T. W. RIDLEY.

PILE.

APPLICATION FILED MAR. 28, 1914.

1,120,974.

Patented Dec. 15, 1914.

2 SHEETS—SHEET 1.

Fig. 1.

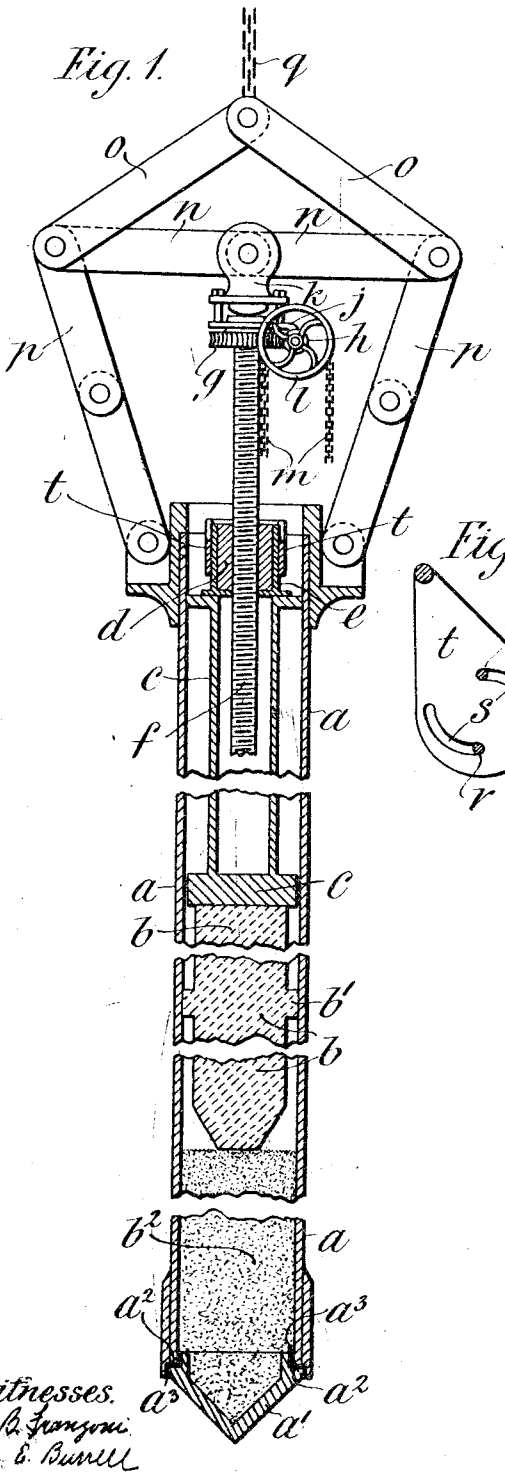
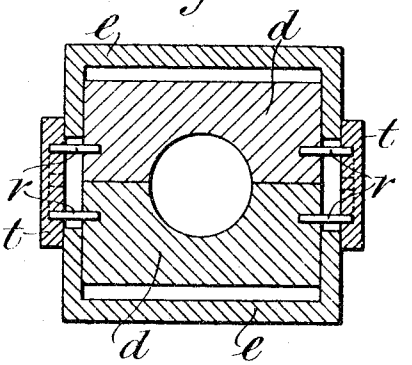


Fig. 3.

Fig. 2.



Witnesses.
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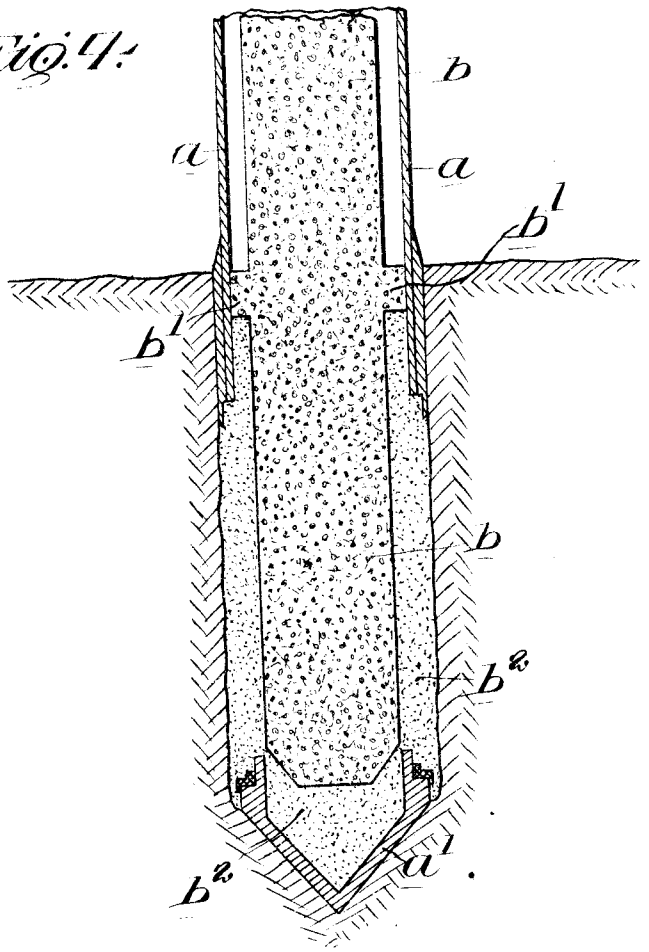
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2 SHEETS—SHEET 2.

Fig. 4.



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UNITED STATES PATENT OFFICE.

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1,120,974. Specification of Letters Patent. Patented Dec. 15, 1914.

Application filed March 28, 1914. Serial No. 827,895.

To all whom it may concern:

Be it known that I, THOMAS WILLIAM RIDLEY, a subject of the King of Great Britain, residing at 67 Marton road, Middlesbrough, in the county of York, England, have invented a new and useful Improvement in Piles, of which the following is a specification.

Two methods of introducing concrete piles into the ground are now commonly employed. In one method the pile is formed in a mold and allowed to set and the solid pile is then driven into the ground in a similar manner to a wooden pile. In the other method a preparatory tubular pile is driven into the ground, is filled with concrete and is then withdrawn leaving the concrete in place. According to this invention these two methods are combined. A tubular preparatory pile is first driven into the ground and is partly filled with liquid concrete. A solid concrete pile of less diameter than the tube is then introduced into the preparatory pile and is forced by pressure into the liquid concrete and the preparatory pile is withdrawn or preferably the solid pile is forced downward simultaneously with the withdrawal of the preparatory pile. A solid pile of wood or other material may be substituted for the solid concrete pile but this is not usually desirable. The method for forcing down the solid pile and withdrawing the preparatory pile it is preferred to adopt is that described in an application filed on the 13th of January 1914 Serial No. 811,925.

Figure 1 is a vertical section showing a pile in the process of being driven and formed according to this invention. Fig. 2 is a horizontal section of the split nut and its box on a larger scale. Fig. 3 is a sectional elevation showing the cam grooves for operating the split nut. Fig. 4 is a vertical section, showing how the permanent or solid pile is driven, the preparatory pile withdrawn, and the concrete made to rise around the permanent pile during the withdrawal of the preparatory pile.

a is the tubular preparatory pile and a' is its head.

a^2 is compressible fibrous packing such as Tuck's packing and a^3 is plastic packing such as clay.

b is a solid concrete pile having a flange b' around it such flange being a loose fit in tube a.

b^2 is concrete made of fine material and in a very plastic or semi-liquid condition.

The tube a with its head a' is first driven into the ground in the ordinary way and when it has reached the required depth the concrete b^2 is poured into it. The solid pile b is then lowered into the tube a. In some cases the weight of the pile b is sufficient to cause it to descend through the concrete b^2 the latter being forced up into the annular space between the pile b and the tube a but usually it is necessary or desirable to apply force to cause the pile b to descend and the drawings show the means it is preferred to adopt namely those described in the pending application above referred to.

c is a rammer resting on the top of the pile b.

d is a split nut contained in a box e at the top of the rammer.

f is a screw working in the nut, and g is a worm wheel fixed to the top of the screw.

h is a worm gearing with the worm wheel and revolving in bearings in a frame j fixed to the short link k.

l is a chain wheel fixed to the worm and m is an endless chain by which it can be revolved.

The bottom of the link k rests on the top of the screw f and takes its thrust while its upper end is pivoted to one end of the links n whose other ends are connected by the links o and p to the lifting chain q and to the preparatory pile a. When the chain q is hauled up to withdraw the preparatory pile a then as described in the U. S. specification No. 1,078,000 the link connections force the rammer c downward and this downward movement of the rammer can be increased or diminished by turning the chain wheel l.

The halves of the split nut d have fixed to them pins r which engage with cam grooves s in the ends of a strap t so that by giving the strap a quarter turn the halves of the nut are separated. As the pile b descends and the tube a rises the concrete b^2 surrounds the pile b and occupies the space before taken up by the thickness of the tube a. The flange b' on the pile b after a time acts as a rammer on the top of the concrete b^2 and assists in consolidating it and forces it against the surrounding earth. Fig. 4 shows this operation and indicates how the concrete is disposed after the preparatory pile has been withdrawn.

What I claim is:—

1. The method of placing piles in the ground consisting in driving a tubular preparatory pile, partially filling said tubular pile with freely flowing plastic concrete, inserting in the tubular pile a solid pile an upper part of which is of a diameter substantially equal to the interior of the tubular pile and the lower part of which is of less diameter than the interior diameter of said tubular pile and then forcibly driving the solid pile downward and thus forcing the plastic concrete upward into the space between the tubular pile and the solid one and confining it within the space below the larger part of the solid pile.

2. The method of placing piles in the ground, consisting in driving a tubular pile, partially filling said tubular pile with concrete, inserting in the tubular pile a solid pile having a lower portion of materially less diameter than the tubular pile, forcing the solid pile into the concrete to cause the latter to rise and fill the space between the solid pile and the tubular pile and then applying pressure to the top of the concrete, preventing the latter from moving upward and causing it to spread and fill the space in the ground between the solid pile and the ground previously formed by the descent of the tubular pile and left vacant by the withdrawal of the tubular pile.

3. The method of placing concrete piles in the ground consisting in driving a tubular preparatory pile, partially filling said tubular pile with plastic concrete, inserting in the tubular pile a solid pile of less diameter than the interior diameter of said tubular pile, forcibly driving the solid pile downward to thus force the plastic concrete upward in the space between the tubular pile and the solid one by means attached to the solid pile and then applying pressure on the concrete thus raised around the solid pile to cause the concrete in the lower portion of the tubular pile to pass outward while the tubular pile is being withdrawn and fill the annular space in the ground between the solid pile and the ground formed by the descent of the tubular pile and left vacant by the withdrawal of the tubular pile.

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