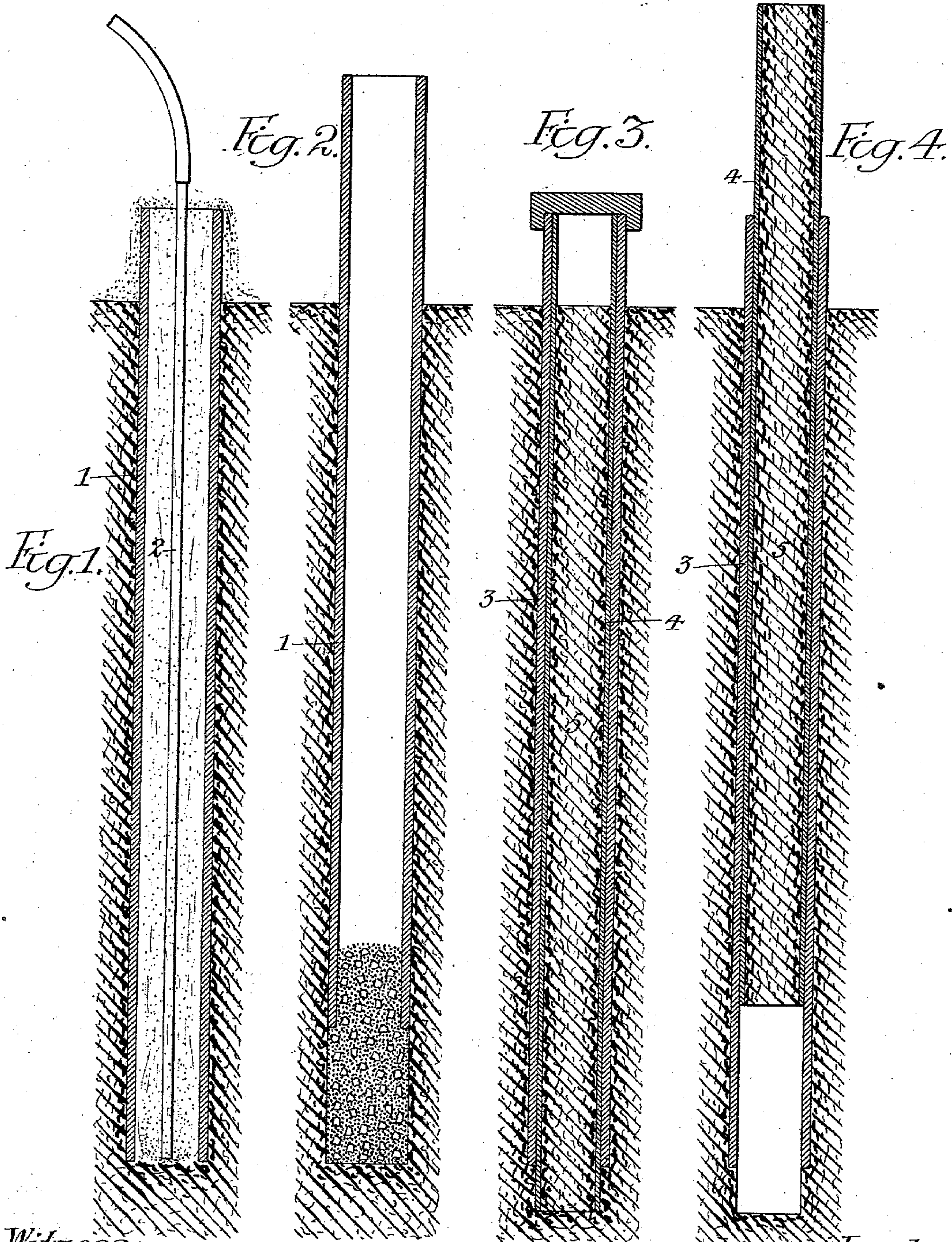


No. 753,008.

PATENTED FEB. 23, 1904.

F. SHUMAN.
FORMING CONCRETE PILES.
APPLICATION FILED DEC. 21, 1903.

NO MODEL.



Witnesses:
Hamilton D. Turner
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Inventor
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UNITED STATES PATENT OFFICE.

FRANK SHUMAN, OF PHILADELPHIA, PENNSYLVANIA.

FORMING CONCRETE PILES.

SPECIFICATION forming part of Letters Patent No. 753,008, dated February 23, 1904.

Application filed December 21, 1903. Serial No. 186,038. (No model.)

To all whom it may concern:

Be it known that I, FRANK SHUMAN, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Forming Concrete Piles, of which the following is a specification.

My invention consists of a certain improvement in or modification of that constituting the subject of my Letters Patent No. 733,337, dated July 7, 1903, the object of my present invention being to adapt some of the principles of said previously-patented invention to the formation of concrete piles in sand or other soil which offers a high resistance to the displacement caused by driving into it an ordinary solid pile or a tubular pile closed at the bottom.

In the accompanying drawings, Figure 1 is a sectional view illustrating the first stage in the formation of a concrete pile in accordance with my present invention. Fig. 2 illustrates the second stage of said process, and Figs. 3 and 4 illustrate another method of carrying out the first stage of the process.

In carrying out the process forming the subject of my patented invention above referred to a hollow pile provided with a detachable point was driven into the ground, so as to form an opening of the desired diameter therein, and the hollow pile was then withdrawn without the point and preferably by a slow or intermittent movement, and during such withdrawal the concrete was filled into the opening through the pile, the concrete being supplied in such quantity relatively to the rate of withdrawal of the pile that a head of concrete extending some distance above the lower end of the pile was maintained during such withdrawal.

In carrying out my present invention I use in sand or compact soil in place of a solid pile or a tubular pile closed at the bottom a tube open at the bottom, as such a tube can be sunk or driven into the sand or soil with much less displacement of the latter than the closed pile, and hence with a less expenditure of power.

In Fig. 1 of the drawings I have illustrated a method of sinking a tube 1 by displacing the sand or soil within the same by means of

a water-jet from a pipe 2, secured to the tube, pressure being also exerted upon the top of the tube, if desired, in order to assist the weight of the same in causing it to sink as said sand or soil is displaced. The displacing of the sand or soil within the tube by means of the water-jet may proceed simultaneously with the sinking of the tube or the tube may first be driven and the sand or soil within the same afterward displaced or removed by means of the water-jet or other means. When the tube has been sunk to the desired depth, the jet-pipe may be removed and concrete is then introduced into the tube, and when a sufficient quantity has accumulated in the lower portion of the tube the latter is withdrawn either slowly and continuously or intermittently a little at a time, the supply of concrete being continued during such withdrawal, so that it can escape into the opening below the tube, as shown in Fig. 2, until by the time the tube has been completely withdrawn the opening will be filled with concrete.

The concrete is introduced into the hollow pile at such a rate as to always maintain a head of concrete at the bottom of the same, so that in case the opening is formed in wet ground or beneath the water-level the water can gain no access to the interior of the hollow pile, but will be displaced upwardly as the concrete escapes from the lower end of the pile and into the opening. By this means caving in of the walls of the opening when the latter is formed in unstable ground is effectually prevented and the concrete pile when it becomes set is a homogeneous structure possessing all needed strength.

In Figs. 3 and 4 I have shown a tube 3, having a detachable core-tube 4. The two tubes are driven as a unit into the ground, so that a core 5, of earth, is packed tightly within the inner tube 4, as shown in Fig. 3. Hence when after the completion of the driving operation said tube 4 is withdrawn it carries said core of earth with it, as shown in Fig. 4, thus leaving the outer tube 3 clear for the reception of the concrete, which is introduced during the gradual withdrawal of the said tube 3 in the same manner as in Fig. 2. In either case the concrete can be rammed or otherwise sub-

jected to pressure, so as to compact the same and increase the solidity of the resulting pile.

Having thus described my invention, I claim and desire to secure by Letters Patent—

5 1. The mode of forming concrete piles which consists in sinking an open-bottomed tube into the ground to the proper depth, removing the earth from the interior of said tube, intro-
10 ducing the concrete into the tube, and withdrawing the latter, so that the concrete will pass from its lower end into the opening, substantially as specified.

2. The mode of forming concrete piles which consists in sinking an open-bottomed tube into
15 the ground to the proper depth, removing the earth from the interior of the tube, slowly or intermittently withdrawing the tube, and introducing concrete into the opening through said tube, as the latter is thus withdrawn, sub-
20 stantially as specified.

3. The mode of forming concrete piles which consists in sinking an open-bottomed tube into the ground to the proper depth, removing the

earth from the interior of the tube simultaneously with the sinking of the same, intro- 25
ducing concrete into the tube, and withdrawing the tube so that the concrete will pass from its lower end into the opening, substantially as specified.

4. The mode of forming concrete piles which 30
consists in sinking an open-bottomed tube into the ground to the proper depth, removing the earth from the interior of the tube simultaneously with the sinking of the same, slowly or intermittently withdrawing the tube, and 35
introducing concrete into the opening through the tube as the latter is thus withdrawn, substantially as specified.

In testimony whereof I have signed my name to this specification in the presence of two sub- 40
scribing witnesses.

FRANK SHUMAN.

Witnesses:

HENRY NOAR,
JOS. H. KLEIN.