

No. 733,335.

PATENTED JULY 7, 1903.

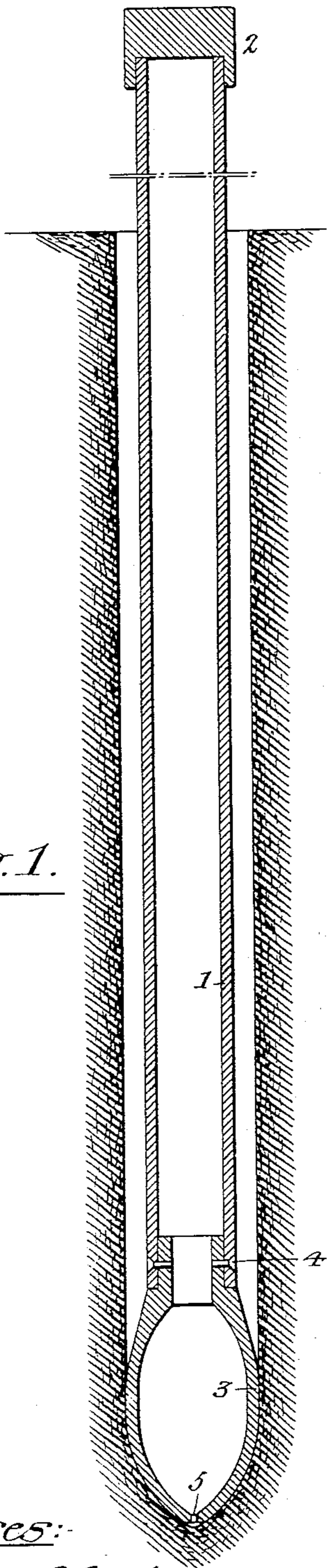
F. SHUMAN.

PROCESS OF FORMING OPENINGS IN THE GROUND.

APPLICATION FILED JUNE 4, 1903.

NO MODEL.

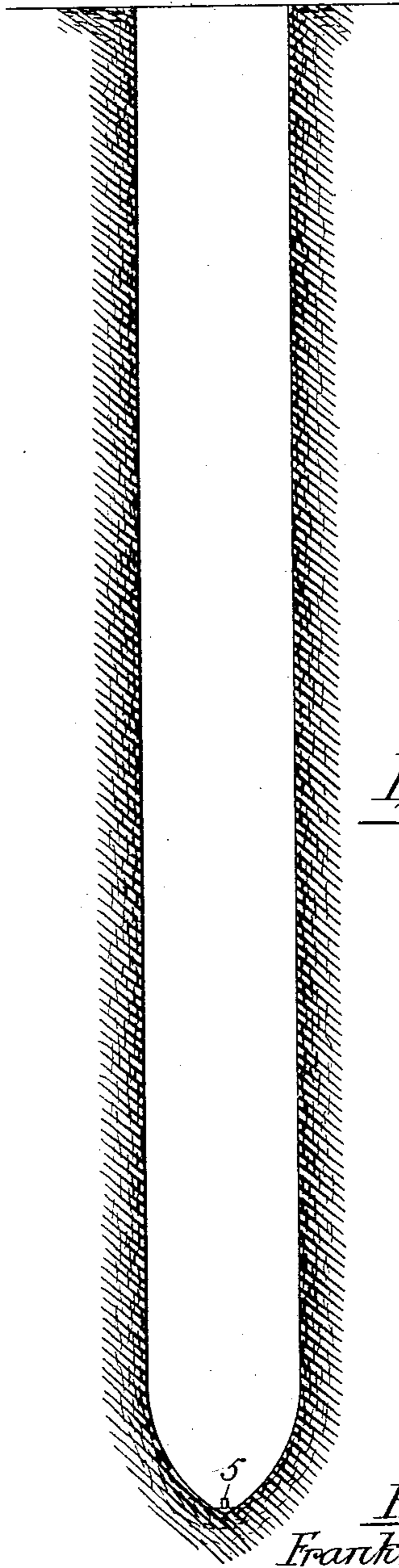
Fig. 1.



Witnesses:-

Herman C. Metius
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Fig. 2.



Inventor:-

Frank Shuman,
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UNITED STATES PATENT OFFICE.

FRANK SHUMAN, OF PHILADELPHIA, PENNSYLVANIA.

PROCESS OF FORMING OPENINGS IN THE GROUND.

SPECIFICATION forming part of Letters Patent No. 733,335, dated July 7, 1903.

Original application filed April 23, 1903, Serial No. 153,974. Divided and this application filed June 4, 1903. Serial No. 160,118. (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 an Improved Process of Forming Openings in the Ground, (the same being a division of my application Serial No. 153,974, filed April 23, 1903,) of which the following is a specification.

My invention relates to that method of forming openings in the ground for the subsequent reception of piles or posts which consists in first driving a preparatory pile into the ground and then withdrawing said preparatory pile, the object of my invention being to provide for driving or withdrawing the preparatory pile with the exercise of much less power than is required when piles of this class as heretofore constructed are used.

In the accompanying drawings, Figure 1 is a sectional view illustrating the method of forming the opening in the ground by means of a preparatory pile in accordance with my invention, and Fig. 2 is a similar view showing the opening from which the preparatory pile has been removed.

For the purpose of forming in the ground openings for the subsequent reception of permanent piles or posts the use of an ordinary wooden or metal preparatory pile of cylindrical form or tapering inwardly from top to bottom is objectionable, for the reason that the frictional hold of the earth upon the sides of the same is such that the pile cannot be driven beyond a limited distance without the exercise of destructive force and cannot be withdrawn after being driven without the exercise of still greater force, frictional hold of the earth upon the pile being now assisted by atmospheric pressure, owing to the fact that the withdrawal of the pile tends to create a partial vacuum in the opening left thereby. For this reason various forms of collapsible piles have been proposed; but such piles owing to their sectional character are necessarily limited in strength, and, moreover, do not overcome the objections of resistance to the frictional hold of the earth thereupon while they are being driven. When the pile tapers inwardly from top to bottom, there is the same resistance to the driving of the pile,

and the resistance to the withdrawal of the pile is also excessive, because owing to the atmospheric pressure the earth is caused to cling firmly to the pile, so as to increase the difficulty of starting the pile and retard its movement for some time after it is started.

In carrying out my invention, therefore, I displace the earth at and near the point of the preparatory pile to a greater extent than the diameter of said pile, thereby freeing the pile, except as to a limited area at and near the point, from any material frictional contact with the walls of the opening formed thereby, thus not only facilitating the driving of the pile, but also the withdrawal of the same. Such withdrawal is further facilitated by permitting an inflow of air into the space below the pile as said pile is withdrawn from the opening, thus preventing the frictional grip due to atmospheric pressure, and this feature of my invention may be adopted even in connection with the ordinary preparatory pile, which is not furnished with the enlarged point, since such provision materially lessens the difficulty of withdrawing said preparatory pile from the opening formed thereby.

On reference to Fig. 1 it will be observed that the preparatory pile 1 is in the form of a metal tube, although it may be a solid pile, of wood or metal, if desired, this pile being provided at the top with a suitable driving-head 2 and at the bottom with a point 3, which is of so much greater diameter than the pile, 1 that there is no likelihood of the latter coming in contact to any material extent with the walls of the opening formed by driving the pile. The point is reduced in diameter at the top, so as to provide a shoulder for engagement with the lower end of the pile, and this reduced portion of the point may, if desired, be secured to the lower end of the pile by rivets 4 or other suitable fastenings, or the pile and its point may be in one piece, if desired. The point 3 has a tapered lower end and also by preference tapers from its portion of greatest diameter inwardly to the shoulder, upon which rests the lower end of the pile 1, so that no abrupt shoulders are presented to the earth either in driving the pile or withdrawing the point. The point 3 is hollow and has an opening therein, which during the

driving of the pile may be closed at the lower end by a valve opening downwardly, this valve in the present instance consisting of a detachable plug 5, which will be released as soon as the withdrawal of the pile is attempted, so as to permit of a downward passage of air through the pile and point, thus preventing the formation of a partial vacuum in the opening below the point of the pile, and thereby relieving said point from any frictional hold of the walls of the opening thereupon due to atmospheric pressure.

Of course it will be understood that in withdrawing the pile the driving-head 2 is removed or other means are provided for permitting free ingress of air to the interior of the pile.

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

1. The method of forming holes in the ground which consists in preparing a pile with an enlarged head, driving said pile to displace the earth and thereby form a hole which is larger than the pile-stem, and then withdrawing the pile, substantially as specified.

2. The method of forming holes in the ground which consists in preparing a pile having an opening therethrough, driving said pile to displace the earth, and then withdrawing the pile and permitting a flow of air through its opening into the hole below the pile, substantially as specified.

3. The method of forming holes in the

ground which consists in preparing a pile having an opening therethrough with removable closure at the point of the pile, driving said pile to displace the earth, and then withdrawing the pile, without the removable closure, whereby flow of air through the pile, and into the hole below the same, is permitted, substantially as specified.

4. The method of forming holes in the ground which consists in preparing a pile with an enlarged head, and an opening there-through, driving said pile to displace the earth, and form a hole larger than the pile-stem, and then withdrawing the pile and permitting a flow of air into the hole below the same, substantially as specified.

5. The method of forming holes in the ground which consists in preparing a pile with an enlarged head and an opening there-through, with a removable closure at the point of the pile, driving said pile to displace the earth and form a hole larger than the pile-stem, and then withdrawing the pile, without said removable closure, thereby permitting a flow of air through the pile and into the hole below the same, substantially as specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FRANK SHUMAN.

Witnesses:

F. E. BECHTOLD,
WILL. A. BARR.