

Dec. 18, 1923.

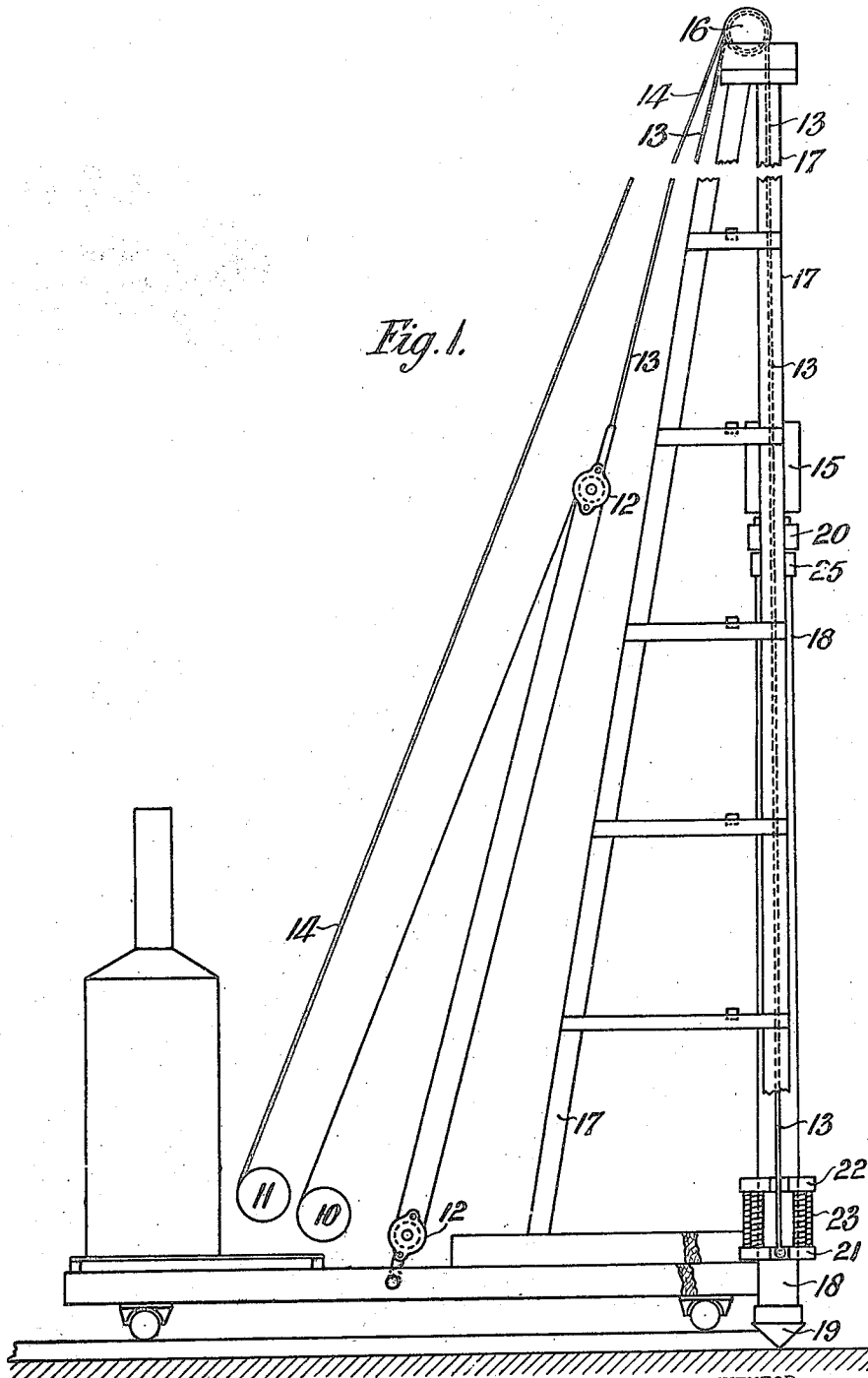
P. N. LANCASTER

1,477,568

APPARATUS FOR USE IN THE CONSTRUCTION OF CONCRETE PILES

Filed Jan. 29, 1923

3 Sheets-Sheet 1



INVENTOR

PERCY N. LANCASTER, By his Attys.,  
*Baldwin Wright*

Dec. 18, 1923.

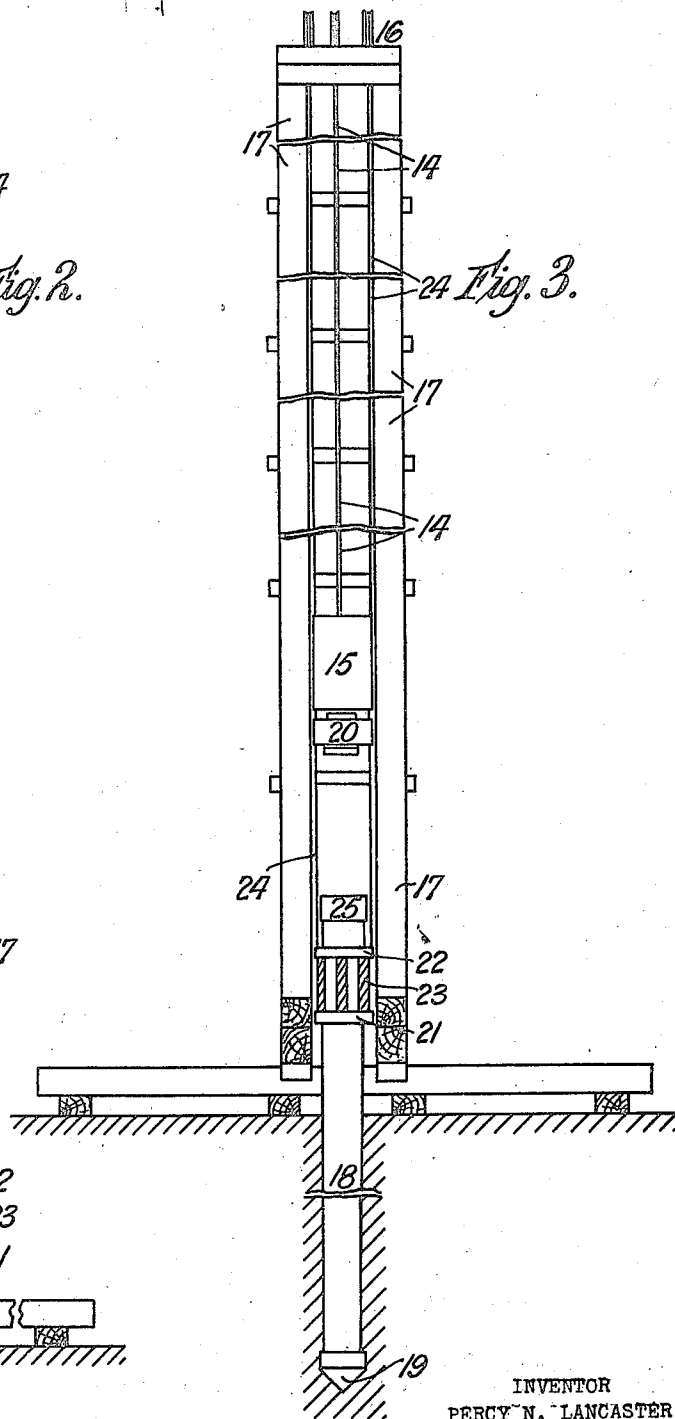
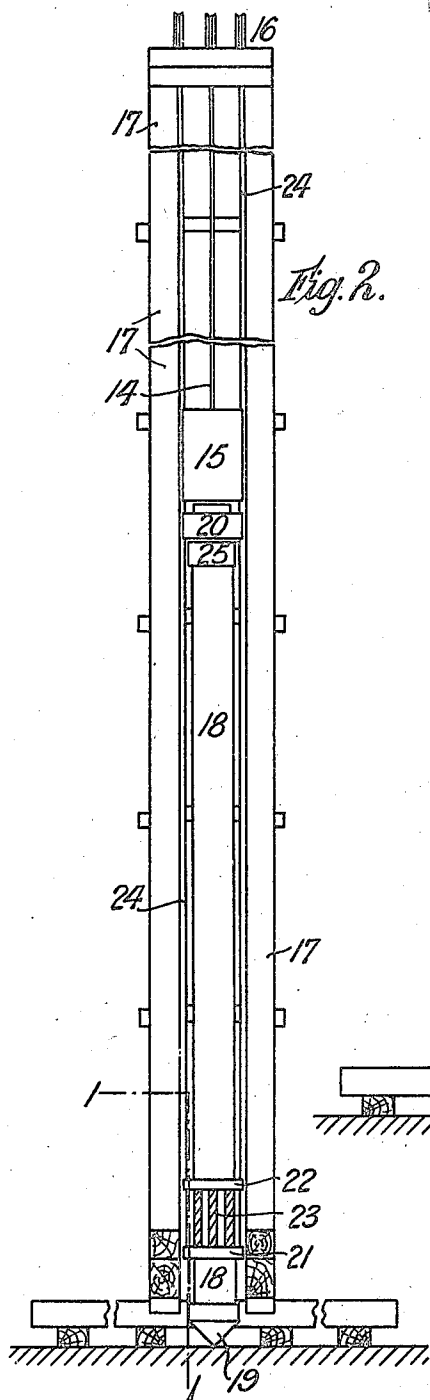
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P. N. LANCASTER

APPARATUS FOR USE IN THE CONSTRUCTION OF CONCRETE FILES

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3 Sheets-Sheet 2



INVENTOR  
PERCY N. LANCASTER  
By his Attorneys,  
*Wm. H. H. H. H.*

Dec. 18, 1923.

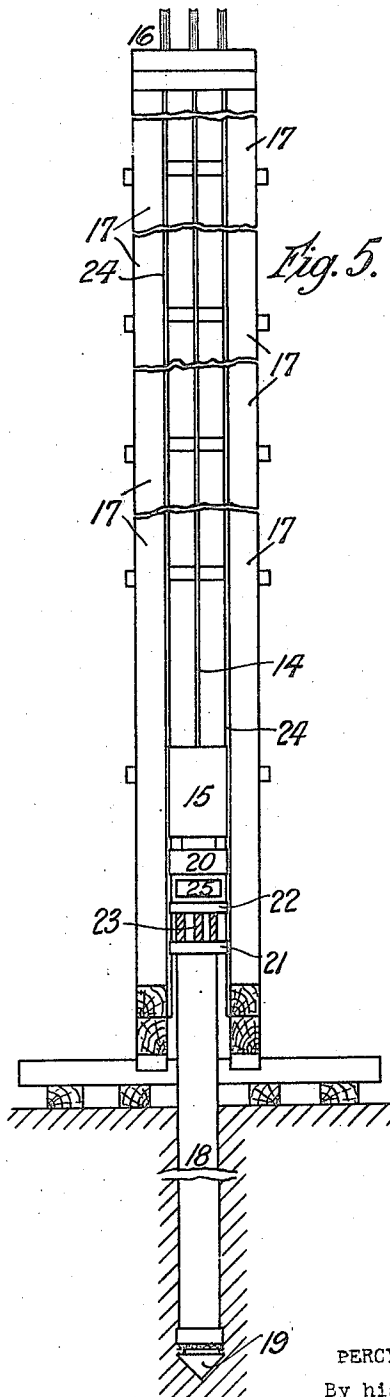
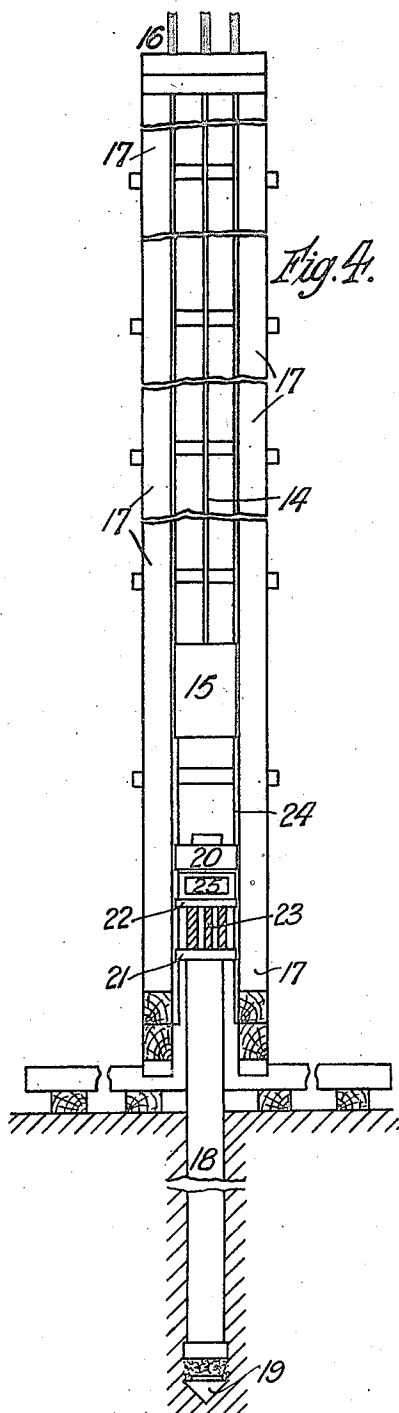
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P. N. LANCASTER

APPARATUS FOR USE IN THE CONSTRUCTION OF CONCRETE FILES

Filed Jan. 29, 1923

3 Sheets-Sheet 3



INVENTOR  
PERCY N. LANCASTER  
By his Attorneys,

*Paulson & Wright*

## UNITED STATES PATENT OFFICE.

PERCY NOEL LANCASTER, OF LONDON, ENGLAND.

## APPARATUS FOR USE IN THE CONSTRUCTION OF CONCRETE PILES.

Application filed January 29, 1923. Serial No. 615,607.

*To all whom it may concern:*

Be it known that I, PERCY NOEL LANCASTER, a subject of the King of Great Britain, residing at 104 Victoria Street, London, England, have invented new and useful Improvements in Apparatus for Use in the Construction of Concrete Piles (for which I have filed application for patent in Great Britain Dec. 1, 1921), of which the following is a specification.

This invention relates to apparatus for withdrawing the preparatory pile, and as the pile is withdrawn, tamping the concrete by moving the pile up and down.

According to this invention a spring is inserted into the withdrawal rope system between the connexion of the preparatory pile with the withdrawal ropes and the drum of the winding mechanism, which spring is not wholly compressed by the withdrawal pressure, thus allowing downward movement of the pile when pressure is exerted upon it by means of a hammer or weight.

In one arrangement a collar is fixed to the end of the preparatory pile and springs are inserted between two loose collars on the pile, and the withdrawal ropes are secured to the lower of the movable collars whilst the upper surface of the upper movable collar engages with the fixed collar on the pile.

In ordinary working such springs must be capable of taking a pull of 40 tons, by which they should not be compressed for more than half their length, the length of the springs when not in compression being usually from two and a half feet, whilst the shortening due to compression is six inches to one foot.

The usual apparatus for driving piles consists of a frame having pulleys mounted on its top for guiding ropes from the winding drum to the weight for driving the pile, and also for guiding the withdrawal ropes which after passing over the pulleys are connected to a pulley block; another rope passes round pulleys upon this pulley block and round other pulleys secured to the frame base, and thence to a winding drum.

When such an apparatus is used, springs may be inserted beneath the pulleys at the top of the frame or in the connections of the ropes and the pulley block or between the pulleys and the frame base.

In working, a constant withdrawal pressure is applied to the preparatory pile and

downward pressure is also intermittently applied either by a hammer or weight, so that when the preparatory pile is withdrawn, concrete escapes therefrom and is tamped into the hole by the downward movement of the preparatory pile.

The accompanying drawings show pile driving and withdrawing machinery and preparatory piles made in accordance with this invention. Figure 1 is a side elevation, partly in section on the line 1—1, Figure 2, and Figure 2 is a front elevation of a pile driver with the preparatory pile ready to be driven. Figure 3 is a front elevation in which the preparatory pile has been driven into the ground. Figure 4 is a front elevation showing the preparatory pile withdrawn a short distance. Figure 5 is a front elevation in which the preparatory pile shown in Figure 4 has been redriven into the ground under the action of the hammer.

In all the figures 10 and 11 are winch drums; the drum 10 for winding through sheaves 12, 12, the withdrawal ropes 13 and the drum 11 for winding rope 14 which is attached to a hammer 15, both the ropes passing over pulleys 16 at the top of the frame 17. The preparatory pile 18 has at its bottom end a shoe 19 and at its top a driving cap 20. On the preparatory pile 18 are two loose collars 21, 22, pressed apart by strong springs 23 and to the collar 21 are secured the ends of the withdrawal ropes 13 (see Figure 1). The hammer 15, the cap 20 and the collars 21 and 22 are guided in the frame by channel guides 24. The preparatory pile 18 is driven into the ground by means of the hammer 15 until it reaches the position shown in Figure 3. The winding drum 10 is then operated and the tension of the rope 13 acting on the collar 21 compresses the springs 23 and presses the collar 22 against a fixed collar 25 on the preparatory pile 18 and causes the preparatory pile 18 to be raised a short distance as shown in Figure 4. It will be noted that a portion of the concrete which has been inserted into the pile 18 has issued from the tube filling the space left by its withdrawal. The hammer 15 is then allowed to fall upon the cap 20 and compressing the springs 23 drives the preparatory pile 18 some of the distance it has been withdrawn as shown in Figure 5, the concrete being tamped by the downward movement of the pile 18. This operation is repeated until the pile 18 is wholly with-

drawn and a thoroughly consolidated concrete pile left in its place.

What I claim is:—

1. In pile withdrawing machinery, means for driving the pile, a winding mechanism, a rope adapted to withdraw the pile and connected to the winding mechanism, two collars slidably mounted on the pile, a spring between the collars, a stop fixed to the pile and adapted to engage the upper collar, and a connection between the lower collar and the rope.

2. In pile withdrawing machinery, means for driving the pile, a winding mechanism, a rope adapted to withdraw the pile and connected to the pile and the winding mechanism, and a spring inserted in the rope between the two connections, which spring is compressed by the tension applied to the withdrawal rope and also by the intermittent action of the pile driving means.

3. In pile withdrawing machinery, means for driving the pile, a winding mechanism, a rope adapted to withdraw the pile and connected to the winding mechanism, two collars slidably mounted on the pile, a spring between the collars, which spring is compressed by the tension applied to the withdrawal rope and also by the intermittent action of the pile driving means, a stop fixed to the pile and adapted to engage the upper collar, and a connection between the lower collar and the rope.

4. In pile withdrawing machinery, means for driving the pile, a winding mechanism, a rope adapted to withdraw the pile and connected to the pile and the winding mechanism, and a spring inserted in the rope between the two connections, which spring is compressed by the tension applied to the withdrawal rope but allows a downward movement of the pile.

5. In pile withdrawing machinery, means for driving the pile, a winding mechanism, a rope adapted to withdraw the pile and connected to the winding mechanism, two collars slidably mounted on the pile, a spring between the collars, which spring is compressed by the tension applied to the withdrawal rope but allows a downward movement of the pile, a stop fixed to the pile and adapted to engage the upper collar, and a connection between the lower collar and the rope.

6. In pile withdrawing machinery, a winding mechanism having two drums, a pile driving hammer, a rope connecting one drum to said hammer, another rope connecting the other drum to the pile, and a

spring inserted in the withdrawal rope between the latter drum and the pile.

7. In pile withdrawing machinery, a winding mechanism having two drums, a pile driving hammer, a rope connecting one drum to said hammer, another rope connecting the other drum to the pile, and a spring inserted in the withdrawal rope between the latter drum and the pile, which spring is compressed by the tension applied to the withdrawal rope and also by the intermittent action of the pile driving means.

8. In pile withdrawing machinery, a winding mechanism having two drums, a pile driving hammer, a rope connecting one drum to said hammer, another rope connecting the other drum to the pile, and a spring inserted in the withdrawal rope between the latter drum and the pile, which spring is compressed by the tension applied to the withdrawal rope but allows a downward movement of the pile.

9. In pile withdrawing machinery, a winding mechanism having two drums, a pile driving hammer, a rope connecting one drum to a hammer, two collars slidably mounted on the pile, a spring between the two collars, a stop fixed to the pile and adapted to engage the upper collar, and another rope connecting the lower collar to the other drum.

10. In pile withdrawing machinery, a winding mechanism having two drums, a rope connecting one drum to a pile driving hammer, two collars slidably mounted on the pile, a spring between the two collars, which spring is compressed by the tension applied to the withdrawal rope and also by the intermittent action of the pile driving hammer, a stop fixed to the pile and adapted to engage the upper collar, and another rope connecting the lower collar to the other drum.

11. In pile withdrawing machinery, a winding mechanism having two drums, a rope connecting one drum to a pile driving hammer, two collars slidably mounted on the pile, a spring between the two collars, which spring is compressed by the tension applied to the withdrawal rope but allows a downward movement of the pile, a stop fixed to the pile and adapted to engage the upper collar, and another rope connecting the lower collar to the other drum.

In testimony that I claim the foregoing as my invention I have signed my name this 18th day of January, 1923.

PERCY NOEL LANCASTER.