E. W. MINTER.

FOUNDATION PILE DRILL.

APPLICATION FILED JUNE 17, 1912.

1,067,363. Patented July 15, 1913.

Fig. 1.

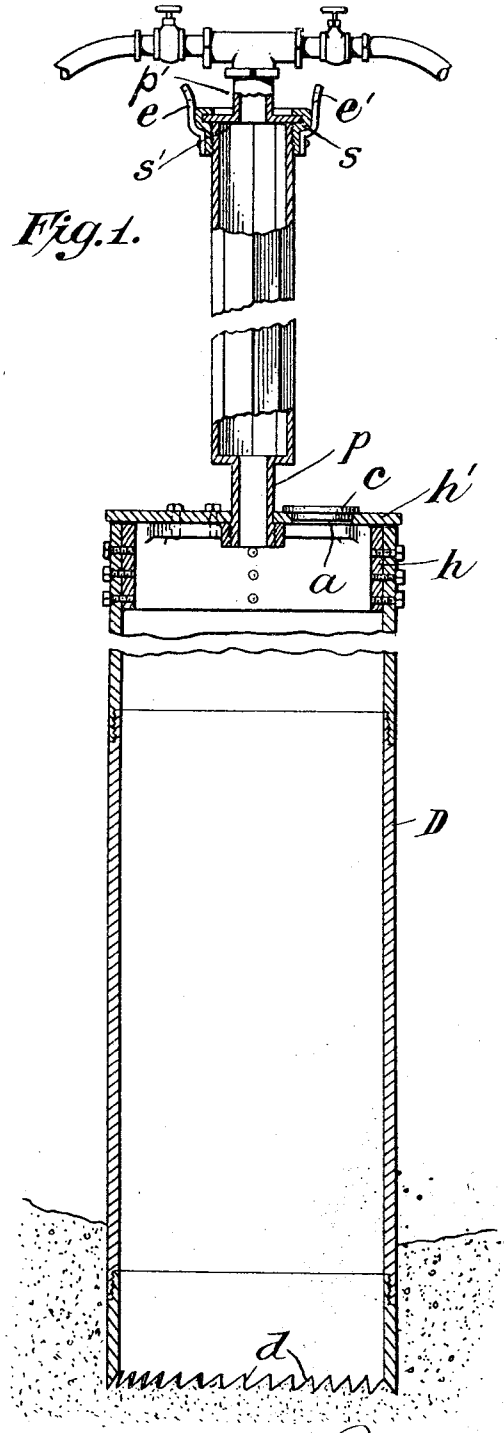


Fig. 2.

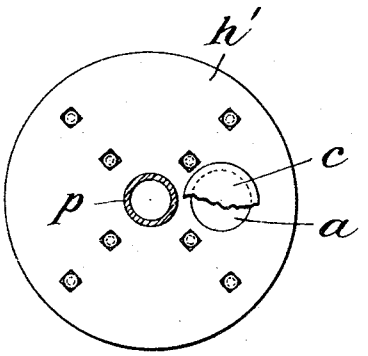
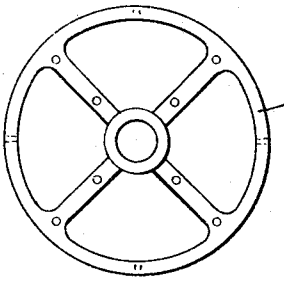


Fig. 3.



Attest:
Clifford N. Richerson
Sarah H. Fuchs

Edgar W. Minter Inventor:
by Wallis N. Dodd
Atty.

UNITED STATES PATENT OFFICE.

EDGAR W. MINTER, OF NEW YORK, N. Y.

FOUNDATION PILE-DRILL.

1,067,363. Specification of Letters Patent. Patented July 15, 1913.

Application filed June 17, 1912. Serial No. 704,091.

To all whom it may concern:

Be it known that I, EDGAR W. MINTER, a citizen of the United States, residing in the city, county, and State of New York, have invented a new and useful Improvement in Foundation Pile-Drills, of which the following is a specification.

My invention relates to the method of installing piles in the ground for the foundations of structures, and it is preferably adapted to concrete piles.

Concrete piles now in general use are divided into two classes; (*a*) those made in place where the pile hole is made by a mandrel and the wet concrete is dropped directly into the position it is to occupy as a concrete pile and sets in place, and (*b*) those molded or cast and permitted to harden thoroughly before being placed in position. The installation of piles of either class possesses objectionable features which are removed by my invention. The hole required in constructing the made-in-place pile is made by driving a form into the ground and is filled with wet concrete. Very frequently some of the sub-strata penetrated by the form are in a semi-fluid condition and have not sufficient consistency to serve as a mold to retain the concrete in shape. The operator, however, can have no knowledge of this subsurface condition and fills in the wet concrete which is partly washed away or disseminated through the adjacent soil. Under such conditions also the wall of the hole is not stable and the surrounding earthy material presses in upon the layers of soft concrete, squeezing them out of shape and robbing the pile of its uniform structure and strength. The molded pile is set in place by driving or jetting. If such a pile is driven the shock caused by the impact of the hammer tends not only to break or shatter the concrete shaft of the pile, but also to affect the integrity of adjacent structures. If it is jetted into place the operator has no means of ascertaining as the pile descends when the point of required resistance has been reached.

The object of my invention is to procure the means for installing a pile quickly, cheaply and securely, and to enable the operator to ascertain immediately at any stage of the work the actual character of the ground which the pile drill is then penetrating and when substance of sufficient resistance has been reached in the penetration.

The character and application of my invention are illustrated in the accompanying drawing, in which—

Figure 1 is a vertical section of the drilling tube composing my invention completely equipped; Fig. 2 is a plan view of the head plate of such tube; and Fig. 3 is a plan view of the head frame which, together with said head plate, constitute the cover of the tube.

Similar letters refer to similar parts throughout the several views.

I employ a hollow steel drilling tube or shell D which is adapted to be rotated on its vertical axis downwardly into the ground by means of some suitable mechanical apparatus. The tube or shell D is of the same diameter throughout its entire length and it is constructed of sheets of metal formed into a cylindrical shape and of sufficient thickness so that the same will not buckle or crimp when the tube is being rotated or screwed into the ground. The tube may also be made in sections capable of being screwed together, which construction will permit the tube to be lengthened when a deep bore is desired. To facilitate penetration a cutting surface or edge *d* is attached at the lower edge of the drilling tube D and I have found it often advisable, because of the resisting character of the ground through which the drilling is being done, to provide a saw tooth cutting edge.

At the top of the tube D I provide a metal head *h*—*h'*. This head consists of the skeleton frame *h* which is inserted in and fastened to the top of said tube and the circular plate *h'* which is laid upon and secured to said frame and completely covers and hermetically seals the top of the tube D. Into the center of the head *h*—*h'* I insert and firmly attach the driving pipe *p* which is preferably octagonal in section and is adapted to engage and, together with the tube D, to be rotated by such mechanical apparatus as may be employed therefor. The pipe *p* is connected at its upper end to the feed pipe *p'* which in turn is connected with a pump designed to force a stream of water or air through both pipes into the tube D. In order that the pipe *p* which drives the tube D may be rotated freely while the supply pipe *p'* from the force pump remains in a fixed position I join them together by the swivel collar *s*. The pipe *p'* attached to the swivel plate *s'* in the swivel collar remains stationary while the

collar *s* rotating with the driving pipe *p* revolves around it. A hole or port *a* is provided in the head plate *h'* together with a cover *c* adapted to fit air tight thereon and to be removed whenever desirable for the purpose of inserting a sounding rod or light through the same into the tube D while the drilling is being done. By this means the interior of the tube and the character of the soil which it is then penetrating may be examined at any stage of the work. For the purpose of lowering or raising the drilling tube D handles or clamps *e—e'* are provided by means of which and of an appropriate pulling device the tube may be raised or lowered or withdrawn from the ground after the drilling is completed.

When the drill is in operation a current of water is driven through the pipes *p* and *p'* and through the tube D and expedites the penetration by softening the earthy material which forms the core of the drill. It also automatically expels the excavated material from the tube by forcing the same out under the cutting edge *d* as the drill descends. After the drilling tube D has penetrated to the depth required the water remaining within the tube is expelled therefrom by a current of air injected into the drill through the pipes *p* and *p'* and the head *h—h'* is removed from the top of the tube. A charge of wet concrete is then dropped into the tube to form a base or foundation for the pile, the pile is then inserted and the drilling tube is withdrawn by means of the clamps *e—e'*, leaving the pile duly installed in place.

I have found that the best results are accomplished by the use of a watertight head secured to the drilling tube in conjunction with a pipe so adapted that a stream of air or water may be forced into and through the tube, such as is illustrated in Figs. 1 and 2 in the said drawing, but I do not confine my invention thereto. The head may be of skeleton or open formation only as is illustrated in Fig. 3, and the agency of air or water in expelling the water and other materials which form the core of the drilling tube may be dispensed with without departing from the spirit of my invention. In the former case the pressure of the air or water, jets or forces out the said materials composing such core as fast as the drill tube descends; in the latter case the core is removed by a sand bucket or other mechanical device.

My invention is designed principally for installing molded or cast concrete piles, but it may be extended to the installation of timber piles or of columns constructed of any material without violating the spirit of my invention.

I claim:—

1. The combination of the cylindrical metal drilling tube D adapted to be rotated downwardly into the ground and the head *h—h'* which is secured to the top thereof and completely covers and hermetically seals the same, said head being provided with the port *a* and the removable cover *c* adapted to fit air tight thereon, substantially as described.

2. The combination of the cylindrical metal drilling tube D adapted to be rotated downwardly into the ground and a head therefor which is constructed in skeleton form and is so secured to said tube at the top thereof as to be easily and quickly removable therefrom, substantially as described.

3. The combination of the hollow cylindrical drilling tube D adapted to be rotated on its vertical axis downwardly into the ground and provided with the cutting edge *d;* the head *h—h'* which is secured to the top of said tube and hermetically seals the same; the port *a* in said head and the removable cover *c* fitting tightly thereon; the pipe *p* attached to the pipe *p'* by the swivel collar *s* and adapted to conduct a stream of air or water through the head into the tube D; and the handles or clamps *e e';* substantially as described.

EDGAR W. MINTER.

Witnesses:
CLIFFORD H. ROBERSON,
J. ALFRED ANGUS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."