

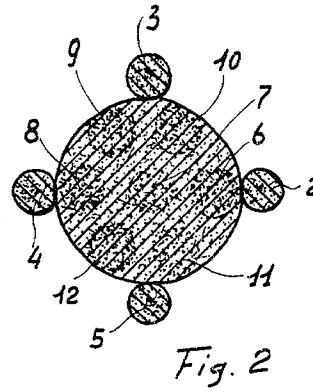
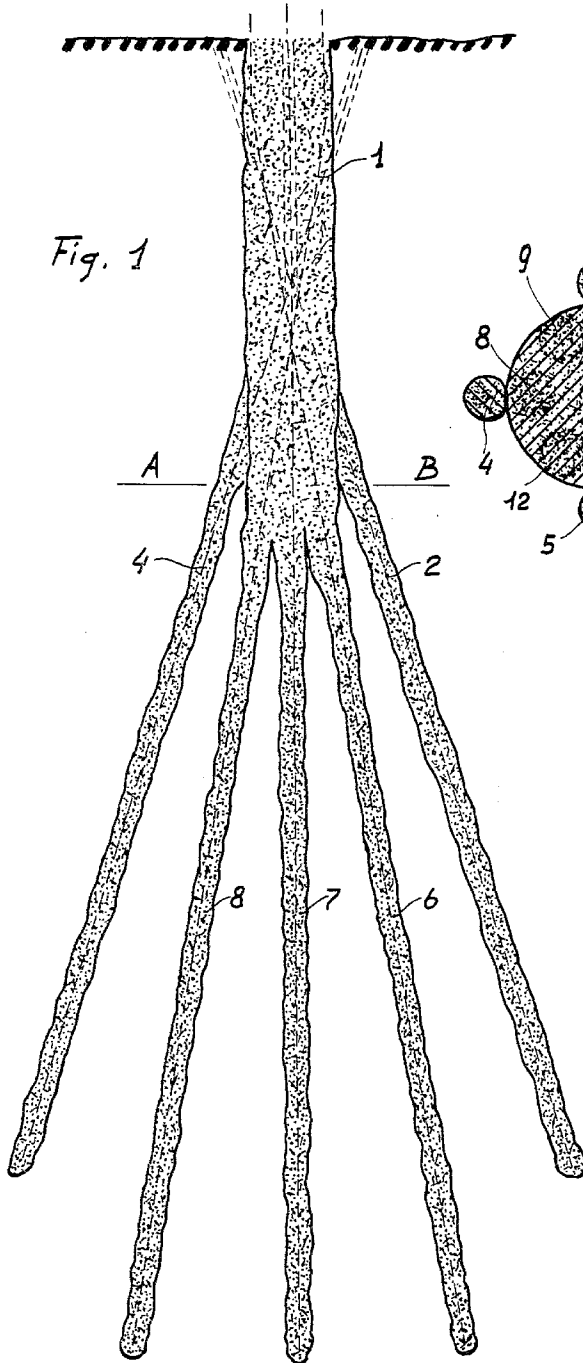
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FOUNDATION PILE

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FOUNDATION PILE

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The present invention relates to foundation piles and its main object is to provide foundation piles comprising an upper solid portion and a lower portion branching out in a plurality of smaller diameter stumps.

It is known the use, in carrying out foundations for construction works, of piles made of concrete, prepared in the field, and successively driven into the ground, or else directly poured in situ, after boring the ground. In most cases, when no bed of rock or of particularly resisting soil may be found, on which to prop and abut the foot of the pile or foundation, the capacity of said pile to support a load is essentially based on the resistance that arises by adherence, between the lateral surface of the pile and the adjacent soil. Consequently the load carrying capacity of the pile will be the higher as the greater will be the extension of the contact surface with the ground.

For this reason there are often used piles of rather large diameter, when the load carrying capacity of the pile has to be great. On the other side however, it has to be noted that with increasing pile diameter, while its circumference, which actually defines the friction surface, increases directly with the diameter, the pile cross-section, which determines its cost, increases with the diameter square. Hence the convenience, when carrying out a foundation, to employ several piles of small diameter rather than a small number of large diameter piles.

However, in some particularly important cases, there are used piles of a remarkable diameter because of the fact that said piles, besides carrying the normal vertical loads, are capable to better withstand eventual tangential stresses in correspondence with the region of application of the building superstructures. Moreover, if the foundation pile diameter is rather large, the load stresses in said attachment region are maintained within reduced limits, what is highly desirable.

As a result of the foregoing remarks, it is convenient to have foundation piles, having a suitable load carrying capacity in their upper portion, for the reason already set out above, while in depth, the tangential stresses acting on the very pile, have a tendency to decrease by effect of the supporting action exercised by the ground. However, in the depth, it is more desirable the possibility of having a maximum development of the contact surface between pile and ground, inasmuch as this is what determines the load carrying capacity of the pile.

It is the object of the present invention a foundation pile which is in accordance with the above mentioned requisites, and namely same is constituted by an upper portion having a remarkable diameter, so as to withstand very well even to the tangential stresses, while the lower portion of said pile is constituted by a certain number of smaller diameter, vertical or inclined, roots or stumps and such that the perimetrical total development of this plurality of stumps be remarkably higher than the perimetrical development of the solid upper large diameter stalk.

The accompanying drawing illustrates diagrammatically and in the way of an example, a pile according to the invention, and precisely:

FIG. 1 shows an axial section of a pile according to the invention, and

FIG. 2 shows the cross-section of said pile, taken along the line A-B in FIG. 1.

As it is apparent from the FIG. 1, in the drawing, the

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pile according to the invention comprises an upper portion 1, of a rather large diameter, remaining practically the same over all its length, while to said first portion there follows a second portion formed by a plurality of smaller diameter stumps, such as those shown with 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12, in the drawing. From FIGURES 1 and 2 taken together, it can be seen that the smaller diameter stumps 8, 9, 10, 6, 11 and 12 comprise a first group of branch members which are integral with the upper portion 1 at their upper ends and extend downwardly therefrom to a greater depth. The stumps or branches 8, 9, 10, 6, 11 and 12 approximately converge at their upper ends and extend downwardly and outwardly at an angle of inclination to the axis of the upper portion 1 so as to define a generally conical surface substantially concentric relative to the upper portion 1. It will further be seen from the drawings that the smaller diameter stumps 2, 3, 4 and 5 comprise a second group of branch members which are integral with the upper portion 1 at their upper ends and extend downwardly therefrom to a greater depth. The stumps or branches 2, 3, 4 and 5 also approximately converge at their upper ends and extend downwardly and outwardly at a greater angle of inclination to the upper portion 1 than the first group of branches so as to define a second generally conical surface which surrounds the first group of branch members and is substantially concentric with respect thereto.

As already mentioned above, such stumps, branching out from the upper stalk of the pile, may have an inclined position, with a larger or lesser opening, according to cases, or else they may even be parallel to one another; however, in all cases, there will be obtained what was sought, namely that the upper portion be particularly adapted to withstand especially transverse and tangential stresses, while the lower portion offers a great friction resistance with the ground and therefore can carry very high loads. In this way there are achieved with a limited amount of materials, for instance concrete foundation piles capable of carrying very high loads.

It is also an object of the present invention the way of realising such piles: according to same, by means of standard facilities, there is bored a hole having the diameter and depth of the upper portion 1 of the piles, and the concrete or another similar material is directly poured therein. Successively, said stalk 1 is bored itself and these borings extend in the ground below it, in the number and with a predetermined path in order to realize the plurality of lower stumps constituting the deeper portion of the pile; and in these borings there is poured the concrete to form the corresponding smaller diameter stumps, thus obtaining in a simple way and with a reduced amount of material, foundation piles according to the invention, and capable to withstand easily to all stresses.

According to a variant for the realization of these piles first all the boring work is carried out; that is first there is bored a large hole to a depth corresponding to the portion 1, and successively there are bored also the deeper and smaller holes for the stumps with the successive reference numbers and then there is simultaneously poured the concrete for both the small diameter stumps and the upper solid, large diameter, stalk of the pile.

Of course, these methods of obtaining these piles have no limiting value inasmuch as said piles may also be realized using prefabricated elements whether made of concrete, metal or wood, and in the upper stalk there can be foreseen suitable recesses for successively realizing the lower stumps; all these variants however, will all fall into the scope of the present invention.

There is also foreseen, in embodying piles according to the present invention, and in order to obtain a first compacting of the footing of said upper stalk of the pile,

from which there are to be branched the lower stumps, to subject the upper stalk to a certain load and thereafter, that is upon obtainment of the compacting of the foot of said upper stalk, there are bored the holes for obtaining the lower multiple branch stumps of the pile.

What I claim is:

1. A foundation pile for construction works comprising an upper stalk extending downwardly into the ground to a relatively shallow depth, a first group of branch members which are integral with said stalk at their upper ends and extend downwardly therefrom to a greater depth, said members being arranged so as to approach one another and thereby approximately converge at their upper ends and to extend downwardly and outwardly at an angle of inclination to the axis of said stalk so as to define an approximately conical surface substantially concentric with respect to said stalk, and a second group of branch members which are integral with said stalk at their upper ends and extend downwardly therefrom to a greater depth, said second branch members being arranged so as to approach one another and thereby approximately converge at their upper ends and to extend downwardly and outwardly at a greater angle of inclination to the axis of said upper stalk than said first group of branch members so as to define a second approximately conical

surface surrounding said first group of branch members and substantially concentric with respect thereto.

2. A foundation pile of the type set forth in claim 1 wherein said upper stalk comprises a relatively large diameter cylindrical member.

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