May 3, 1932. E. D. WATT 1,856,522

JOINT FOR PILE SHELLS

Filed Sept. 26, 1929

FIG. 1.

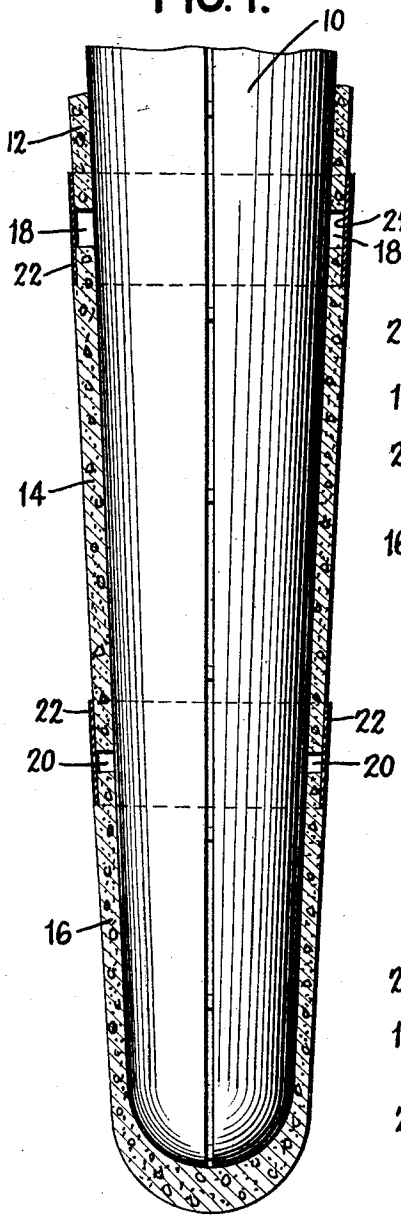


FIG. 3.

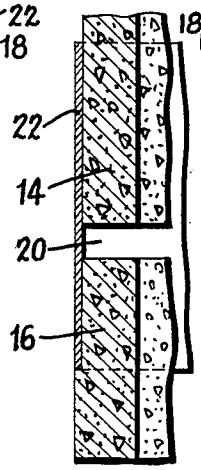


FIG. 4.

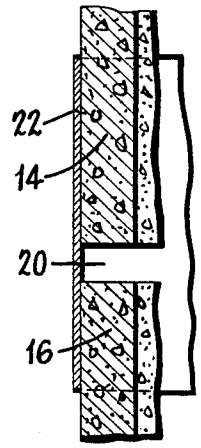
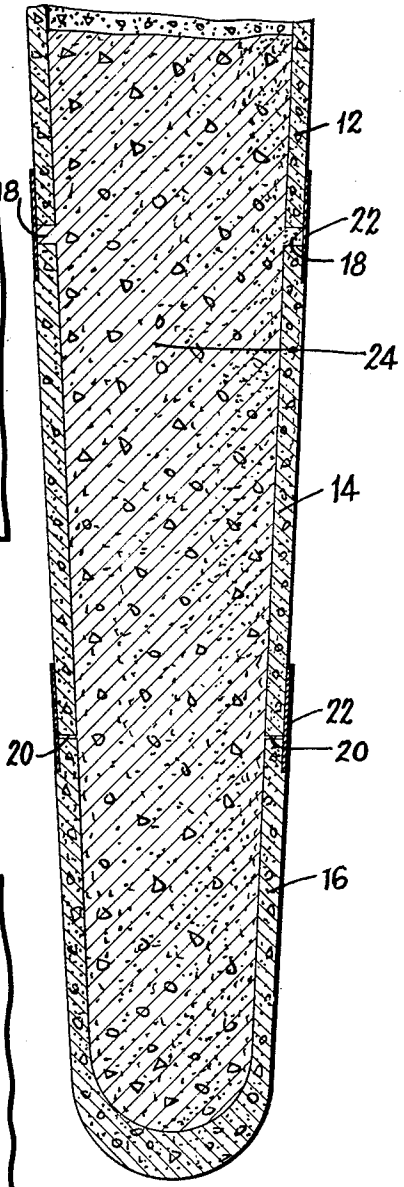


FIG. 2.



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UNITED STATES PATENT OFFICE

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JOINT FOR PILE SHELLS

Application filed September 26, 1929. Serial No. 395,257.

In one method of forming and placing concrete piles a driving core is enclosed in a shell, the core and shell are driven together and the core is then removed, leaving the hollow shell in the ground to be later filled with concrete to form the pile. The core and shell may be of uniform cross-section throughout their length, or they may be tapered. The corts and shells may engage each other by means of corrugations on their surfaces, or they may have smooth surfaces and simply rely on their taper to force the shell to follow the core when the core is driven.

It has been customary in practice to use thin metal shells, formed in short sections, the sections being placed on the driving core with the upper end of each section overlapping and surrounding the lower end of the section above it, stove-pipe fashion, thus closing the joint between the sections. This procedure is easy with thin flexible metal shells, but is impractical when concrete shells are used, such shells being too thick and rigid to form overlapping joints.

The principal object of the present invention is to provide a combination concrete and sheet metal pile section in which a practical, cheap, and effective joint is provided between the pile sections so as to exclude dirt and water while being driven on the core and after the core is removed.

Further and other objects of the present invention will become apparent from the specification, claims and appended drawings in which:—

Fig. 1 is a view of a portion of a pile shell mounted on a core preparatory to driving, the shell being in sections shown in cross-section.

Fig. 2 is a view of the shell of Fig. 1 after it has been driven, the core removed and the shell filled with concrete.

Fig. 3 is an enlarged view of the joint shown in Figs. 1 and 2.

Fig. 4 is a view of an optional type of joint.

Referring to Fig. 1, 10 is a collapsible tapered driving core of familiar type, encased by concrete shell sections 12, 14 and 16.

In practice the shell and core are prepared for driving by suspending the core in the air and then by means of hoisting tackle drawing the shell sections onto the core one by one beginning at the upper end of the core. Thus in Fig. 1, the shell sections were placed on the core in the order 12, 14, 16.

It is impossible to make the shell sections with such accuracy that the end of each section will become tight on the core at the same time that the upper end of the section contacts with the lower end of the section above it, therefore the present invention contemplates so dimensioning the shells that they will always become snug on the core before making end contact, the result being that gaps or spaces of various lengths are left between the sections, for instance, gap 18 between sections 12 and 14 and gap 20 between sections 14 and 16.

To cover the gaps each shell section is provided with a thin metal tube or ferrule 22 surrounding the upper end of the section and extending upwardly. The tube is tapered so as to tightly surround the lower end of the next adjacent shell section.

During the driving operation the gaps between the shells decrease by varying amounts. The shell sections are forced up to firm bearings on the core, and since the bearings at the bottom of the core are smaller than those at the top, and since the lower sections are subjected to the most severe service, the gaps between the lower sections are usually decreased more than the gaps higher up.

After the shell is driven and the core removed, the shell is filled with plastic concrete 24 which when hardened forms with the concrete shell a monolithic pile structure. It will be noted in Fig. 2 that gap 18 being only partially closed has been filled with concrete 24 whereas gap 20 has closed so completely as to admit no concrete. In either case, intimate contact is made between the shell sections so that the shell portion of the finished pile is effective to carry its share of the load.

A preferred form of ferrule is shown in Figs. 1, 2 and 3, the design being such that

the soil has no opportunity to enter between the lower edge of the ferrule and its shell section. Fig. 4 shows an optional form of ferrule which may be used under some conditions.

It is to be understood that the invention is not limited to the construction herein specifically illustrated but can be embodied in other forms without departure from its spirit.

I claim:

1. A pile shell comprising a plurality of hollow tapered concrete sections adapted to enclose a core by which the shell is driven each of said concrete sections being provided at one end only with a fitted ferrule flush with the outside surface of said section and conforming to the taper thereof, said ferrule enclosing and tightly fitting the smooth end of an adjoining section for the purpose set forth.

2. A pile shell comprising a plurality of hollow tapered concrete sections adapted to enclose a core by which the shell is driven each of said sections provided at one end only with a rabbet, and a ferrule of thin metal seated within said rabbet and flush with the surface of the section to which the ferrule is attached and conforming to the taper thereof, said ferrule adapted to enclose the unrabbeted end of the next adjacent shell section for the purpose set forth.

3. A tapered pile shell comprising a series of hollow concrete sections with gaps therebetween, and means bridging said gaps and solely maintaining said gaps and serving to exclude foreign matter therefrom.

4. The invention set forth in claim 3 in which said gap bridging means is effective throughout varying changes in size of the gaps during the driving operation.

5. The invention set forth in claim 3 in which said gap bridging means comprises a sheet metal tube tapered to conform to the shell sections and engaged with the outside surface of said sections.

6. The invention set forth in claim 3 in which the gap bridging means comprises a tapered sheet metal tube integral with the end of one section, tightly surrounding the end of the next adjacent section and preventing contact thereof with the section upon which the tube is fastened.

7. A concrete pile comprising a plurality of hollow concrete shell sections with gaps therebetween, means for enclosing and maintaining said gaps, said means serving to exclude foreign matter from the gaps, and a concrete core filling said sections and having portions entering said gaps.

8. The invention set forth in claim 7 in which said gap enclosing means is effective throughout varying changes in size of the gaps during the driving operation.

9. The invention set forth in claim 7 in which said gap enclosing means comprises a sheet metal tube tapered to conform to the shell sections and engaged with the outside surface of said sections.

10. The invention set forth in claim 7 in which the gap enclosing means comprises a tapered sheet metal tube integral with the end of one section, tightly surrounding the end of the next adjacent section and preventing contact thereof with the section upon which the tube is fastened.

In testimony whereof I hereto affix my signature.

ELIHU D. WATT.