is usual to provide reinforcement and the reinforcing members or systems preferably are directly attached interiorly of the metal sleeve by welding thereto. Optionally, a tapering expansion pin is provided within the base of the concrete member and protrudes a distance therefrom within the sleeve. Instead of fitting the follower and wooden pile together, I merely drive the latter approximately to the ground level or water line, then apply the tubular sleeve to the top of the wooden pile and drive the follower to a fit thereon by telescoping the sleeve over the end of the wooden pile, and finally driving the composite pile thus produced, to its full depth.

My invention and improvements may be more fully and explicitly set forth by making reference to the accompanying drawings, wherein:

Figure 1 is a view principally in vertical section, illustrating the pile follower and the upper portion of the wooden pile; both members, however, being broken away.

Fig. 2 is a transverse section through the concrete pile follower on line 2—2, Fig. 1, and

Fig. 3 is a somewhat diagrammatic view intended to illustrate the method of mounting the pile follower, showing the members in position for uniting them.

Throughout the several figures of the drawings I have employed the same character of reference to indicate similar parts.

Describing first, with more detail, the reinforced, concrete pile follower of my invention, I may explain that the tubular shell or sleeve *a* is formed of any suitable metal, such as steel, bronze or the like, to adapt it for the particular use intended. The reinforcing rods *b* are interiorly welded within the upper portion of the sleeve and an associated system of reinforcement *c* and the tapering expansion pin *d* are all positioned as shown prior to the casting of the concrete body *e* within and above the sleeve. It will be understood that the nature and amount of reinforcement will be designed and adapted for the length and size of concrete follower which is to be constructed and I do not wish to be understood as in any way limiting myself to the details somewhat diagrammatically shown and herein referred to, except as they are set forth in the claims.

These concrete followers naturally will be made of different diameters approximating the butts of the wooden piles *f* with which they are intended to be used. Accordingly, when the wooden pile *f* has been driven to nearly its full length, one of my improved concrete pile followers, having a sleeve approximating, but preferably of slightly smaller interior diameter than the exposed butt, is then placed in position thereon end to end, a pile cap *g* is placed upon the head or butt of the concrete follower and the pile driving is resumed. Care should be taken to insure the

initial telescoping of the seleeve for a short distance over the end of the wooden pile so that the members will be joined securely by a shearing fit in substantial alinement. Thereupon, the composite pile may be driven in the usual manner and to the full depth desired.

If the tapering expansion pin is used, this will serve somewhat to spread the upper portion of the butt within the sleeve, while a thin, irregular shell *f'* usually is shaved from the upper portion of the wooden pile *f*, exteriorly of the sleeve. By reason of the direct attachment of the reinforcing system to the long, telescoping, sleeve member *a*, the composite pile thus formed is practically unitary from a mechanical standpoint and the wooden butt is adequately protected by the sleeve which firmly encases the same. Moreover, when the sleeve is driven below the surface of the ground or beneath the bed of the waterway, the wooden pile member is protected thereby from the more common sources of damage and deterioration.

My improved method, involving the production of precast, reinforced concrete members, permits cheaper and more careful construction than when the concrete is poured in place. Again, the work quite obviously can proceed with much greater rapidity and certainty of result than with the older methods. The independent anchorage of the reinforcing members, effected by welding, riveting or otherwise suitably securing them to the sleeve, although this frequently may be found unnecessary in practice, adds an important factor to the strength and durability of the composite pile. A factor of still greater importance and novelty, however, resides in the economical and time-saving method of making the pile follower self-fitting, by shearing with its metallic sleeve the exterior extremity of a substantially unshaped wooden pile for accomplishing a rigid telescopic union therewith.

Having now described the preferred mode and means for practicing my invention, I claim as new and desire to secure by Letters Patent, the following:

1. The herein described method of pile driving, comprising the provision of a composite concrete follower with a hollow metallic sleeve, driving a wooden pile in place, the butt of the pile being larger than said sleeve, positioning the follower in alinement with the butt, driving the sleeve down about the butt to insure a shearing fit, and thereafter driving the follower and pile as a unit to the depth desired, substantially as set forth.

2. A precast concrete pile follower comprising an elongated metallic sleeve member, reinforcing members attached thereto and extending above said sleeve member, and a concrete pile body cast about said reinforcing members substantially in line with the sleeve, substantially as set forth.

3. A precast concrete pile follower comprising a metallic sleeve member, a gradually tapered expansion pin therein, and a concrete pile body cast partly within the sleeve and about the end of the pin and extending in alinement beyond the sleeve opposite its open end, substantially as set forth.

4. A precast concrete pile follower comprising a metallic sleeve member, reinforcing members attached thereto and extending beyond the sleeve, an axial pin within said sleeve, and a concrete pile body cast partly within the sleeve and about said reinforcing members substantially in alinement with the sleeve, substantially as set forth.

5. The herein described method of mounting a pile follower, which consists in providing the pile follower with an integral metallic sleeve member, driving a wooden pile in place, driving the sleeve member partially to telescope the butt of the wooden pile, and finally driving the composite pile to the desired depth, substantially as set forth.

6. The herein described method of pile driving, comprising the provision of a concrete follower with a hollow metallic sleeve, driving a wooden pile in place, positioning the sleeve in alinement with the butt of the pile, driving the follower to effect a telescoping fit of the sleeve and butt, and finally driving the follower and pile as a unit to the desired depth, substantially as set forth.

7. The herein described method of driving composite piles, which consists in providing a concrete follower with reinforcements directly attached to a terminal metallic sleeve, driving a wooden pile in place, positioning the sleeve in alinement with the butt of the driven pile, driving the sleeve to effect a telescoping fit with said butt, and finally driving the composite pile as a unit to the desired depth, substantially as set forth.

8. The herein described method comprising sinking a wooden pile unit and driving thereon a precast reinforced concrete unit provided with a metallic tubular extension formed integrally thereon so that said extension shall terminally shear the material of the wooden pile unit and telescope over the same and thereby unite the reinforcement and concrete with said wooden pile unit.

9. The method of pile driving comprising driving a wooden pile in place and approximately to depth, positioning a follower having a hollow sleeve that is smaller than the butt of the pile in alinement with said butt, driving the sleeve down about the butt, to insure a shearing fit and thereafter driving the follower and pile as a unit to the depth desired, substantially as set forth.

10. The herein described method of uniting the members of a composite pile by alining an upper pile member provided with a long metallic connecting sleeve, with a lower pile member, and driving said sleeve over the relatively larger end of said lower pile member to unite said members by a driving shearing fit, substantially as set forth.

11. The herein described method of uniting the members of a composite pile by driving a lower pile member in place, aligning therewith an upper pile member provided with a long metallic connecting sleeve, and driving said sleeve over the relatively larger end of the lower pile member to unite said members by a driving shearing fit, substantially as set forth.

12. The herein described composite pile, comprising a wooden pile member, a reinforced cementitious member, and a relatively long metallic sleeve enclosing and uniting the presented alined ends of said members; said sleeve being of less inner diameter than the wooden member and secured solely thereto by a driving fit, substantially as set forth.

13. The herein described method comprising sinking a wooden pile unit and driving thereon a precast concrete unit provided with a metallic tubular extension formed thereon so that said extension shall terminally shear the material of the wooden pile unit and telescope over the same.

14. The herein described composite pile, comprising a lower wooden pile member, an upper pile member, and a relatively long metallic sleeve enclosing and uniting the presented alined ends of said members; said sleeve being of less inner diameter than the lower wooden member and secured thereto by a driving shearing fit, substantially as set forth.

In testimony whereof I do now affix my signature.

JAMES H. SMALL, JR.