Nov. 16, 1937. M. M. UPSON ET AL 2,099,285

CONCRETE PILE MANUFACTURE

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FIG. 1.

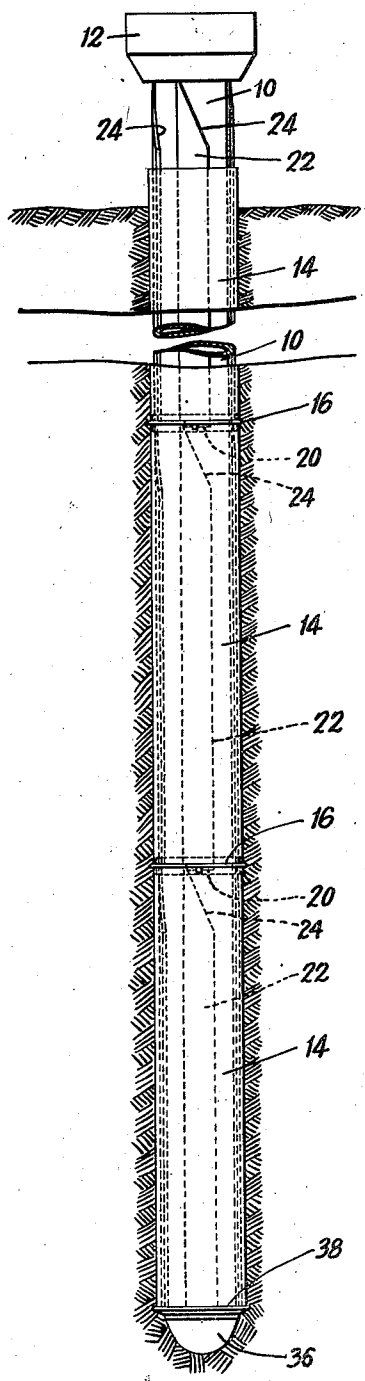
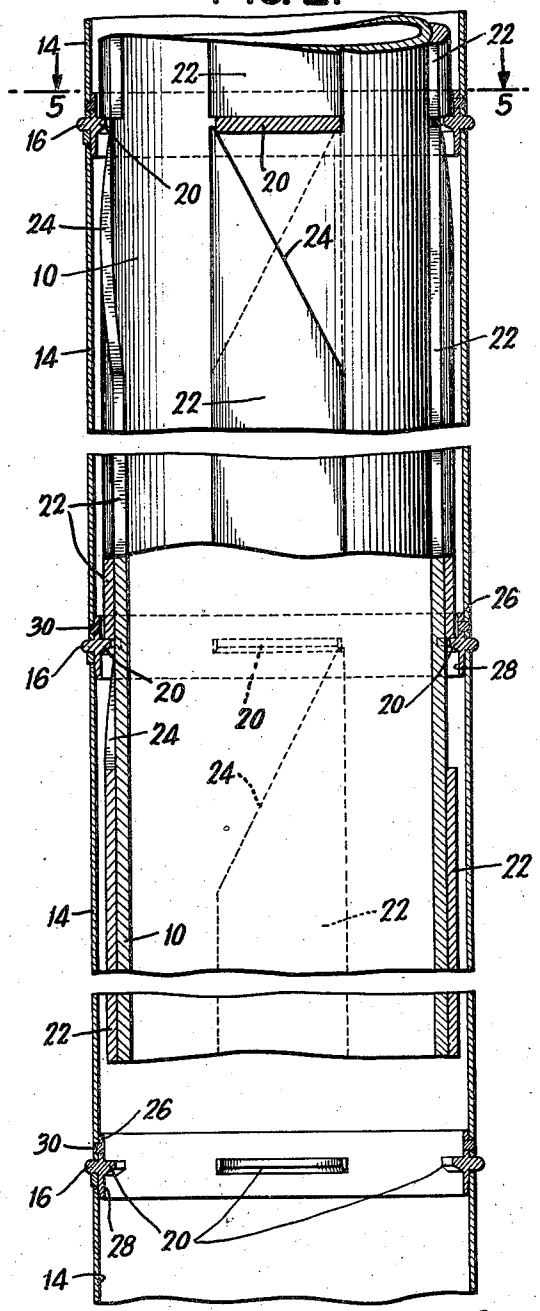


FIG. 2.



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FIG. 3.

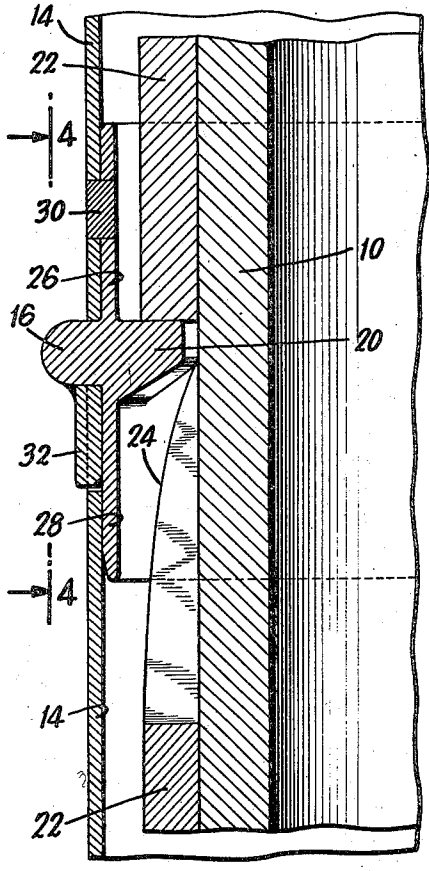


FIG. 5.

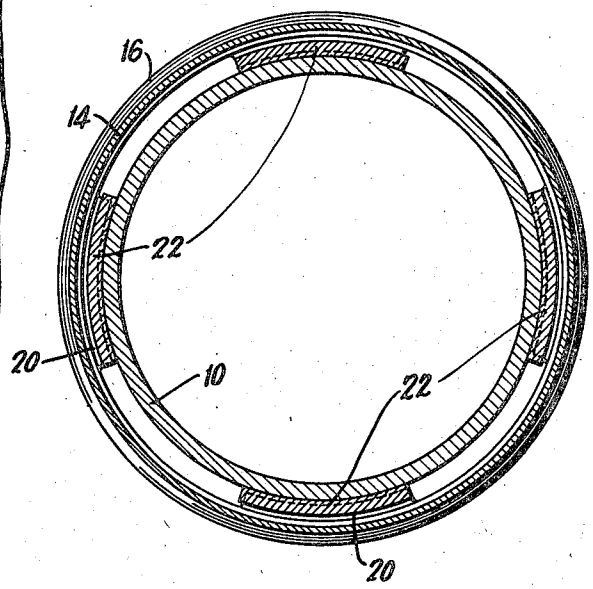
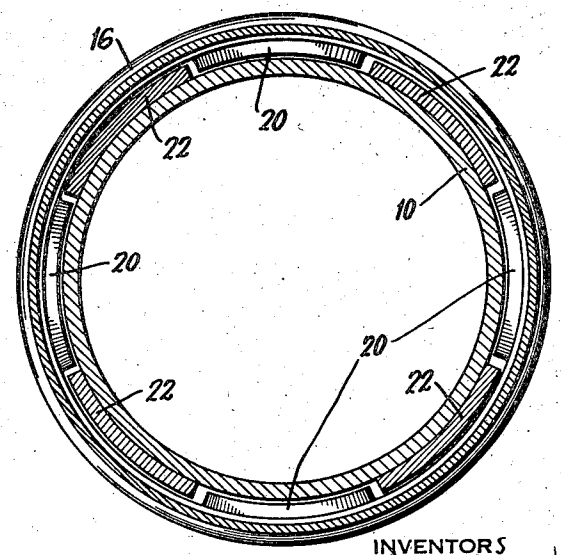


FIG. 6.



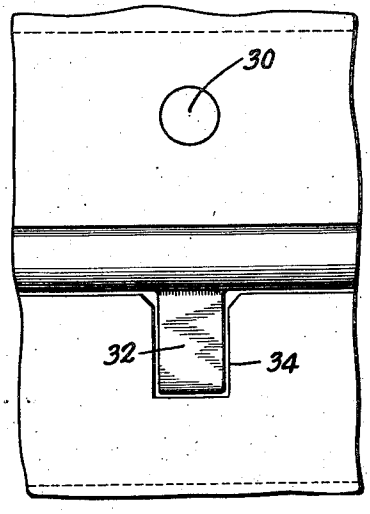


FIG. 4.

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FIG. 7.

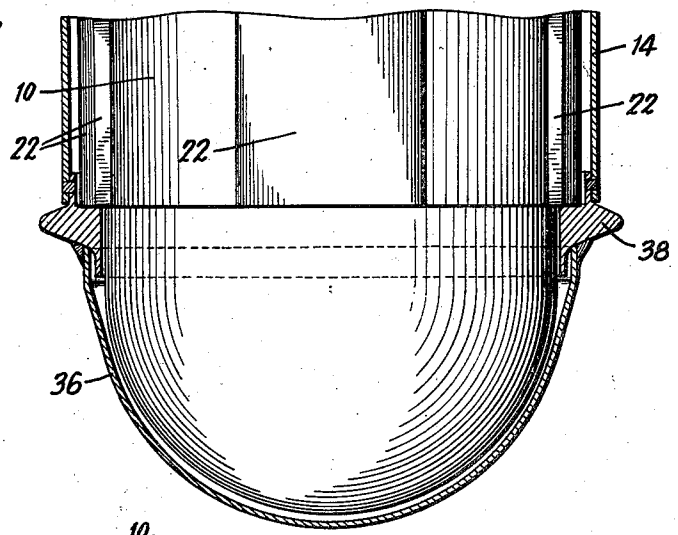


FIG. 8.

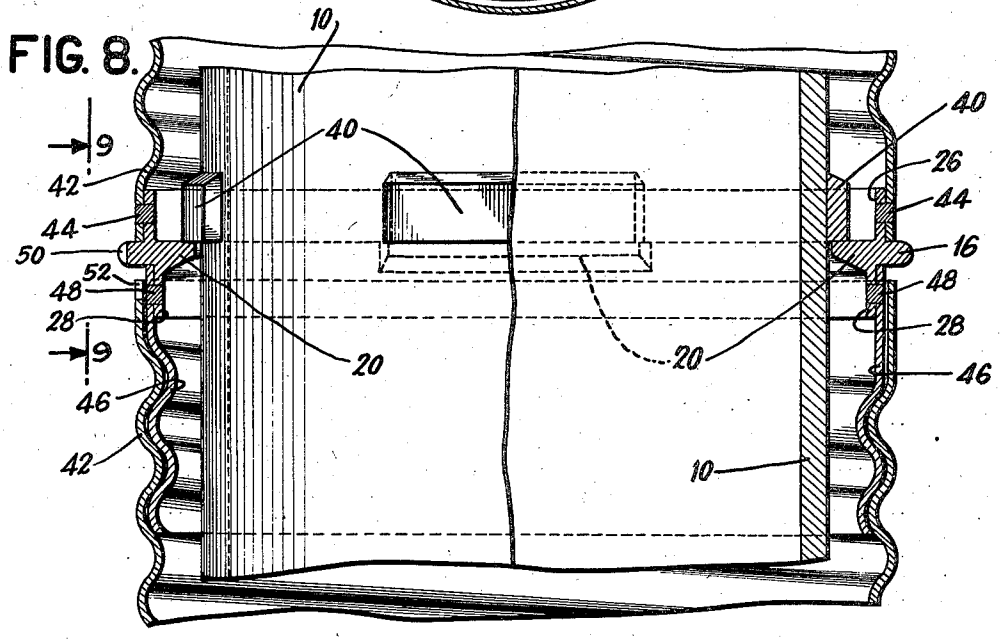
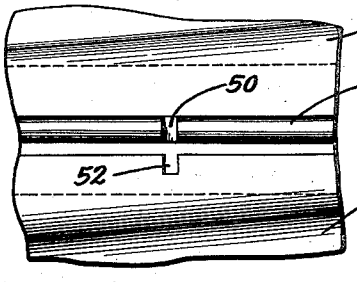


FIG. 9.



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CONCRETE PILE MANUFACTURE

Maxwell M. Upson, Englewood, and Edward A. Smith, Chatham, N. J., assignors to Raymond Concrete Pile Company, New York, N. Y., a corporation of New Jersey

Application May 23, 1936, Serial No. 81,362

8 Claims. (Cl. 61—57)

This invention pertains to the manufacture of concrete piles and has for its object an improvement of the method and apparatus of Upson United States Patent No. 1,836,140. In that disclosure the pile shell was made in sections, each larger in diameter than the one below it, and each adapted to surround one of the cylindrical sections of a drive core. A plow ring was provided at the bottom of each section in order to plow a path for the shell section above it, thus protecting the thin shell from wear and tear. The finished pile was of decreasing diameter from top to bottom.

It is sometimes desirable to produce a very long pile of uniform diameter throughout its length without the stepped taper of the above mentioned patent, and the present invention teaches how that may be done. The drive core is cylindrical and is provided with sets of driving shoulders at intervals along its length. The shell is of uniform diameter but is made up of sections, each section being pulled down by a plow ring at its lower end, the ring being adapted for engagement by one of the sets of shoulders on the core. This method keeps down cost because very thin shell material may be used, which would not be possible if the shell were pushed or driven into the ground, as has usually been heretofore done with extra long shells.

Further and other objects and advantages will be apparent from the specification and claims, and from the accompanying drawings which illustrate what is now considered the preferred embodiment of the invention.

Fig. 1 shows an uncorrugated shell after it has been driven and before withdrawal of the core.

Fig. 2 is an enlarged sectional view of a portion of shell and core.

Fig. 3 is a fragmentary detail still further enlarged.

Fig. 4 is a view on line 4—4 of Fig. 3.

Fig. 5 is a view on line 5—5 of Fig. 2 with core in driving relationship with the shell.

Fig. 6 is a view similar to Fig. 5 but with core rotated to position for removal.

Fig. 7 is an enlarged detail of the lower end of shell and core.

Fig. 8 is a cross-section of an embodiment of the invention in which the shell is corrugated, and in which the drive shoulders are modified.

Fig. 9 is a view on line 9—9 of Fig. 8.

In the drawings (Figs. 1–7), 10 is the cylindrical drive core having a drive head 12. For convenience, the drive core is made hollow. The shell, which remains in the ground after removal of the core, comprises a number of comparatively short sections 14 preferably of equal length and each attached at its lower end to a ring 16, the functions of which will be explained. The shell sections 14 may be plain (Figs. 1–7) or corrugated (Fig. 8), as desired.

Each ring 16 is provided with four inwardly extending lugs 20. Welded to the drive core are sets of longitudinal plates 22, the same in number and similarly spaced as lugs 20 so that during driving the bottom of each plate 22, which forms a shoulder on the drive core, may rest on a lug 20. There are as many sets of plates 22 as there are rings and shell sections 14. Plates 22 extend longitudinally on the core from one ring to the next, and the upper ends of the plates are bevelled as at 24 for a purpose that will appear.

Lugs 20 are of such dimensions circumferentially as to leave spaces between them through which plates 22 may pass vertically when they are in alignment with the spaces.

Each ring 16 has upwardly and downwardly extending fins 26 and 28, respectively. Ring 16 may be of greater diameter than shell section 14 in order to serve as a plow therefor. The lower end of each shell section 14 is welded or riveted as at 30 to fin 26, and the upper end of each shell section is a slip fit on fin 28 of the ring above it, thus automatically taking care of any slight variations of length of the shell sections. Each ring 16 may be provided with an ear 32 which enters a notch 34 in the top of the section 14 below it, in order to vertically align the several sets of lugs 20 (Fig. 4).

A shoe 36 (Fig. 7) is fitted over the bottom of the drive core and cooperates with a circumferential continuous ring 38 to prevent entry of dirt between core and shell.

In operation, as many shell sections and rings as desired are assembled on the core. Then by rotating core and shell relatively to each other the bevelled upper ends 24 of plate 22 engage their corresponding lugs 20 and force the parts into proper driving alignment, as is best shown in Figs. 1 and 2, the bottom of each plate 22 resting on a lug 20. When the driving operation is completed, and the shell sections are firmly held by the ground, a straight upward pull on the core will first cause bevels 24 (acting against lugs 20) to rotate the core until plates 22 assume the positions of Fig. 6, and then cause them to pass upwardly between lugs 20.

Fig. 8 shows a modification in which drive plates 22 are replaced by simple shoulders 40 welded to the core, and in which corrugated shell sections

are used. The corrugated sections have the important advantage of being to a certain extent self-adjusting as to length, so that no slip joint is needed on the plow ring fin 28. The bottom of each spirally corrugated section 42 is welded or riveted as at 44 to the upper fin 26, and a short coupling member 46 is similarly attached as at 48 to the lower fin 28. Then the top of lower section 42 is screwed onto coupling 46. Marks or notches 50 and 52 on ring 16 and on the shell section indicate when the rings are in proper vertical alignment.

It is to be understood that the invention is not limited to the specific embodiments herein illustrated and described, but may be used in other ways without departure from its spirit as defined by the following claims.

We claim:

1. In apparatus for forming a concrete pile, a drive core having sets of spaced-apart shoulders at intervals along its length, in combination with a pile shell comprising a plurality of rings each having a set of internal lugs, each lug being adapted for engagement by one of a set of said shoulders, and each ring having a shell section secured thereto and extending upwardly to engage the ring next above it.

2. The invention set forth in claim 1 in which the shoulders of each set and the lugs of each ring are alike in number and in circumferential spacing and in which means is provided on the core for maintaining said lugs and said shoulders in vertical alignment.

3. The invention set forth in claim 1 in which means is provided on the core whereby vertical movement of said core causes rotation of said shoulders relatively to said lugs.

4. In apparatus for forming a concrete pile, a drive core having sets of longitudinal plates on the outer surface thereof, the lower ends of which form sets of spaced-apart shoulders, in combination with a pile shell comprising a plurality of plow rings each having a set of internal lugs, each lug being adapted for engagement by one of a set of said shoulders, and each plow ring having a shell section secured thereto and extending upwardly to engage the plow ring next above it.

5. The invention set forth in claim 4 in which the upper ends of said plates are bevelled, whereby after the driving operation, upward motion of said core will cause said bevelled ends to rotate said core relatively to said lugs.

6. Apparatus for forming a concrete pile, comprising a shell formed of a series of thin metallic sections of uniform diameter and adapted to remain in the ground to be filled with concrete, a plow ring at each joint between said sections, means for operatively connecting each plow ring to the shell section above it, and circumferentially spaced lugs on the inside of said plow rings, said lugs being adapted for engagement by shoulders on a drive core, whereby said shell sections are drawn down into the holes formed by their corresponding plow rings.

7. Apparatus for forming a concrete pile, comprising a shell formed of a series of spirally corrugated sections of uniform diameter, and adapted to remain in the ground to be filled with concrete, a plow ring at each joint between said sections, means for connecting each ring to the shell section above it, and means comprising a spirally corrugated coupling member projecting downwardly from each ring for engaging the upper end of the shell section below it, the said connecting means and the coupling member being so located upon the plow ring that uniform corrugated sections when connected with the plow ring are positioned in proper vertical alinement.

8. Apparatus for forming a concrete pile, comprising a shell formed of a series of spirally corrugated sections of uniform diameter, and adapted to remain in the ground to be filled with concrete, a plow ring at each joint between said sections, means for connecting each ring to the shell section above it, and means comprising a spirally corrugated coupling member projecting downwardly from each ring for engaging the upper end of the shell section below it, each coupling member having an outside dimension substantially equal to the outside dimension of the connecting means for each ring and the shell section above it, substantially as described.

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