April 16, 1968 J. J. DOUGHERTY 3,377,808

CAP ASSEMBLY FOR PILE SHELL

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Fig. 1

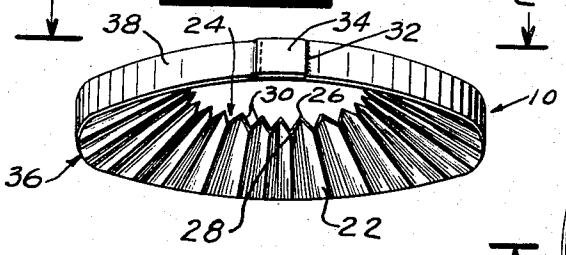


Fig. 2

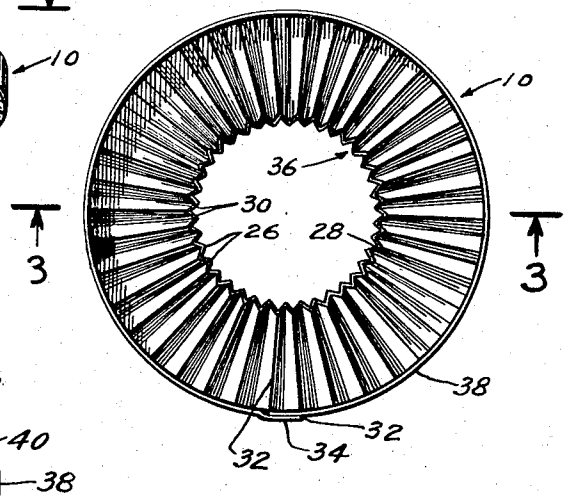


Fig. 3

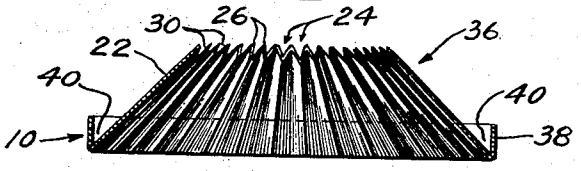
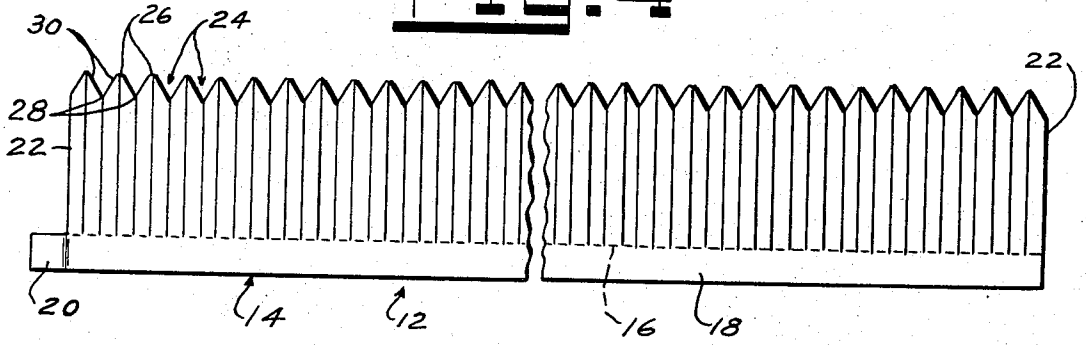


Fig. 4



INVENTOR.
JOHN J. DOUGHERTY
BY
Edw. S. Higgins
ATTORNEY

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Fig. 5

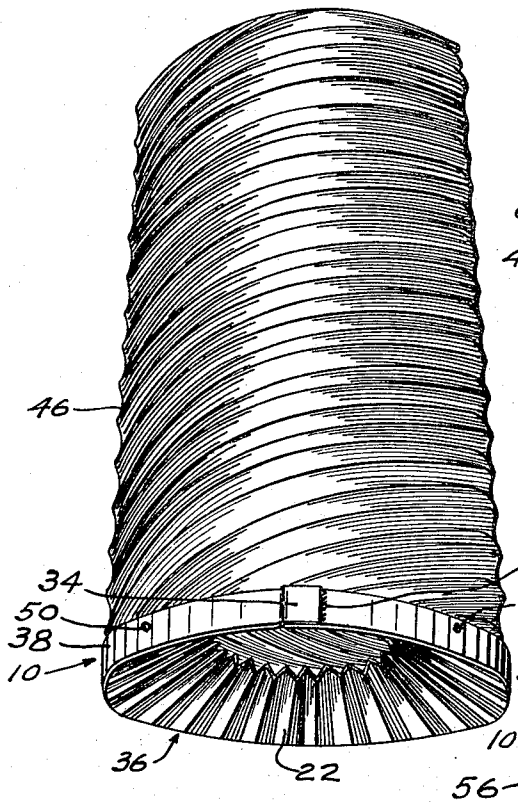


Fig. 6

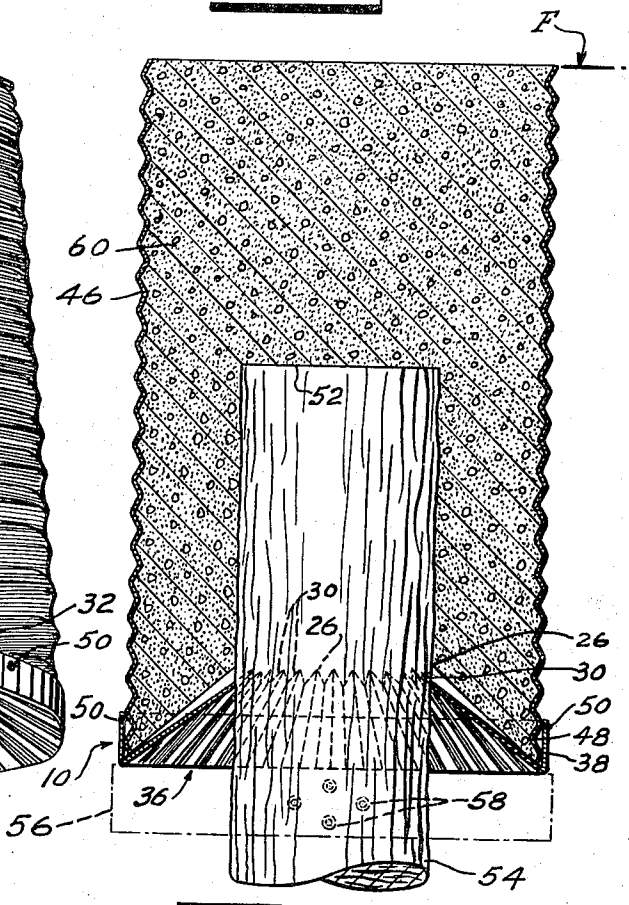


Fig. 8

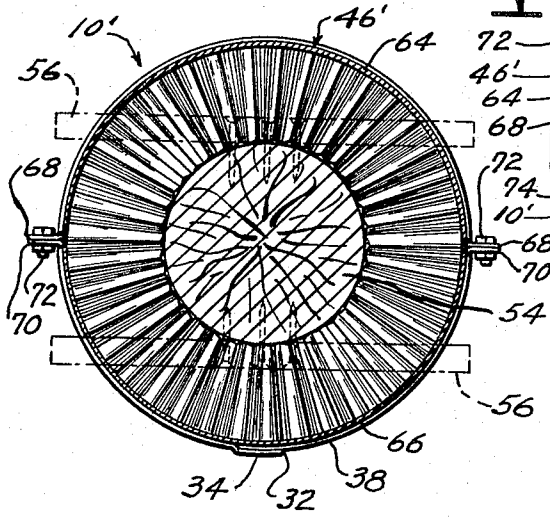
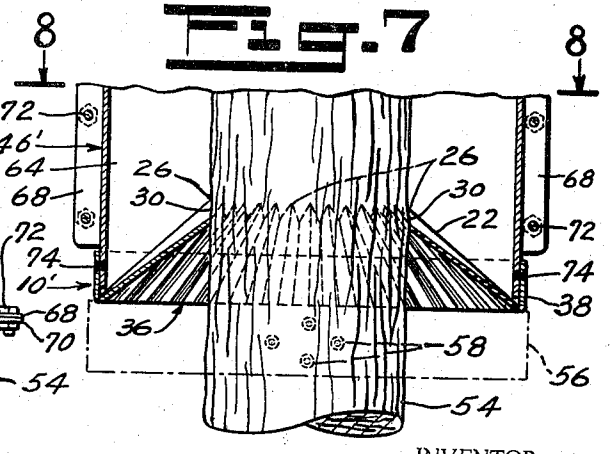


Fig. 7



INVENTOR.
JOHN J. DOUGHERTY
BY
Edw. S. Higgins
ATTORNEY

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3,377,808

CAP ASSEMBLY FOR PILE SHELL

John Joseph Dougherty, Cedar Grove, N.J.
(262 Rutherford Blvd., Clifton, N.J. 07014)

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5 Claims. (Cl. 61—53)

This invention relates to new and useful improvements and refinements in cap assemblies for shells of piles, and more particularly to a cap assembly for a shell, said cap assembly having a concavo-convexo or frusto-conical shaped body of spring steel with corrugations or teeth running radially between the inner narrow end and the outer wider end of the body of the assembly with an upright band around the periphery of the outer wider end of the body.

Piles under piers are usually formed of timber and deteriorate, become damaged and are subject to fire hazards and accordingly must be repaired from time to time which is very difficult because of the lack of space within which to operate. In such repairing operations, the top of the pile is often cut off leaving a space between the top of the cut timber and the floor of the pier, making it necessary to building the pile structure up until it reaches and supports the floor of the pier.

It is an important object of the present invention to provide a perforated cap assembly for capping one end of a shell whereby the shell and cap assembly as a unit may be slid over the top of a timber pile at the pier for receiving concrete whereby the pile structure may be built up to the floor of the pier or the like.

Another important object of the invention is to provide a new method of repairing and/or constructing piles under piers and the like.

Yet another important object of the present invention is to provide a length of concrete pile around and above the top of a timber pile, and the method of making such length of concrete pile.

Still another object of the invention is to provide a cap assembly for such a length of concrete pile whereby the length of concrete pile may be constructed at the site.

Yet another object of the invention is to provide a perforated cap assembly having a frusto-conical shaped body with corrugations therealong for attachment to the end of a shell or tube, the cap assembly and shell adapted to be slid over the top end of a timber pile to receive concrete, which assembly upon pouring of the concrete will anchor and keep anchored the inner tip ends of its corrugations in the outer surface of the timber pile under the most adverse conditions by utilizing the elasticity inherent in the spring body, the extra ordinarily strong spring force of such a frusto-conical body being capable of equalizing every pressure brought to bear thereagainst.

Another object is to provide a cap assembly of this kind capable of absorbing an increased pressure without breaking.

A specific object of the invention is to provide a cap assembly having a frusto-conical body with corrugations running radially on the outer surface thereof, which assembly has a combined locking and shakeproof effect.

Other objects of the invention are to provide a perforated cap assembly for capping the bottom end of a shell and reinforcing the shell, which can be manufactured readily and economically.

For further comprehension of the objects and advantages of the invention, reference will be had to the following description thereof taken in connection with the accompanying drawings wherein:

FIG. 1 is a bottom perspective view of a cap assembly for a concrete pile section made in accordance with the present invention.

FIG. 2 is a top plan view as seen from the line 2—2 of FIG. 1.

FIG. 3 is a cross-sectional view taken on the plane of the line 3—3 of FIG. 2.

FIG. 4 is a plan view of the blank from which the cap assembly of FIG. 1 is made, parts being broken away.

FIG. 5 is a bottom perspective view showing the cap assembly applied to the bottom end of a helical shell or tube.

FIG. 6 is a vertical sectional view of a concrete pile section taken through the center thereof with the cap assembly applied thereto and showing the pile section applied to the top of a timber pile under a pier.

FIG. 7 is a vertical sectional view of a fragment of a modified form of concrete pile section shown applied to the top of a timber pile, the concrete being omitted.

FIG. 8 is a top plan view as seen from the line 8—8 of FIG. 7.

In FIG. 1, an embodiment of the cap assembly of the present invention is shown and designated **10**. The cap assembly **10** is formed from the blank **12** of spring steel shown in flattened condition in FIG. 4, consisting of an elongated rectangular shaped body **14** formed with a fold line **16** therealong adjacent one long edge, its bottom edge, defining a band portion **18**, the band portion having a short extension **20** at one end. The remainder of the body of the blank is grooved and bent transversely forming corrugations **22**, the material of the blank being formed with V-shaped notches **24** along its other long edge. The notches define inverted V-shaped tip ends **26** on the inner ends of the corrugations and define inner pointed ends **28** and oblique edges **30** of the notches between the outer tip ends **26** and the pointed ends **28**.

When the blank **12** is looped into annular or ring-like formation and its outermost corrugations **22**, as seen in FIG. 4, welded to each other as indicated at **32**, and the band portion **18** turned inwardly along the fold line **16**, over the bases of the corrugations **22**, with its extension **20** overlapping the adjacent end of the band portion, as indicated at **34**, the blank forms the frusto-conical body **36**, with continuous band **38**, as seen in FIG. 1, with a gutter **40** at the juncture of the bases of the corrugations **22** and band **38**. An opening **42** is formed in the inner or top end of the body as viewed in FIG. 1, that is at the top of the frustrum.

By virtue of the above described construction of the cap assembly, there has been provided a very simple construction which can be attached to a shell or helical tubing in a minimum of time and effort. The attachment of the cap assembly to the shell or tubing is very strong and through the provision of adaptability to meet manufacturing tolerances, there a has been provided a cap assembly which can be used under field operation by relatively unskilled personnel.

The use of the cap assembly **10** in its attachment to the end of a helical shell or tube **46** is simple. In this operation, the cap assembly **10** is slipped over one end of the shell, the bottom end as viewed in FIG. 5, until it overlaps the bottom helical convolutions **48** of the shell, and until the bottom end edge of the shell seats in the gutter **40**. The band **38** is then spot welded to the bottom convolutions of the shell as indicated at **50** whereby the frusto-conical body of the cap assembly is centered interiorly of the shell **46**. The shell **46** and attached cap assembly **10**, as a unit, are slid over the top end **52** of a timber pile **54** until the bottom edge of said cap assembly rests upon a pair of supports **56** secured in place by fastening elements **58**. The supports **56** are secured to the pile at a predetermined distance from the top edge **52** of the pile to allow the top edge of the shell **46** to become level with the bottom of the pier floor F or other structure to be supported by the concrete capped pile. The dis-

tance of the supports **56** from the top edge **52** of the pile and the length of the shell **46** will vary in accordance with the requirements of the particular job. When the shell and cap assembly are thus positioned on the timber pile **54**, concrete **60** is poured over and around the top end **52** of the timber pile **54**, down into the gutter **40** and over the corrugated frusto-conical body **36** until the concerete reaches the top of the shell **46** and is levelled off. During the operation of pouring the concrete, the unit including the shell **46** and cap assembly **10** remain in fixed position. The inner pointed ends **26** of the corrugations and the oblique edges **30** function as inclined planes or wedges which redirect loosening forces on the timber pile surface to a tightening direction due to the corrugated formations **22** and the resiliency of the spring steel from which the cap assembly is formed. Furthermore, such pointed ends **26** and the oblique edges **30** function as an interlocking force between the body of the cap assembly and the outer surface of the timber pile **54** which counteracts any loosening generated.

It will be understood that the dimensions of the blank are dependent upon the diameter of the pile upon which it is to be assembled.

In FIGS. 7 and 8, the cap assembly **10'** is shown attached to a sectional shell or tube **46'** composed of two semi-cylindrical sections **64** and **66** with juxtaposed flanges **58** and **70**, respectively, along the long edges thereof. The flanges are secured together by bolt and nut assemblies **72** in spaced relation therealong. The cap assembly **10'** is welded to the bottom end of the shell as indicated at **74**.

While I have illustrated and described the preferred embodiment of my invention, it is to be understood that I do not limit myself to the precise construction herein shown and described and any modifications may be made therein without departing from the principle of the invention as defined in the appended claims.

I claim:

1. As an article of manufacture, a cap assembly for a pile shell comprising a frusto-conical body of spring steel having an opening in the narrow end thereof and having a band around the wide end thereof, said band extending inwardly along the body in spaced relation thereto, said body being corrugated, the corrugations extending

from the opening to the band, the edge of the body forming the opening being notched between the ends of the corrugations.

2. As an article of manufacture, a cap assembly for a pile shell as defined in claim **1** wherein the notches are V-shaped defining inverted V-shaped ends on the adjacent ends of the corrugations, the inverted ends adapted to flex for interlocking with a timber pile and the like.

3. As an article of manufacture, a cap assembly for a pile shell as defined in claim **1** wherein a gutter is formed at the juncture between the band and the adjacent ends of the corrugations for seating the end of a pile shell.

4. As an article of manufacture, a cap assembly for a pile shell as defined in claim **2** wherein a gutter is formed at the juncture between the band and the adjacent ends of the corrugations for seating the end of a pile shell, the band being welded to the end of the shell.

5. A composite pile including a timber pile section, and a concrete pile section around the top of the timber pile section, said concrete pile section including a shell, a perforated cap assembly attached to the bottom end of the shell and concrete in the shell over and around the top end of the timber pile and over and around the cap assembly, said cap assembly having a frusto-conical body with an opening in the narrow end thereof receiving the timber pile, and a band around the wide end of the body extending inwardly along the body in spaced angular relation thereof for attachment to the adjacent end of the shell, the edge wall of the narrow opening being notched forming inner pointed ends adapted to interlock with the top end of the timber pile.

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JACOB SHAPIRO, *Primary Examiner.*