PATENT SPECIFICATION

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COMPLETE SPECIFICATION

Improvements in and relating to Concrete Friction Piles

I, JOHN THOMAS CHESTER, a British Subject, of 4B, Robinson Road, Singapore, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to concrete friction piles and has for its object to provide such devices of large frictional area, especially although not exclusively for use on mud foundation, in replacement of jungle swamp poles such for example as those called "Bakau."

In general, a concrete friction pile in accordance with the invention comprises a pre-cast toe of suitable and desired shape, having an upper surface which has projecting upwardly therefrom one or more integral narrow walls or slab portions each having one or more transverse downwardly extending notches from the upper edge or edges, together with any desired number of separate interlocking units, each constituted by a narrow slab transversely notched on its lower and upper edges. The thickness of the integral wall or slab portions of the toe and of the interlocking units is slightly less than that of the transverse notches and further the notches have such depth that the lowest unit when fitted in position, that is, by the interlocking engagement of the notches between the respective parts, becomes solid with the said toe, as also does the next succeeding interlocking unit and so on, so that a pile of desired length, solid throughout, is built up.

In this manner and according to the particular arrangement given, the toe with its uprising notched wall or walls and by interfitting the vertically extending units, the pile of any desired length built up can be used for its particular purpose and loading.

The pile may be concerned with only one upstanding wall or part slab on the toe or with more than one such upstanding wall or part slab on the toe, in the latter case these walls being adequately spaced apart.

In the result, there is built up a pile of any desired length which is a cross between a pre-cast pile of desired length and a cast-*in-situ* pile of desired length. In other words, given the toe there can be superimposed upon the various parts as they are driven, as many interlocking units as may be desired, in accordance with the exact structure of the pile.

The toe may be of any design. In its pre-cast form it may be inverted pyramidal, inverted conical, truncated pyramidal, truncated conical, cylindrical or otherwise mass-formed according to the exact nature of the foundation to be dealt with.

Whatever the actual formation of the toe, it has one or more upstanding, what have hereinbefore been termed walls or part slabs, integral therewith, symmetrically or otherwise arranged and each possessing a transverse notch or spaced notches for the inter-engagement of notched units coming thereabove to build up a consolidated pile.

In a simple method of carrying the invention into effect, the toe is of inverted pyramidal form and the base has extending upwardly therefrom in a central position between two boundaries of the base of an inverted square pyramid, a centrally disposed part slab or wall transversely notched to half its depth. The co-operating vertically extensible interlocking unit has its lower formation similarly notched to engage in the said notch so that the sides and ends of the notches (with clearance) coincide and that the lower end of the unit contacts with the surface of the toe.

Thereafter, similar interlocking units are superposed (for example successively at right angles) to build up a pile of any desired height. With the transverse

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angle of the notches at 90°, thus it will be appreciated that the cross-section is cruciform throughout.

The structure as previously outlined can be duplicated by two spaced-apart slabs or walls integral with the toe, each having possibly two or more notches so that by a criss-cross arrangement slabs similarly notched in their lower and upper edges inter-engage to build up the pile proper. This leaves a main central space if the notches are two per edge.

However, obviously there may be more than two per edge so that, starting from the toe there may be more than two notches and the interlocking units may be similarly constructed for the purpose.

The invention is not confined to the above but may have many modifications. In order that the invention may be better understood, it will now be described with reference to the accompanying drawings, which are given by way of example only and in which:—

Fig. 1 shows a perspective view of a simple form of pile constructed according to the invention,

Figs. 2 and 3 being similar views of the toe and vertically extending unit therefor,

Figs. 4, 5 and 6 are similar views to Figs. 1, 2 and 3, but of a more complicated structure.

Referring to Figs. 1 to 3 of the drawings, in this case the toe proper 7 is pre-cast and is of inverted square pyramidal form with a blunt point. Its base 8 has in a symmetrical centre position projecting therefrom a wall or part slab 9 extending upwardly therefrom of desired width with a central transverse right angular notch 10.

The width of the wall or part slab 9 in the example given is roughly one third of the base 8. The height of the wall is roughly two thirds of the said base, and the depth of the notch 10 and its width are also roughly one third of the said base 8.,

There is also provided, to as many as are desired, slab members 11. Roughly each has a width slightly less than that of the notch 10 and four times its height. Consequently, when such slab is located in position it stands upon the base 8, the surfaces of its lowermost notch 12 contact with those of the notch 10, and its upper notch 13 is ready to receive another member similar to that shown in Fig. 3 for transverse arrangement and direct contact.

In this way the pile as shown in Fig. 1 of any desired length is built up except that to give a flush upper surface the uppermost slab member is halved by a member 11a so that it does not project above the other slab member 11 therebelow.

As will be realised, the structure as outlined in Figs. 1, 2 and 3 can be duplicated laterally and transversely, that is to say, in place of one wall of part slab 9 there may be two such as shown in Fig. 5 at 14.

These two walls or part slabs 14 are notched in the upper surfaces to receive correspondingly notched slabs 15 (Fig. 6). There are thus two such slabs on each level and above one pair of slabs there is another pair of slabs transversely and at right angles thereto. In this case also the uppermost slabs 15a are what may be termed half slabs to bring the structure up to a level surface.

Apart from the whole of the above, it will be realised there may be more than two upstanding walls such as 14 with their superimposed notched slabs to give a long continuous vertical pile.

Again, any hollow spaces that are present between the slabs, such for example as the central space shown in Fig. 4, can be used for inspection purposes with a lowered lamp or otherwise, although these may be filled in.

Although for convenience of construction it is preferred that the various members intersect at right angles, they may intersect at other angles, preferably regular angles, so that although the transverse notches preferably come at 90° to the general lay of the slabs, they may come at other angles.

To increase the frictional effect of the pile, the outer surfaces of the slabs may be notched, serrated, corrugated, or otherwise.

The invention is not limited to the precise forms or details of construction herein described, as these may be varied to suit particular requirements.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A concrete friction pile comprising a pre-cast toe of suitable and desired shape having an upper surface which has projecting upwardly therefrom one or more integral narrow walls or slab portions each having one or more transverse downwardly extending notches from the upper edge or edges, together with any desired number of separate interlocking units, each constituted by a narrow slab transversely notched on its lower and upper edges, and in which the thickness of the integral wall or slab portions of the toe and of the interlocking units is slightly less than that of the transverse notches

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angle of the notches at 90°, thus it will be appreciated that the cross-section is cruciform throughout.

The structure as previously outlined can be duplicated by two spaced-apart slabs or walls integral with the toe, each having possibly two or more notches so that by a criss-cross arrangement slabs similarly notched in their lower and upper edges inter-engage to build up the pile proper. This leaves a main central space if the notches are two per edge.

However, obviously there may be more than two per edge so that, starting from the toe there may be more than two notches and the interlocking units may be similarly constructed for the purpose.

The invention is not confined to the above but may have many modifications. In order that the invention may be better understood, it will now be described with reference to the accompanying drawings, which are given by way of example only and in which:—

Fig. 1 shows a perspective view of a simple form of pile constructed according to the invention,

Figs. 2 and 3 being similar views of the toe and vertically extending unit therefor,

Figs. 4, 5 and 6 are similar views to Figs. 1, 2 and 3, but of a more complicated structure.

Referring to Figs. 1 to 3 of the drawings, in this case the toe proper 7 is pre-cast and is of inverted square pyramidal form with a blunt point. Its base 8 has in a symmetrical centre position projecting therefrom a wall or part slab 9 extending upwardly therefrom of desired width with a central transverse right angular notch 10.

The width of the wall or part slab 9 in the example given is roughly one third of the base 8. The height of the wall is roughly two thirds of the said base, and the depth of the notch 10 and its width are also roughly one third of the said base 8.,

There is also provided, to as many as are desired, slab members 11. Roughly each has a width slightly less than that of the notch 10 and four times its height. Consequently, when such slab is located in position it stands upon the base 8, the surfaces of its lowermost notch 12 contact with those of the notch 10, and its upper notch 13 is ready to receive another member similar to that shown in Fig. 3 for transverse arrangement and direct contact.

In this way the pile as shown in Fig. 1 of any desired length is built up except that to give a flush upper surface the uppermost slab member is halved by a member 11a so that it does not project above the other slab member 11 therebelow.

As will be realised, the structure as outlined in Figs. 1, 2 and 3 can be duplicated laterally and transversely, that is to say, in place of one wall of part slab 9 there may be two such as shown in Fig. 5 at 14.

These two walls or part slabs 14 are notched in the upper surfaces to receive correspondingly notched slabs 15 (Fig. 6). There are thus two such slabs on each level and above one pair of slabs there is another pair of slabs transversely and at right angles thereto. In this case also the uppermost slabs 15a are what may be termed half slabs to bring the structure up to a level surface.

Apart from the whole of the above, it will be realised there may be more than two upstanding walls such as 14 with their superimposed notched slabs to give a long continuous vertical pile.

Again, any hollow spaces that are present between the slabs, such for example as the central space shown in Fig. 4, can be used for inspection purposes with a lowered lamp or otherwise, although these may be filled in.

Although for convenience of construction it is preferred that the various members intersect at right angles, they may intersect at other angles, preferably regular angles, so that although the transverse notches preferably come at 90° to the general lay of the slabs, they may come at other angles.

To increase the frictional effect of the pile, the outer surfaces of the slabs may be notched, serrated, corrugated, or otherwise.

The invention is not limited to the precise forms or details of construction herein described, as these may be varied to suit particular requirements.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A concrete friction pile comprising a pre-cast toe of suitable and desired shape having an upper surface which has projecting upwardly therefrom one or more integral narrow walls or slab portions each having one or more transverse downwardly extending notches from the upper edge or edges, together with any desired number of separate interlocking units, each constituted by a narrow slab transversely notched on its lower and upper edges, and in which the thickness of the integral wall or slab portions of the toe and of the interlocking units is slightly less than that of the transverse notches

therein, and in which the notches have such depth that the lowest unit when fitted in position becomes solid with the said toe, and in which the next succeeding unit becomes solid with the under unit and thus with the said toe to build a pile of desired length solid throughout, for the purposes set forth.

2. A concrete friction pile as claimed in claim 1, in which there is one upstanding wall or part slab integral with the toe, for the purposes set forth.

3. A concrete friction pile as claimed in claim 1, in which there is more than one upstanding wall or part slab integral with the toe, and in which these walls or part slabs are spaced apart, for the purposes set forth.

4. A concrete friction pile as claimed in any of the preceding claims, in which the toe is of inverted pyramidal, inverted conical, truncated pyramidal, truncated conical, cylindrical, or other form, for the purposes set forth.

5. A concrete friction pile as claimed in any of the preceding claims, in which the notched engagement between the inter-engaging parts of the pile is transversely at right angles.

6. A concrete friction pile as claimed in any of the preceding claims 1 to 4, in which the notched engagement between the inter-engaging parts of the pile is transversely at angles other than right angles.

7. A concrete friction pile as claimed in any of the preceding claims, and especially claim 5 or 6, in which, when engaged, the upper sub-units form a solid pile, for the purposes set forth.

8. A concrete friction pile as herein described and shown in Figs. 1, 2 and 3 of the accompanying drawings.

9. A concrete friction pile as herein described and shown in Figs. 4, 5 and 6 of the accompanying drawings.

Dated this 28th day of October, 1947.

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