

Dec. 7, 1926.

O. STERN

1,609,670

PILE OR PILE CORE

Filed Oct. 12, 1925

Fig. 2

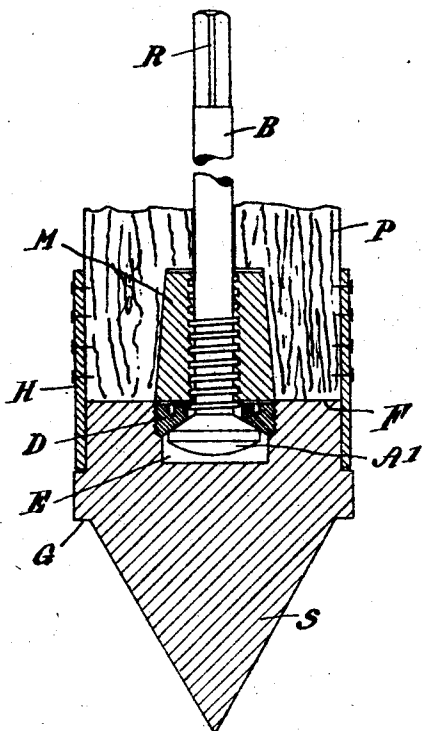
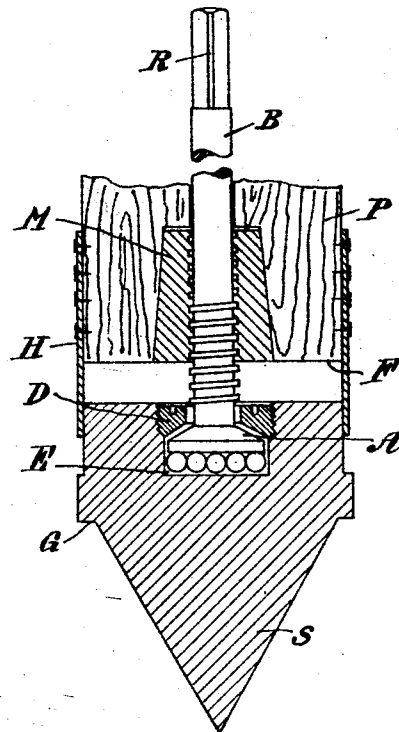


Fig. 1



O. Stern
inventor

By: Markes & Clark
Attys.

Patented Dec. 7, 1926.

1,609,670

UNITED STATES PATENT OFFICE.

OTTOKAR STERN, OF VIENNA, AUSTRIA.

PILE OR PILE CORE.

Application filed October 12, 1925, Serial No. 62,202, and in Austria October 9, 1924.

In most cases dealing with the withdrawal of driving piles, the employment of very great pulling forces by means of very complicated, time absorbing and expensive devices is indispensable. Moreover in the driving-in of sheet metal tubes by means of pile cores under certain conditions such a great adhesion of the tube to the pile core takes place that during the withdrawal of the latter the driven-in sheet metal tube is liable to be lifted, and in some cases even the entire withdrawal of the sheet metal tube together with the pile core takes place. The object of the present invention is to avoid these drawbacks.

According to the invention a pile or pile core is provided with a shoe longitudinally movable relatively thereto and so attached as to be adapted to form a support for means exerting pressure on the pile to initiate the withdrawal of the same when desired. The invention may conveniently be carried into effect by rotatably mounting the shoe on the end of a screw-threaded spindle engaging by its threaded portion in a corresponding nut portion on the pile.

By this construction it is possible when the pile driving is effected, to initiate the removal of the pile by rotating the said spindle to exert pressure on the pile by the cooperation of the spindle and nut, the shoe acting as a support for the said spindle during this operation. The most difficult part of the pile withdrawal may thus be easily effected.

In order that the invention may be more readily understood reference will now be made to the annexed drawings, illustrating an embodiment thereof, wherein:—

Fig. 1 is a longitudinal section of the lower portion of a pile or pile core and its shoe, in the position in which the repulsion takes place;

Fig. 2 is a similar sectional view of a slightly modified construction with the parts in the position, which they take up before and during the driving-in of the pile.

From the drawing it will be seen that a spindle B is mounted axially within the pile or pile core. The upper end of said spindle at the head of the pile, is so formed that strong forces may be exerted for rotating the spindle by means of a suitable tool. In the example shown a square-shaped end R is provided on the spindle.

The lower end of the said spindle B is

provided with a flange or collar A. This collar A is freely and rotatably journaled in a corresponding recess E in the pile shoe S, and is secured therein by means of an externally screw-threaded annular member D, which is pushed over the spindle B and screwed into the screw-threaded recess E. Steel balls are preferably placed below it as indicated in Fig. 1 of the drawing, but obviously the free rotation of the collar may be effected by other means, such as by spherically shaping the lower surface A¹ of the collar as shown in Fig. 2.

Whereas the connection of the spindle B with the pile shoe S is effected only by means of the collar A, the connection of the spindle with the pile or pile core P is effected by the engagement of a screw thread on the spindle in a nut or central member M at the lower end of the pile or pile core P.

A sliding or telescopic connection can be provided between the shoe S and the pile or pile core P by the arrangement of a sleeve H, which may either be secured to the lower portion of the pile as shown, or to the upper portion of the pile shoe in such a manner that the projecting end of said sleeve H surrounds the end of the other member to which it is not secured. The annular face G of the pile-shoe serves for taking along the sheet-metal tubes during the driving-in of the pile or pile-core.

The working of the devices described above—after the pile or pile core, with its shoe S raised, i.e. with its screw spindle B entirely screwed upwards, has been driven or brought into its final position (Fig. 2) by pressure, driving, flushing or in any other convenient manner—consists in rotating the spindle B in a clockwise direction, whereby the said spindle B is screwed out downwards from its nut M in the pile or pile core P, whereby the bottom face F of the pile is lifted off the top face of the pile-shoe, thereby pressing the shoe S and pile P apart. According to the relative resistance of these two parts either the shoe will be forced down or the pile raised, or possibly they might both be displaced, in opposite directions.

The overcoming of the resisting forces acting upon the surface of the pile can usually be obtained, under most ground conditions, after more or less strong forcing downwards of the shoe, if the length

of the thread on the spindle and its nut M are sufficient, thus fulfilling the purpose of the present invention, that is to say, effecting the first lift by the pressing upwards of the pile, the most difficult stage of pile withdrawal.

The space created between the pile and shoe during this upward movement of the pile P is closed by the projecting length of the sleeve H, thereby preventing the entry of undesirable matter between the two parts.

The further withdrawal of the pile together with the shoe hanging on its spindle may be effected merely by means of a hauling rope after the pile has been loosened sufficiently by being lifted to the extent of about the length of the screwed portion of the spindle B.

After withdrawal, the pile is again made ready for action by bringing the top face of the shoe into contact with the bottom face of the pile, by screwing down the pile or pile core around the stationarily held spindle, or by screwing up the spindle in case the pile or pile-core is held stationary.

The present invention contains the following progressive features and advantages as compared with known pile raising methods and devices.

No separate lifting devices are necessary when employing the shoe for overcoming the generally very considerable forces acting on the surface of the pile to resist its withdrawal. The lifting power necessary is supplied by a rotary motion of the spindle, which may easily be effected under all conditions, and the spindle engages the pile not under tension, in contradistinction to hitherto known methods, but under upwardly directed pressure. The raising work of the shoe is independent of the compressibility of the ground surface, which in pile driving is usually very great and disadvantageous for the supporting of winches and other hoisting devices. The employment of the shoe prevents an injury to or destruction of the bore hole or shaft walls or of the bottom of the shaft, which may happen in the case of stepwise lifting, or by the com-

mon method of rotating and twisting the pile. As soon as the shoe is put in action when a metal tube has been driven in the ground the pile core is gradually separated from its enveloping sleeve, which is not subjected to any upwardly directed tensional forces; so that not only a loosening, but rather a further, favourably acting, downwardly directed tension is imparted thereto. This latter action is due to the fact that the lifting of the pile core has not been effected by tension, but by an upwardly directed pressure, supported by the shoe, so that the shoe and the enveloping sleeves carried with the shoe, are held stationary in their driven-in position or are even pushed down still further.

Having now particularly described and ascertained the nature of my said invention and is to be performed, I declare that what I claim is:—

1. In combination, a pile core, a shoe movable longitudinally relatively to the core, and means supported by the shoe for exerting pressure on the pile core to initiate the withdrawal of said core.

2. In combination, a pile core, a shoe movable longitudinally to said core, a spindle rotatably mounted in the shoe having a threaded portion thereon, and means on the pile core engaging the threaded portion of the spindle, whereby, incident to rotation of the latter pressure is exerted on the pile core.

3. An arrangement as claimed in claim 2 characterized by the provision of a flange on the spindle rotatably mounted in a recess in the shoe.

4. An arrangement as claimed in claim 1 characterized by the provision of means closing the space between the pile core and the shoe when the latter are separated.

5. An arrangement as claimed in claim 2 characterized by the provision of means closing the space between the pile core and the shoe when the latter are separated.

In testimony whereof I affix my signature.

OTTOKAR STERN.