

June 11, 1940.

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2,203,978

MEANS AND METHOD OF SHORING BELL BOTTOM PILE HOLES

Filed Oct. 15, 1938

2 Sheets-Sheet 1

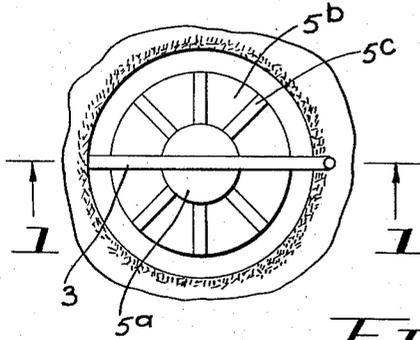


Fig. 2

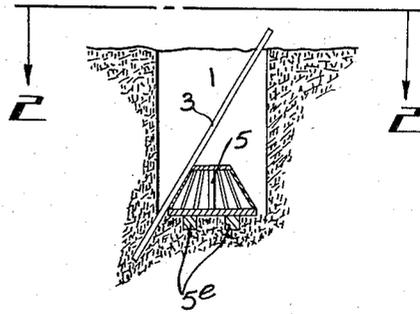


Fig. 1

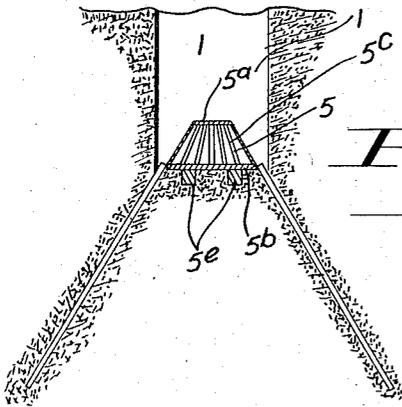


Fig. 3



Fig. 4

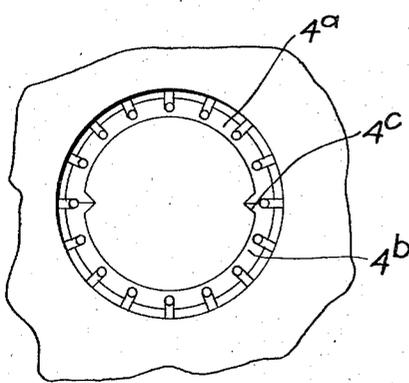


Fig. 5

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2 Sheets-Sheet 2

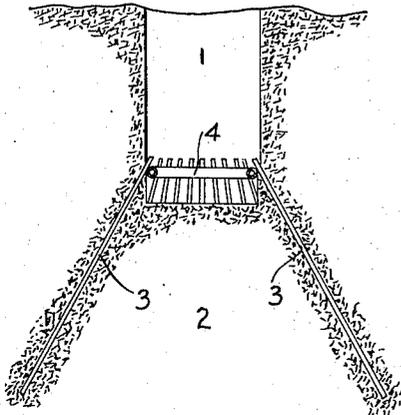


Fig. 7

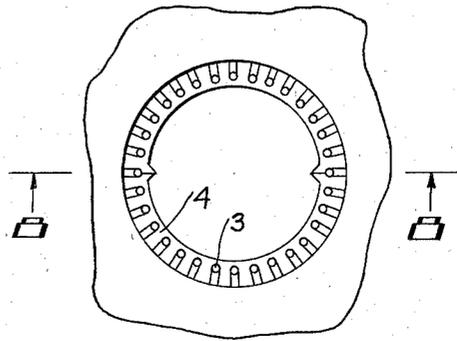


Fig. 8

Fig. 8

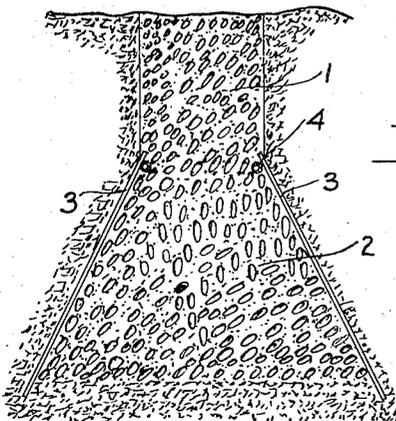
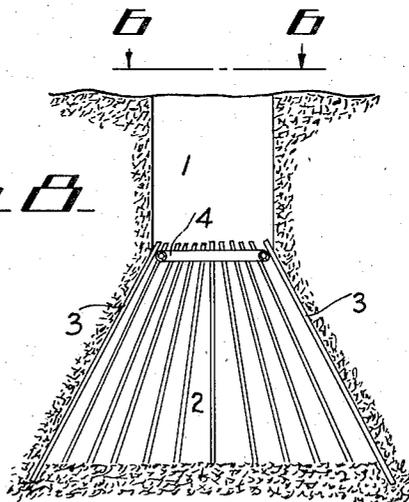


Fig. 9

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MEANS AND METHOD OF SHORING BELL BOTTOM PILE HOLES

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9 Claims. (Cl. 61—40)

My invention relates to means and method of shoring bell bottom pile holes and the objects of my invention are:

First, to provide a means of supporting the tapering walls of a bell bottom pile hole where they are to be dug in soft ground, such as sand, gravel or the like;

Second, to provide a means of this class which is placed in position for supporting the sloping wall before the dirt is removed for forming the bell shaped hole;

Third, to provide a means of this class in which a template is used for directing the positioning of the supporting shoring;

Fourth, to provide a means of this class which is applicable for use in connection with any kind of earth that is liable to cave from any cause;

Fifth, to provide a means of this class which reduces to a minimum the liability and danger of caving while a person is removing the earth in the bell bottom hole;

Sixth, to provide a novel method of supporting the roof or sides of a bell bottom hole for caisson or pile of any size or diameter in soft sandy earth;

Seventh, to provide a method of this class which is particularly adapted for sand, gravel, or earth that is liable to cave;

Eighth, to provide a method of this class in which shoring is placed in position for supporting the wall before the earth is removed;

Ninth, to provide a means of this class which is very simple and economical of construction, easy to operate, efficient in its action; and

Tenth, to provide a very economical and efficient method of this class.

With these and other objects in view as will appear hereinafter, my invention consists of the novel features of construction, combination and arrangement of parts and portions and the certain novel method as will be hereinafter described in detail and particularly set forth in the appended claims, reference being had to the accompanying drawings and to the characters of reference thereon which form a part of this application in which:

Figure 1 is a vertical sectional view of a hole arranged preparatory for preparing the bell bottom in soft material taken from the line 1—1 of Fig. 2 on a reduced scale and showing the template in position in the pre-arranged hole and with one of the shoring members ready to be started; Fig. 2 is a top or plan view taken from the line 2—2 of Fig. 1 on an enlarged scale; Fig. 3 is a vertical sectional view showing the shoring

driven into position; Fig. 4 is a similar view of that of Fig. 3 with the template removed and the shoring supporting ring shown in position ready to be placed against the upper ends of the shoring members; Fig. 5 is an enlarged top view taken from the line 5—5 of Fig. 4; Fig. 6 is a similar view showing more of the shoring in position and the ring secured at the top taken from the line 6—6 of Fig. 8 with the earth removed; Fig. 7 is a vertical sectional view on a reduced scale showing the supporting ring up in position and secured to the upper ends of the shoring members ready for the removal of the earth; Fig. 8 is a vertical sectional view of the hole ready for receiving the caisson or pile with the earth removed, on a reduced scale taken from the line 8—8 of Fig. 6; and Fig. 9 is a transverse sectional view of the hole complete with the plastic material piled therein.

Similar characters of reference refer to similar parts and portions throughout the several views of the drawings:

The initial bore 1, bell shaped hole 2, shoring members 3, supporting ring 4, and template 5, constitute the principal elements of my means and the principal elements utilized in my novel method of shoring bell bottom pile holes for soft sandy material.

My means and method of shoring bell bottom pile holes enables the casting of bell bottom piling in soft sandy material whether the material is wet, or dry or dusty.

The first step consists in drilling a bore 1 which is the initial bore with any suitable drilling tool to approximately the depth of the stem of the caisson or pile and the position where the top of the bell shape starts. This is usually a short distance. After this is accomplished, a template 5 is positioned with its base on the bottom of the additional hole 1 as shown best in Figs. 1, 2 and 3 of the drawings. This template member consists of a circular top member 5a, a circular base member 5b and a plurality of angularly positioned supporting members 5c connecting the members 5a and 5b. The angle of these members 5c determine substantially the angle of the slope of the bell shaped hole as the members 5a and 5b form the guide for driving the shoring members 3 into position. This base 5b is preferably supported on two beams 5e which rest in ditches in the earth in the bottom of the hole 1 tending to hold the template from shifting while the shoring members 3 are being driven. After the template 5 is thus positioned in the bottom of the hole 1, one of the shoring members 3 is posi-

tioned as shown best in Fig. 1 of the drawings and it is driven down so that it maintains substantially the angle between the top member 5a and base member 5b of the template 5. This can be driven by an air hammer or any means desired for driving the shoring member 3. These shoring members 3 are made of pipe which may be second grade or old pipe, or may be made of railroad ties or any scrap bar material that may be driven into the earth.

It will be here noted that in case there are too many relatively large stones to permit the driving of these members, holes may be drilled using the template for supporting the drill instead of the shoring member and the holes may be drilled to the proper position. Then the shoring members 3 may be driven into these holes prepared for them. The shoring members 3 are driven relatively close to each other to form a shoring support for the sloping wall of the bell shaped bottom hole. These shoring members 3 are driven some distance below the bottom of the finished bell shaped hole as shown best in Fig. 8 of the drawings so that they are substantially supported at their lower ends after the material is removed. As soon as the shoring is driven the template 5 is removed and dirt is removed some distance below the upper end of the shoring 3 as shown in Fig. 4 of the drawings. Then a supporting ring 4 made in two halves 4a and 4b, is lowered into the hole inside of the upper ends of the shoring members 3, after which they are placed on the bottom of the hole and welded together at the reinforced point 4c, thus forming a welded single piece ring out of the two separate pieces. This ring is then raised by jacks or by other means so that it is pressed up against the inside of the upper ends of the shoring members 3 as shown best in Fig. 7 of the drawings and it is then welded or otherwise rigidly secured to the upper ends of the shoring members 3 forming a rigid unit and supporting the upper ends of the shoring members, while the lower ends are supported in the earth in which they are driven. The earth is then removed inside of the shoring members 3 forming a bell shaped bottom for receiving cement, concrete or the like for forming the bell shaped bottom casing or pile.

It will be here noted that if there is any caving or running of the sand in the space between the pipe causing a space outside of the shoring members at or near the top of the driven shoring members, cement grouting is placed therein, filling up all of the cavity, or sheet metal is laid back of the pipe to catch the sand. Then the earth material is removed inside of the shoring members 3 as shown best in Fig. 8 of the drawings. The bell shaped hole 2 is then ready to be filled with the plastic material forming the caisson or pile. The shoring members 3 and ring 4 are left in position and form reinforcing for the outer side of the caisson or pile. However, if desired, the ring member 4 may be broken loose from the upper end of shoring members 3 and removed and the shoring members 3 may be withdrawn as the filling of the cement is proceeded with. In Fig. 9 is shown the finished hole with the pile or caisson in position showing the shoring members 3 and ring 4 in reinforcing position.

It will be here noted that the template 5 may be made of solid or hollow material and frusto-conical in shape if desired, and the ring 4 may be made in two or more pieces as desired, and the shoring member 3 may be made of any drivable

material that is strong enough to support the soft wall and prevent its caving.

Though I have shown and described a particular construction, combination and arrangement of parts and portions and a particular method, I do not wish to be limited to this particular construction, nor to the particular method, but desire to include in the scope of my invention the construction, combination and arrangement of parts and method substantially as set forth in the appended claims.

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

1. In a means for shoring bell bottom pile holes, a plurality of spaced shoring members forming a bell shaped skeleton of frusto-conical shape forming a lining support for the bell bottom hole, a reinforcing member secured near the upper ends of said shoring members for supporting said shoring members at their upper ends, said reinforcing member including an annular member made in a plurality of pieces for placing and afterwards welded to form a single annular member.

2. In a means of the class described, a frusto-conical template and a plurality of shoring members supported by said template while driving the same.

3. In a means of the class described, a frusto-conical template, a plurality of shoring members supported by said template while driving the same, and a ring member formed in several parts adapted to be drawn up against the inner end of the shoring member for supporting the same.

4. In a means of the class described, a frusto-conical shaped template forming a guide for driving shoring members, and means extending from the bottom thereof adapted to rest in grooves in the earth for stabilizing said template.

5. A method of shoring bell bottom pile holes consisting in preparing a vertical initial hole at the earth surface, then placing a template in the bottom of said hole provided with an angular outer side wall and then driving shoring members using the outer side wall of said template as a guide for said shoring members.

6. A method of shoring bell bottom pile holes consisting in preparing a vertical initial hole at the earth surface, then placing a template in the bottom of said hole provided with an angular outer side wall, then driving shoring members using the outer side wall of said template as a guide for said shoring members, then removing the template, then removing the earth some distance below the upper ends of said driven shoring members, then placing a reinforcing ring made in a plurality of pieces in said hole, then securing said plurality of pieces together, then raising said ring and securing it to the inner sides of said shoring members near their upper ends.

7. A method of shoring bell bottom pile holes consisting in preparing a vertical initial hole at the earth surface, then placing a template in the bottom of said hole provided with an angular outer side wall, then driving shoring members using the outer side wall of said template as a guide for said shoring members, then removing the template, then removing the earth some distance below the upper ends of said driven shoring members, then placing a reinforcing ring made in a plurality of pieces in said hole, then securing said plurality of pieces together, then raising said ring and securing it to the inner sides of said shoring members near their upper ends, then re-

moving the earth inside of said shoring members.

8. A method of shoring bell bottom pile holes consisting in preparing a vertical initial hole at the earth surface, then placing a template in the bottom of said hole provided with an angular outer side wall, then driving shoring members using the outer side wall of said template as a guide for said shoring members, then removing the template, then removing the earth some distance below the upper ends of said driven shoring members, then placing a reenforcing ring made in a plurality of pieces in said hole, then securing said plurality of pieces together, then raising said ring and securing it to the inner sides of said shoring members near their upper ends, then removing the earth inside of said shoring

members, then filling said bell shaped hole and said initial hole with cement.

9. A method of preparing bell bottom pile holes in soft cavable material consisting of preparing a straight vertical initial hole, then placing an angularly walled template in the bottom of said hole, then sinking shoring members into the earth on an angle with the wall of said template, then removing said template, then supporting the upper end of said shoring members, then removing the earth from the inside of said shoring members to near the bottom ends thereof, then molding said shoring members and supporting means in plastic material filling said holes.

BENJAMIN E. BERTRAN. 15