

March 8, 1932.

E. GEIGER

1,848,339

SCREW PILE

Filed July 7, 1928

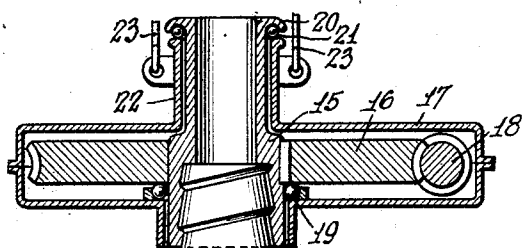


FIG. 1.

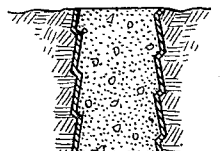


FIG. 2.

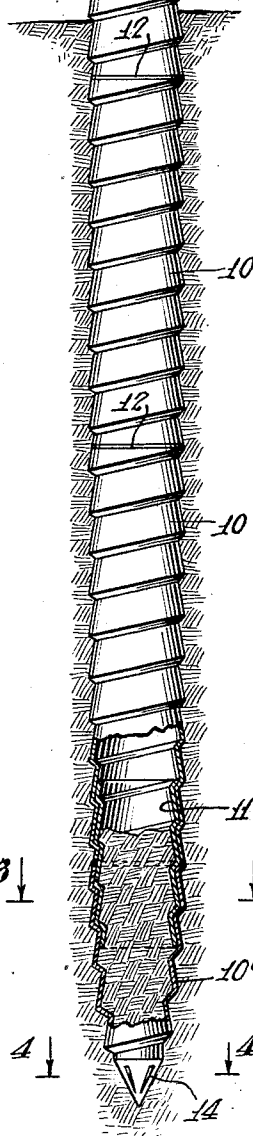


FIG. 3.

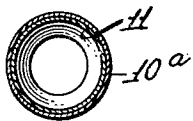


FIG. 4.

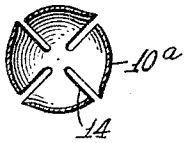
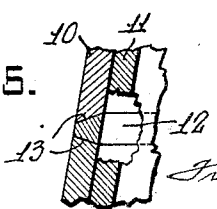
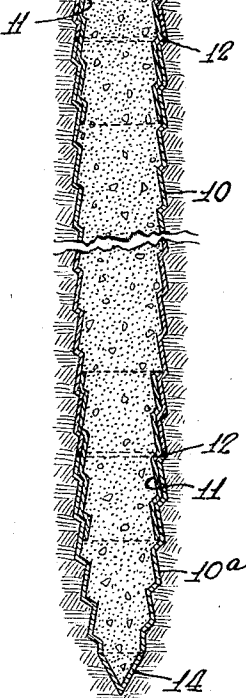


FIG. 5.



INVENTOR
Ernst Geiger
BY
Franklin J. Foster
ATTORNEY

UNITED STATES PATENT OFFICE

ERNST GEIGER, OF IRVINGTON, NEW JERSEY

SCREW PILE

Application filed July 7, 1928. Serial No. 290,923.

An object of this invention is to provide a piling which may be sunk noiselessly and without vibration, and which is consequently especially well suited for construction work in congested areas, where present noisy pile driving practice not only disturbs large numbers of people but frequently causes dangerous vibrations and consequent settling or weakening of buildings on adjacent lots.

Another object is to provide a piling which may be sunk by the application of considerable less force than is required to drive the ordinary piling.

Another object is to provide a piling which may be conveniently made up in relatively short, standard size sections for convenient transportation and the sections readily coupled together as the piling is screwed into the ground.

Another object is to provide a piling which may be conveniently sunk in water bearing sand or other very moist soil without the need for well points or other moisture extracting apparatus.

Another object is to provide a piling which, due to the powerful leverage obtained by a screwing action, will penetrate readily various types of sub-strata through which it is very difficult to drive the conventional piles.

Still another object of the invention is to provide a piling which due to its peculiar exterior configuration is highly frictionally resistant to straight downward thrusts and which consequently is capable of supporting a much heavier load than ordinary piling of the same diameter.

Other and further objects are to provide a pile of simple and practical construction which may be conveniently and quickly sunk and which is well suited to the requirements of economical manufacture and durability in use.

Another object of the invention is to provide a novel method of sinking the pilings which will result in the production of a

strong, durable compression resisting fabricated piling and which facilitates expeditious pile sinkage in all types of soil.

In a preferred embodiment of the invention, the piling consists of a sectional metal shell screwed into the ground and subsequently filled with concrete. The shell is preferably of sufficiently heavy gauge stock so that it may be screwed home without the need for interior reinforcing mandrels or exterior protective casings. The exterior configuration of the shell adapts it for the screwing operation and the generally similar interior configuration of the shell predetermines the exterior shape of the subsequently cast concrete. Thus the rotting or corrosion of the steel shell after extended use, does not materially impair the strain resisting capacity of the piling inasmuch as the moulded concrete itself offers a similar thrust resisting contour to the soil.

Preferably the shell is made up in relatively short standard size sections which may be coupled together in the field by internal coupling nipples threaded in accordance with the threading of the shell sections. The entering section of the shell may be provided either with a piercing or a cutting point. In the latter instance, some of the soil which is cut away by the entering end of the piling, passes into the interior of the shell and may be conveniently removed by air blast or other suitable means.

With the above noted and other objects in view, the invention consists in certain novel features of construction and combinations and arrangements of parts, as will be more fully hereinafter described and pointed out in the claims.

The invention may be more fully understood from the following description in connection with the accompanying drawings, wherein:

Fig. 1 is a broken view partly in side elevation and partly in longitudinal section showing

ing the sectional shell partially sunk into the ground.

Fig. 2 is a broken longitudinal sectional view through the complete piling.

Fig. 3 is a transverse sectional detail on the line 3—3 of Fig. 1.

Fig. 4 is a transverse sectional view on the line 4—4 of Figure 1, and

Fig. 5 is a considerably enlarged longitudinal sectional detail showing the packing between the abutting ends of adjacent shell sections.

The piling shell is built up of a plurality of generally similar connected hollow metallic sections. These sections may be of rolled, pressed, or cast metal of sufficient thickness and strength so that they can be screwed into the ground without interior reinforcements. Preferably the sections are of similar threaded configuration both interiorly and exteriorly. The threading may assume many forms but I prefer to use the buttress threading illustrated in order to insure maximum fractional resistance to a direct downward thrust. It is well known, of course, that the load sustaining ability of piling is for the most part directly determined by its frictional resistance against a downward thrust.

The standard length threaded shell sections designated by reference numerals 10, 10 are preferably coupled together by similarly threaded internal coupling members 11. Preferably the abutment lines of adjacent shell sections do not follow the line of the threads but are transverse to the longitudinal axis of the piling. In coupling two of the piling sections, the coupling piece 11 is partially screwed into the top of a previously sunk section 10 and a superjacent section 10 is screwed onto the upwardly projecting end of the coupling piece until it abuts the sub-jacent section 10.

In order to render the shell waterproof, packing rings 12 may be provided between the abutting ends of adjacent shell sections and such abutting ends are preferably beveled as shown in 13 of Fig. 5 to insure a better compressive action on the packing rings.

Preferably all of the sections 10 are of uniform diameter except that the lowermost entering section 10a tapers toward the bottom where it may terminate in a piercing point or a cutting point. The latter being illustrated in the present case and is provided with openings 14 so that the soil which is cut away may pass into the interior of the shell.

Numerous expedients might be resorted to for sinking the piling and imparting the necessary rotary motion to the uppermost section thereof to effect the screwing action.

I have shown quite diagrammatically one form of sinking mechanism which includes a socket member 15, this socket member being hollow throughout its length and at its lower end shaped to receive the upper end

of one of the sections 10. The socket member is preferably keyed to a worm gear 16, housed within a gear casing 17 and driven from a screw 18. A suitable thrust bearing 19 is provided between the gear 16 and the bottom of the casing 17 and the upper end of the socket member 15 may be outwardly flanged as at 20, whereby an additional thrust bearing 21 may be disposed between the flange and the sleeve-like upward extension 22 of the casing. The hoisting apparatus, such as the cables 23, may be conveniently attached to the casing 17. It will of course be understood that the screw 18 is driven in any suitable manner to rotate the gear and socket and that the sinking of the pile is assisted by the weight of the operating mechanism which rests upon it. After one shell section has been substantially sunk, the driving mechanism is lifted up permitting another shell section to be coupled to the top of the first one, after which the driving socket is engaged with the top of the second section and further sinks the two sections as a unit, this operation being repeated until the desired length of piling has been sunk.

It will be noted that the hollow socket member 15 permits the convenient insertion of an air blast nozzle directly into the hollow shell for blowing the soil which may collect in the lower end of the shell, out through the top thereof.

After the sectional shell has been completely assembled, and sunk as shown in Fig. 2, and the soil, if any, removed from the bottom thereof, the shell serves as a moulding form for poured concrete 21, and thereby determines the exterior configuration of the metal encased concrete pile.

The use of the shell to determine the exterior shape of the concrete is an important feature, since the corrosion of the shell after a long period of use cannot materially affect the efficiency of the piling. As the shell rusts out, the concrete itself presents a threaded outer surface to the soil.

It is believed that the method of sinking the piling will be fully understood from the foregoing general description of the piling itself, and its sinking mechanism. Such method briefly consists of screwing into the ground a sectional metal shell, the interior configuration of which predetermines the shape of a subsequently cast concrete filler and then pouring concrete into the hollow shell until the latter is completely filled. Where the piling has a cutting point, the method additionally includes the step of blowing or otherwise removing soil from the interior of the shell through the open upper end thereof, either during or subsequent to the sinking operation and the step of coupling additional sections to the top of the piling during the course of the sinkage.

Obviously various changes and alterations might be made both in the piling and the

method of sinking it, without departing from the spirit and scope of the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is as follows:

1. As a new element in a fabricated screw piling, an internally and externally screw threaded metal shell including a plurality of abutting sections, internal hollow coupling sleeves connecting said sections, and waterproof packing rings encircling the sleeves and compressed between adjacent shell sections.

2. A method of installing a field-fabricated screw piling which includes the steps of screwing an internally and externally threaded sectional metal shell into the ground one section at a time by inserting coupling sleeves into each section after it is partially or completely sunk and screwing a superjacent section onto the projecting upper end of the coupling sleeve, then filling the completely sunk shell with concrete.

3. In a fabricated piling metal shell including a plurality of abutting sections externally and internally screw-threaded on continuous and parallel lines and adapted to be screwed into the ground, similarly threaded internal coupling sleeves connecting and reinforcing the ends of said sections, and a poured concrete filler within the shell.

4. In a fabricated piling a hollow metal shell including a plurality of abutting sections externally and internally screw-threaded in continuous and parallel lines and adapted to be screwed into the ground section by section, similarly threaded internal coupling sleeves connecting and reinforcing the ends of said sections, water-proof packing between adjacent sections and a concrete filler poured in the shell.

5. As a new element in a field-fabricated screw piling a fabricated metal tube including a plurality of abutting sections screw-threaded internally and externally on parallel and continuous lines, and similarly threaded coupling sleeves connecting and reinforcing the ends of said sections.

6. As a new element in a field-fabricated screw piling a fabricated metal tube including a plurality of abutting sections screw-threaded internally and externally on parallel and continuous lines, and similarly threaded coupling sleeves connecting and reinforcing the ends of said sections, and water proof packing between adjacent sections.

7. As a new element in a field-fabricated screw piling a fabricated metal tube including a plurality of similar sections screw-threaded internally and externally in parallel and continuous lines, and similarly threaded coupling sleeves connecting and reinforcing the ends of said sections.

8. A method of installing field fabricated piling which includes the steps of screwing

an internally and externally screw-threaded sectional metal shell into the ground one section at a time, connecting superjacent sections to the partially or completely sunken sections by means of similarly threaded coupling sleeves as the various sections are sunk and then filling the completely sunk shell with concrete.

Signed at New York, in the county of New York and State of New York, this 5th day of July, A. D. 1928.

ERNST GEIGER.

80

85

90

95

100

105

110

115

120

125

130