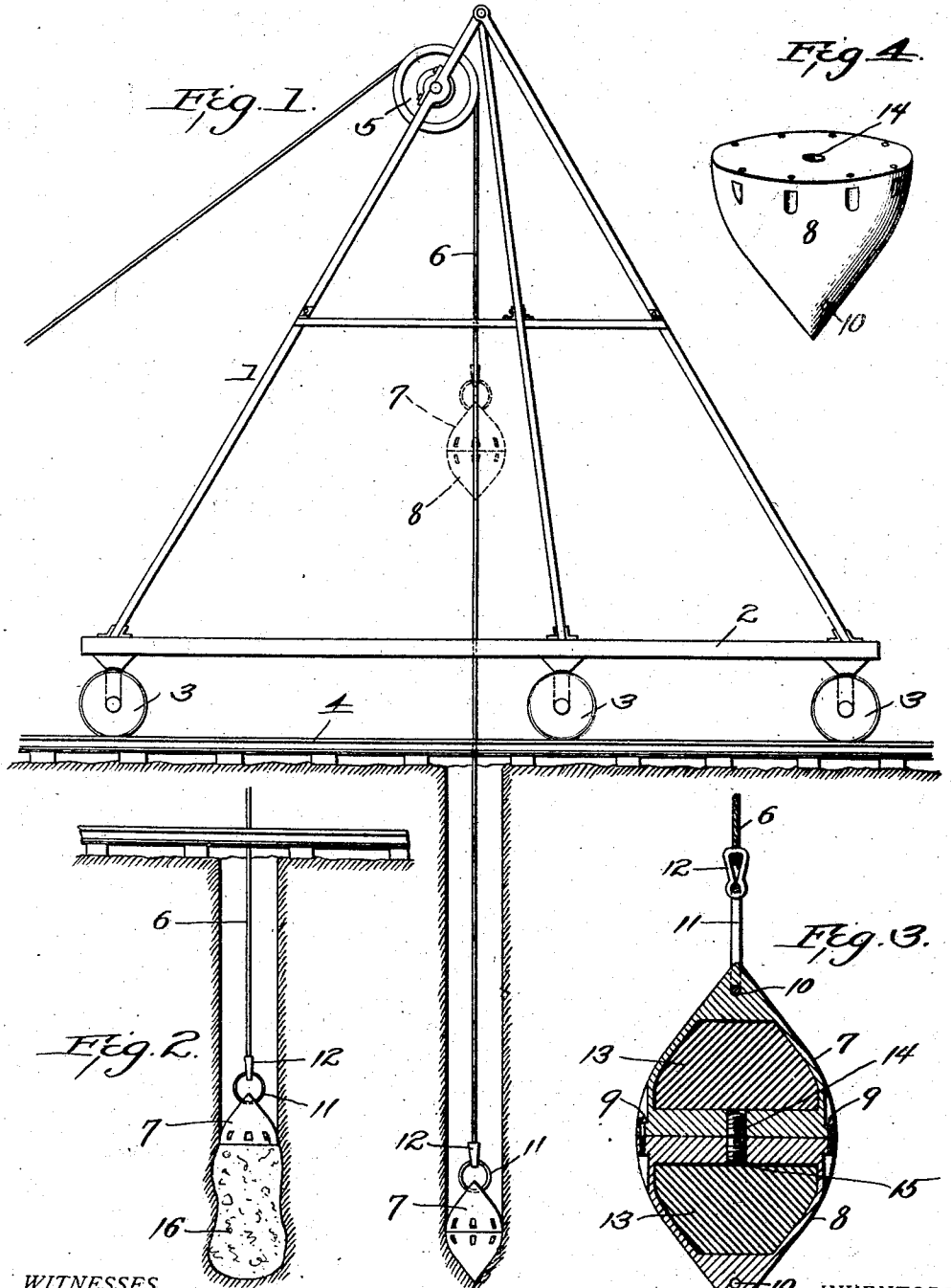


F. HENDERSON & T. L. ESSICK.
METHOD AND APPARATUS FOR FORMING CONCRETE PILES.
APPLICATION FILED SEPT. 21, 1912.

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WITNESSES

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Specification of Letters Patent.

Patented Dec. 17, 1912.

Application filed September 21, 1912. Serial No. 721,652.

To all whom it may concern:

Be it known that we, FRANK HENDERSON and THOMAS L. ESSICK, citizens of the United States, residing at Summit, in the county of Roberts and State of South Dakota, have invented certain new and useful Improvements in Methods and Apparatus for Forming Concrete Piles, of which the following is a specification.

The present invention relates to an improved method and apparatus for forming concrete piles, the object of the invention being the provision of novel means whereby the opening or hole can be readily formed in the earth and the concrete filling material firmly tamped in position therein.

A further object of the invention is to provide a novel method of forming the concrete piles involving the formation of a hole or opening by the successive dropping of a pointed weight, thereby providing the hole with laterally compacted sides, the concrete being subsequently placed in the opening and firmly tamped therein.

The invention further contemplates a compact, portable, and inexpensive apparatus by means of which the openings can be quickly formed and the concrete firmly tamped in position therein.

With these and other objects in view, the invention consists in certain novel combinations and arrangements of the parts as will more fully appear as the description proceeds, the novel features thereof being pointed out in the appended claims.

For a full understanding of the invention, reference is to be had to the following description and accompanying drawing, in which:—

Figure 1 is a side elevation of an apparatus for forming concrete piles in accordance with the present invention, the said apparatus being shown as adjusted for boring or forming an opening in the ground. Fig. 2 is a fragmentary view showing the operation of the tamper which is employed for tamping the concrete within the opening. Fig. 3 is an enlarged longitudinal sectional view through the boring element, and Fig. 4 is a detail perspective view of one of the tamping elements of which the boring member is built up.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawing by the same reference characters.

In carrying out the present invention, a

pointed weight or boring element is successively raised to a suitable elevation and then dropped in the same place so as to form an opening in the ground, the operation being repeated until an opening or hole of the required depth has been formed. The dropping of the pointed weight serves to compact the earth so that an opening is formed with firm and tightly compacted sides. The next step in carrying out the process consists in filling the opening with concrete and tamping the concrete in position within the same. For convenience in performing these various steps, the boring element is preferably formed in duplicate sections, one of which can be removed to transform the device into a tamper.

Referring to the drawings, the numeral 1 designates a frame or derrick which may be of any suitable material and construction, although in the present instance the frame is shown as in the form of a tripod and as supported by a base 2 which is mounted upon the wheels 3. These wheels 3 are adapted to travel upon a light portable track 4 so that the frame can be readily moved from place to place as may be desired. A pulley or sheave 5 is journaled upon the upper part of the frame 1, and a cable 6 passes around this sheave. One end of this cable is adapted to be connected to some suitable mechanism, such as a hoisting engine, for taking in and letting out the cable, as is required during the boring and tamping process.

When forming the opening or hole in the ground, a pointed weight is attached to the free end of the cable 6, the said weight being raised to certain heights within the limits of the derrick, or as found necessary by the character of the soil encountered, and then permitted to drop freely with the cable still attached thereto. This weight strikes against the ground and penetrates the same and form a clear cut cavity, the earth and soil in the vicinity of the open cavity being compressed. This operation of raising and dropping the pointed weight member is repeated until the desired depth of cavity is reached. This pointed weight which is used in forming the opening comprises two duplicate and interchangeable substantially conical members 7 and 8 which have the bases thereof fitted against each other, the said members being rigidly connected by suitable fastenings such as the screws 9. The apex of each of the conical

members 7 and 8 is formed with an opening 10, the said opening 10 in the upper member 7 engaging a ring 11, and the said ring 11 being connected by a dead eye 12 to the cable

6. It will also be observed that these members 7 and 8 are partly hollow and are filled with some heavy filling material such as lead 13. This lead may be poured into the interior of these members 7 and 8 through openings 14 in the ends thereof, the said openings being subsequently closed by the plugs 15.

After a cavity of the desired depth has been formed in the ground, the lower conical member 8 is removed from the upper conical member 7 so that the said member 7 presents a flat lower face and can be used as a tamper. Concrete is now poured into the cavity, as indicated at 16, the successive batches of concrete being tamped firmly in position by means of the tamper 7. As indicated by Fig. 2, as the concrete is tamped and compacted in position, it may further compress and expand the sides of the cavity so that the concrete pile will firmly engage the same and be anchored securely in position. In this operation, the tamper 7 is raised to a sufficient height above the top of the cavity to give the necessary clearance for pouring the desired mixture of concrete into the cavity, the tamper being then lowered into the cavity to a point near the top of concrete previously placed, and then worked energetically and sufficiently to thoroughly incorporate the concrete with the adjacent sides of the cavity. The concrete is thus filled into the cavity in layers and each layer energetically tamped into position, the operation being repeated until the desired length of pile is formed.

No reinforcement whatsoever is necessary for the stability of the pile and is not designed to be employed, although the method of forming the pile admits of the incorporation of reinforcing elements for the connection of the upper end of the pile with any connecting reinforcement from pile to pile, or to beams, arches, walls and the like. The use of these reinforcing elements is optional, and they may either be used or omitted as may be found necessary or desirable.

It will thus be obvious that we have provided a simple and inexpensive device for forming concrete piles, the said device being very effective in operation and having the advantage of always keeping the center line of gravity of the pile in as normal a position as is possible.

Having thus described the invention, what we claim as new and desire to secure by Letters Patent, is:—

1. The method of forming concrete piles, which consists in successively dropping a

boring element to form a cavity with compressed sides, filling the cavity thus formed with successive layers of concrete, and tamping the layers of concrete within the cavity as they are placed therein.

2. An apparatus for forming concrete piles, including a boring weight adapted to be successively dropped from an elevation to form the cavity, said boring weight being formed in detachable sections, one of which is removable to transform it into a tamper.

3. An apparatus for forming concrete piles, including a tamper, means for raising and dropping the tamper, and a boring attachment adapted to be applied to the tamper for forming the cavity.

4. An apparatus for forming concrete piles, including a pair of duplicate conical members having the bases thereof fitted together, and means for raising and dropping the said members, the two members when used in conjunction with each other serving to form the cavity in the earth, while one of the members when used independently of the other member forms a tamper.

5. An apparatus for forming concrete piles, including a pair of hollow and similar conical members, a heavy filling within the members to impart weight thereto, means for detachably fastening the bases of the conical members together with the apexes thereof extending in opposite directions, means for engaging the apex of one of the conical members for raising and dropping the same, the two conical members when secured together serving to form the cavity in the earth, while one conical member serves as a tamper.

6. An apparatus for forming concrete piles, including a derrick, a guide member upon the derrick, a cable passing around the guide member, means for taking in and letting out the cable, a pair of substantially conical weights, means for detachably securing the bases of the conical weights together with the apexes thereof facing in opposite directions, and means for connecting the apex of one of the weights to the cable whereby the weights will be raised and dropped as the cable is taken in and let out, the two weights when secured together forming a borer for producing a cavity in the earth, while one of the weights forms a tamper for tamping the concrete within the cavity.

In testimony whereof we affix our signatures in presence of two witnesses.

FRANK HENDERSON.
THOMAS L. ESSICK.

Witnesses:

ELMER HERRIED,
ANTON JYDSTRUK.