May 5, 1964 J. J. DOUGHERTY 3,131,543

COLLAPSIBLE PILING

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Fig. 1

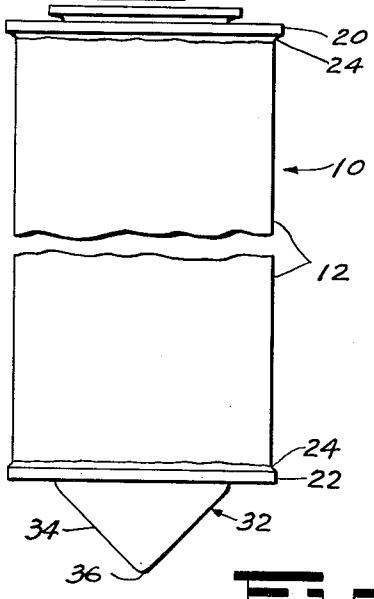


Fig. 2

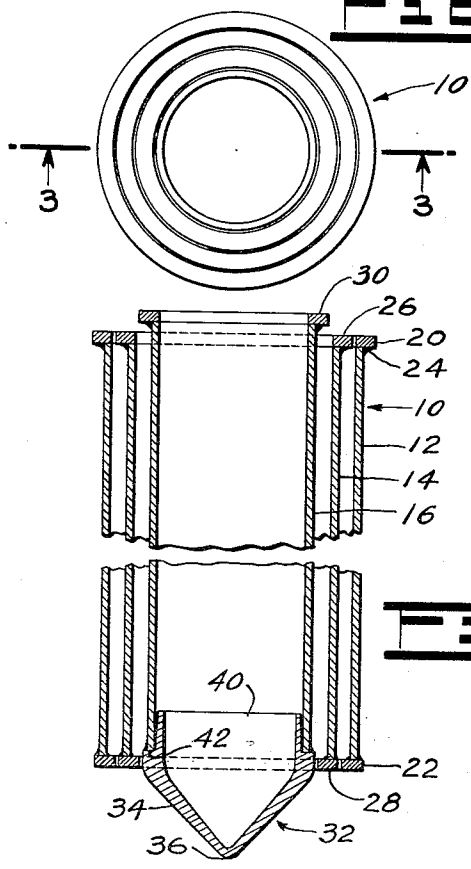


Fig. 4

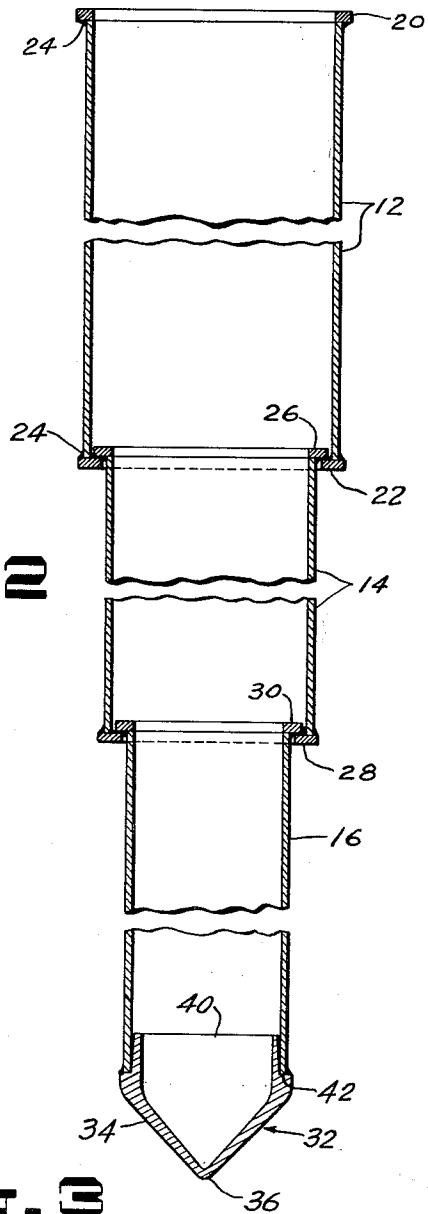


Fig. 3

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Fig. 5

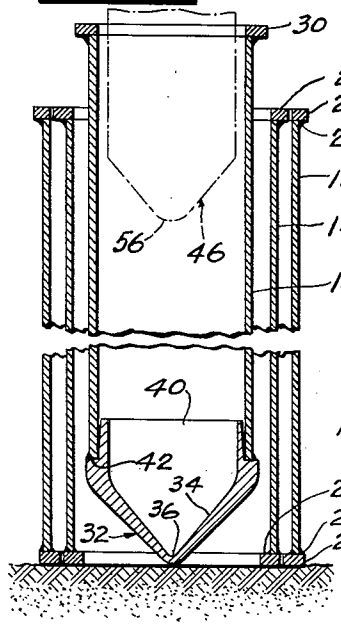


Fig. 6

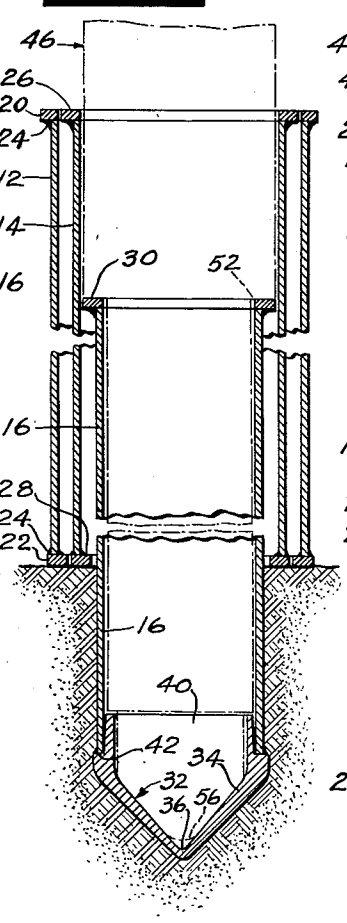


Fig. 7

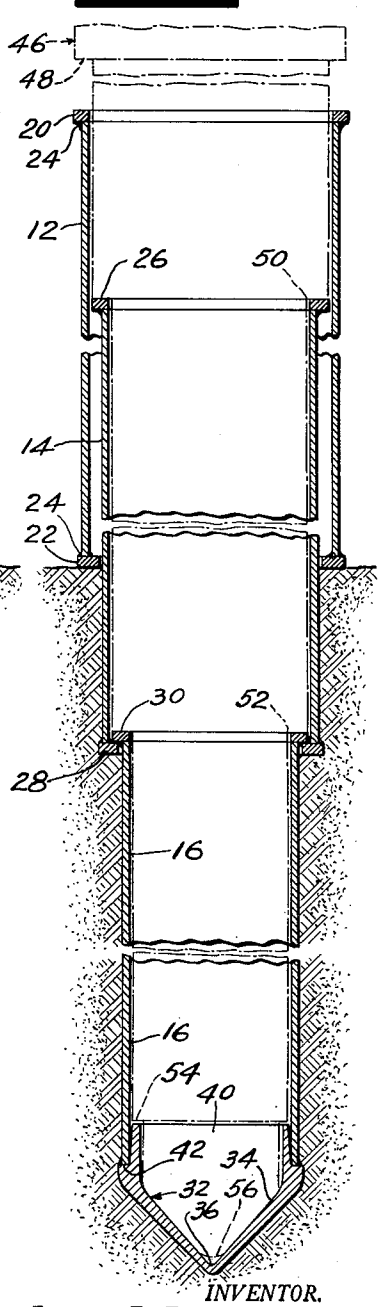


Fig. 8

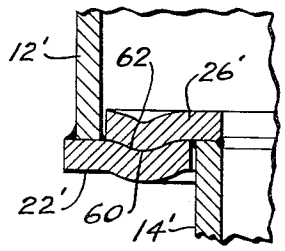


Fig. 9

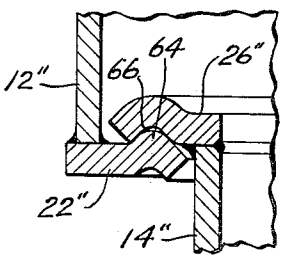
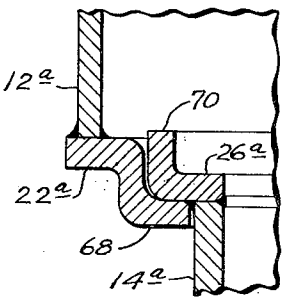


Fig. 10



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COLLAPSIBLE PILING

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Filed Dec. 5, 1960, Ser. No. 73,677
1 Claim. (Cl. 61—53.5)

This invention relates generally to piling and more particularly to an improved collapsible and sectionalized sheet metal pile casing.

Piles are used to support or to form foundations for structures such as buildings, tanks, bridges, conduits, piers, wharves, etc. by inserting them into or through the yielding surface strata far enough to obtain a solid support for the principal structure. Such piles often are constituted by metal tubular casings.

Such tubular piles are generally very long and heavy and one of the problems involved in their use is that of transporting the pile to the site and of unloading and handling the pile. The dimensions of the pile needed sometimes are so large that it is impractical or impossible to fabricate the pile casing in a manufacturing plant and ship it by the usual carrier to the site at which it is to be used. This is due to the fact that bridge clearances, tunnel sizes, track spacings and other factors all operate to limit the size of articles which can be shipped over any given route. Such operations are also costly.

It is the principal object of the present invention to provide a collapsible and sectionalized pile casing that may be readily transported to the site, easily handled at the site and readily installed. This greatly simplifies the shipping and installation of very long pile casings.

Another object of the invention is to provide a collapsible and sectionalized pile casing that can be readily driven by a mandrel of ordinary construction.

A further object of the invention is to provide an improved pile casing that is economical to manufacture, rugged in construction and highly efficient for the purposes intended.

For further comprehension of the invention and of the objects and advantages thereof, reference will be had to the accompanying drawings and to the description thereof to follow.

In the accompanying drawings forming a material part of this disclosure:

FIG. 1 is a side elevational view of a pile casing embodying my invention, the casing being shown in collapsed condition, parts being broken away.

FIG. 2 is a top plan view thereof.

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

FIG. 4 is a view similar to FIG. 3 but showing the pile casing in expanded condition, parts being broken away.

FIG. 5 is a view similar to FIG. 3 showing one step in the operation, a portion of a driving mandrel being shown in dot-dash lines.

FIG. 6 is a similar view showing another step in the operation.

FIG. 7 is a similar view showing a further step in the operation.

FIGS. 8, 9 and 10 are fragmentary sectional views of various modified forms of joints between adjacent sections of the pile casing which forms are adapted to be used with the pile casing of FIG. 1.

Referring in detail to the drawings, in FIG. 1 there is shown a pile casing 10 made in accordance with the present invention. The pile casing is formed of any suitable piling material such as steel tubing and is formed in any desired length, such for example as twenty-four feet. In accordance with the invention, the steel tubing is sectionalized being composed of three sections 12, 14 and 16, all of the sections being open at both ends. As seen in FIG. 4, the section 12 is wider in diameter than the adjacent section 14, and section 14 is wider in diameter than the adjacent section 16. The three sections are arranged in telescoping fashion. The top section 12 as viewed in FIG. 4 is formed with an annular outwardly protruding radial flange 20 at the top open end, and with an inwardly protruding radial flange 22 at the bottom end thereof. The flanges may be welded to the end edges of the tubular section 12 as indicated at 24.

Tubular section 14 slidably fits through the bottom opening in section 12 and past the flange 22. Section 14 is formed with an annular outwardly protruding radial flange 26 at the top of its top open end, the flange 26 projecting outwardly over the bottom flange 22 on section 12 and adapted to seat on said bottom flange as viewed in FIG. 4. The bottom open end of the section 14 is formed with an annular inwardly projecting radial flange 28. The flanges 26 and 28 are welded to the section 14 in a manner similar to the flanges 20 and 22.

The third section 16 is sufficiently narrow to permit it to slide fittingly through the bottom open end of the section 14. An annular outwardly protruding radial flange 30 is formed on the top open end of the section 16 and projects sufficiently outward to overlap and seat on the bottom flange 28 of the section 14 when the sections are extended as shown in FIG. 4.

A pile driving tip or point 32 is carried by the bottom open end of the casing section 16. The tip or point is made preferably of cast steel but may be made of other suitable material such as cast iron or other metals or alloyed metals. The point has a dish shaped body 34 open at the top and tapering downwardly and inwardly to a blunt point 36 at the bottom end. The body 34 is formed with an upstanding collar or flange 40 at the top, which collar is spaced inwardly from the outer surface of the body thereby forming a shoulder 42. The outer circumferential shoulder 42 is adapted to receive the open end 44 of the section 16 of the pile casing. The collar is slightly tapered to permit the bottom end of the pile section 16 to slide over the collar until the end of the section is properly seated on shoulder 42.

The sections 12, 14 and 16 of the pile casing are assembled at the manufacturing plant so that the sections are adapted to assume a telescopic or nested condition as shown in FIG. 3. When in this nested condition, the pile casing assumes the dimensions of the dimensions of the outermost pile section 16 plus the length of the body of the pile point 32. In this collapsed condition, the pile casing can readily be lifted onto any desired form of vehicle and transported to the site.

In operation, the pile casing in collapsed condition as shown in FIG. 3 is placed on the ground at the site as shown in FIG. 6 with the point 32 contacting the ground. A mandrel such as shown diagrammatically at 46 in FIG. 7 is lifted above the pile casing by a crane or the like. The mandrel is of ordinary construction having a tapered body with four stepped shoulders 48, 50, 52 and 54. The mandrel is next lowered into the pile casing until its nose 56 strikes the pile point 32. Simultaneously, the shoulder 52 strikes the flange 30 of the pile section 16 thereby driving said section 16 with the point 32 into the ground as shown in FIG. 6. Continued downward drive of the mandrel will bring its shoulder 50 into striking engagement with the annular flange 26 of pile section 14 driving the section 14 into the ground, and continued downward drive of the mandrel will bring its shoulder 48 into striking engagement

with the annular flange 24 of the pile section 12 driving the section 12 into the ground. When the piling has been driven into the ground, the mandrel may be lifted out of the pile casing by the crane.

In FIG. 8, a modified form of joint is shown between two pile sections, such as for example sections 12' and 14'. In this joint the bottom flange 22' of sections 12' is depressed centrally forming an annular recess 60 in the top surface of the flange. The top flange 26' of the section 14' is similarly centrally recessed forming an undulation 62 complementary to the recess 60 and fitting therein, thereby forming a seal thereat.

The modified form of joint shown in FIG. 9 is similar to the joint shown in FIG. 8 except that the annular flange 22'' on section 12'' is curved adjacent its outer free end edge forming an upwardly projecting annular bead 64, and the annular flange 26'' of section 14'' is curved adjacent its outer free end edge forming an annular recess 66 in its bottom surface coacting with the bead 64 to form a seal thereat.

In the modified joint shown in FIG. 10, the annular flange 22^a on section 12^a is bent downwardly and then laterally parallel to section 12^a as indicated at 68 providing a seat for the angular flange 26^a on section 14^a which is formed with an upstanding flange 70 thereby providing a seal at this point.

While I have illustrated and described the preferred embodiments of my invention, it will be understood that changes in details of construction might be made without departing from the principle of the invention.

I claim:

A collapsible pile casing having a sectionalized tapered body, the sections being tubular and telescopically arranged for sliding movements relative to each other and said sections being of gradually increased diameters in an outward direction, a pile point carried by the innermost one of the tubular body sections, said pile point having a hollow body tapering to a point at one end and open at its other end, said other end having a collar receiving the lower end of the innermost tubular section, an outwardly projecting flange member on the upper ends of the inner sections and an upwardly directed cylindrical extension on the outer edges of each flange member, an inwardly projecting flange on the lower ends of the tubular sections outwardly of the innermost section and having a downwardly extending section at the inner edges thereof terminating in an inwardly directed annular section forming a seat for the flange member of the respective adjacent inner tubular section and to form a seal between the adjacent tubular sections when extended.

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