J. M. LEIGHTON.

CONSTRUCTION OF CONCRETE PILES.

APPLICATION FILED MAR. 5, 1912.

1,179,943. Patented Apr. 18, 1916.

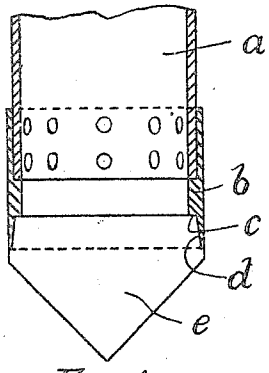


FIG. 1.

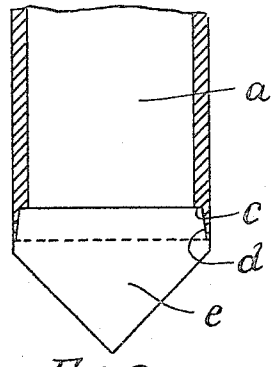


FIG. 2.

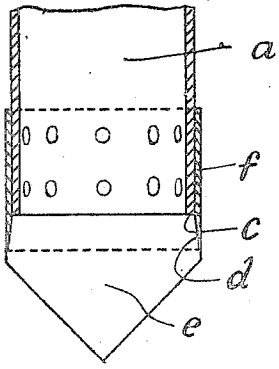


FIG. 3.

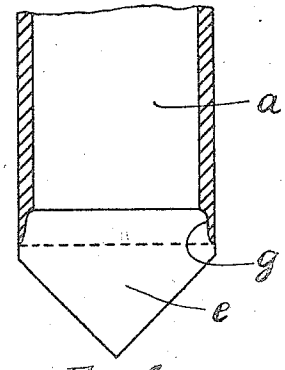


FIG. 4.

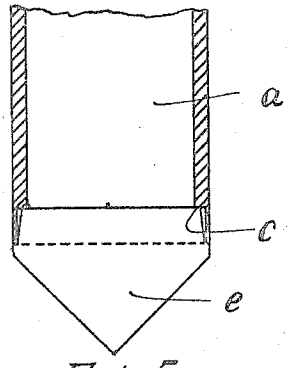


FIG. 5.

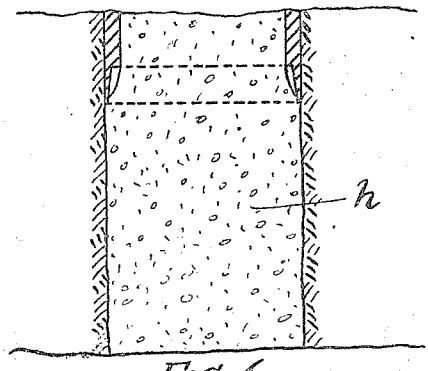


FIG. 6.

Witnesses:
O. F. Nagel.
H. G. Dieterich

Inventor:
John Murray Leighton.
By Wiedersheim & Fairbanks
Attorneys.

UNITED STATES PATENT OFFICE.

JOHN MURRAY LEIGHTON, OF BELFAST, IRELAND, ASSIGNOR TO CONCRETE PILING LTD., OF LONDON, ENGLAND.

CONSTRUCTION OF CONCRETE PILES.

1,179,943. Specification of Letters Patent. Patented Apr. 18, 1916.

Application filed March 5, 1912. Serial No. 681,764.

To all whom it may concern:

Be it known that I, JOHN MURRAY LEIGHTON, a subject of the King of Great Britain and Ireland, residing at Belfast, Ireland, have invented certain new and useful Improvements in the Construction of Concrete Piles, of which the following is a specification.

This invention relates to concrete piles of the kind constructed by driving a hollow tube which is fitted during driving with a loose point or shoe, placing concrete in the tube and then withdrawing the tube, the concrete flowing out and filling the opening thus made in the ground to form the permanent concrete pile.

The object of this invention is the construction of such piles of a more uniform sectional area throughout their length. For this purpose a tube is used having no internal projections whereby the flow of concrete may be checked or retarded. The tube is enlarged internally at its lower end and has a square or other internal driving shoulder to bear on the driving point or shoe during the introduction of the tube into the ground. From this shoulder the bore of the tube expands toward the end which may thereby be brought to a comparatively sharp edge.

In order that my invention may be properly understood I have appended an explanatory sheet of drawings whereon:

Figure 1 is a vertical section of the end of the tube "*a*" showing a sleeve "*b*" with shoulder "*c*" and outward splay "*d*" the loose point or shoe "*e*" being in position as for driving. Fig. 2 shows the shoulder "*c*" and outward splay "*d*" formed in the thickness of the tube "*a*" itself. Fig. 3 shows the band "*f*" attached to the tube "*a*" the end of which forms the shoulder "*c*" the outward splay "*d*" being formed on the band. Fig. 4 shows a modification applicable to Figs. 1, 2 and 3, the curved driving surface "*g*" being substituted for the shoulder and splay. Fig. 5 is a modification of the foregoing figures showing the expanded part of parallel or uniform bore. Fig. 6 illustrates the withdrawal of the tube "*a*" and the formation of the concrete pile "*h*" in the ground by which it will be observed that the concrete flows out in a volume substantially equal to the volume of the opening made in the ground.

The thickness of the tube may be increased externally at the lower end as illustrated in Fig. 1 preferably by connecting to the tube "*a*" a sleeve "*b*" of similar bore. This sleeve "*b*" is recessed out at the top to receive the end of the tube "*a*" to which it would be riveted or otherwise secured; the shoulder "*c*" and the expansion is formed in the sleeve "*b*". This sleeve "*b*" would be preferably made of a harder metal than the tube "*a*" so as to better withstand the wear that takes place on the surface which comes in contact with the shoe "*e*".

The shoulder and expansion of the bore may be formed by a short band "*f*" equal in bore to the outside dimensions of the tube "*a*" as illustrated in Fig. 3. This band "*f*" would be riveted or otherwise secured to the tube "*a*" and allowed to project a short distance below the end of same. The end of the tube "*a*" would then form the shoulder "*c*" and the further expansion of the bore would take place in the projecting portion of the band "*f*".

As a further alternative the square shoulder "*c*" may be omitted and the internally splayed surface "*g*" at the end of the tube or sleeve brought in contact with the shoe "*e*" in which case the splayed surface "*g*" would preferably be of a curved section as shown at "*g*" in Fig. 4. It may however be a plain splay without any curving formation.

It may be desirable in certain circumstances to have a small thickness of metal at the end of the tube and the shoulder enlarged to any desirable size and to such an extent as to leave no splay on the expanded part of the lower end of the tube or sleeve as shown at "*c*" Fig. 5.

The loose shoe "*e*" closely contacts with the expanded surface inside the tube "*a*" or sleeve "*b*" and protects its reduced edge during driving.

The tube "*a*" with the expanded sleeve "*b*" and the separate driving point or shoe "*e*" is driven filled with concrete and withdrawn by means of any suitable appliance. The separate driving point or shoe may be left in the ground or be recoverable through the tube before the concrete is filled into it. As the tube is withdrawn the concrete issues from it in a volume closely approximating to the sectional area of the hole made by the tube; this hole is therefore instantly filled with concrete. There is no period

such as occurs when the stream of concrete is of considerably lesser volume than the hole made in the ground during which the sides of the hole are left momentarily unsupported and therefore liable in soft spongy soil to close in on the stream of concrete before it has fully expanded and so reduce the sectional area of the pile just at the point where greatest strength is needed.

It will be noticed that with this invention a pile of larger sectional area is formed in the ground relatively to the size of the opening made by the tube than is possible with a tube without the improvements herein set forth: the essential features being the expansion of the bore of the tube at its lower end to the greatest desirable extent in the construction of concrete piles in the ground by means of a hollow tube fitted during driving with a loose driving shoe or driving point.

Having now fully described my invention, what I claim and desire to secure by Letters Patent is:—

For forming concrete piles *in situ*, a driving tube or preparatory pile having its wall of a thickness to permit of it being driven into the ground and an interior shoulder at its lower end for engagement with a separate point, the wall of the lower end of the tube or pile from the shoulder downward being reduced in thickness internally so that the lower end of the tube has an interior diameter approximating the exterior diameter of periphery of the tube, said lower end portion of the tube, below the shoulder, causing the column of concrete in the tube, during its passage through said lower portion and previous to its issuing therefrom, to increase in diameter to approximately the diameter of the hole left in the ground by the withdrawal of the preparatory tube or pipe, so that the concrete issuing from the tube will approximately fill said hole.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN MURRAY LEIGHTON.

Witnesses:

ALEXANDER HAMILTON,

ANDREW HAMILTON.