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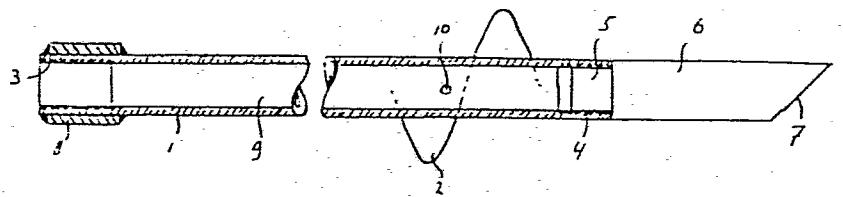
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54 **Method of arranging a ground anchor into the ground and ground anchor intended for carrying out said method.**

57 A method of arranging a ground anchor in the ground, said anchor comprising a shank and at least one helically extending blade on the outer side of said shank, the shank with the blade being screwed into the ground wherein after the ground anchor is screwed into the ground, air or gas is first injected into the ground surrounding the blade, after which a hardening fluid is injected.



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Method of arranging a ground anchor into the ground and ground anchor intended for carrying out said method.

The invention relates to a method of arranging a ground anchor into
5 the ground, said anchor comprising a shank and at least one helical blade arranged on the outer side of said shank, the shank with the blade being screwed into the ground.

Such a ground anchor as described, for example, in German Patent Application 1,634,671 is employed for many purposes, for example, for fixing
10 or anchoring dam walls along channels and rivers, for anchoring high masts, air halls and the like. Although such anchors screwed into the ground generally have a satisfying effect, the force that can be exerted on such anchors always strongly depends upon the conditions of the ground into which the anchor is screwed. During drilling operations it has been found, in
15 practice that even at small intervals appreciable differences in the solidity of the ground can be assessed.

The invention has for its object to provide a method of the kind set forth by which the ground anchor can be arranged in a simple manner such that in addition a satisfactory ground condition is safeguarded so that optimum
20 fixation of the ground anchor in the ground is invariably obtained.

According to the invention this can be achieved in that after the ground anchor is screwed into the ground first air or gas is injected into the ground surrounding the blade, after which a hardening fluid is injected.

The air or the gas will drive out any water contained in the soil
25 surrounding the ground anchor so that the subsequently injected fluid can

penetrate into the surrounding soil over a large distance away from the ground anchor without mixing with water. As a result an effective consolidation of the soil around the ground anchor and an effective fixation of the ground anchor are obtained.

5 Hardening fluids solidifying within a comparatively short time after injection into the ground are known, for example, from German Patent Application 2,819,974 and 2,820,963.

10 A particularly suitable ground anchor for carrying out the method according to the invention is obtained, when the shank has, over at least part of its length, a passage which is open at least near the top side of the anchor and which communicates with the external side of the anchor through at least one bore located near the helical blade. Thus the hardening fluid can be injected through the passage and the bore into the ground surrounding the anchor.

15 The invention will be described more fully hereinafter with reference to an embodiment of the ground anchor in accordance with the invention shown schematically in the accompanying Figure.

20 The ground anchor illustrated in the Figure comprises a hollow shank 1 surrounded over part of its circumference in known manner by a helical blade 2. In the embodiment shown the hollow shank 1 has at both ends inner screwthread 3 and 4 respectively. Into the lower end of the shank with the screwthread 4 is screwed a correspondingly screwthreaded end 5 of a closing piece 6 for the shank. The closing piece 6 has a bevelled tip 7. Obviously, the lower end of the shank may be closed in a different manner, 25 for example, by welding the closing piece 6 to the shank or, for example by flattening and/or sealing by welding the lower end of the shank 1.

30 The top end of the shank is surrounded by a rectangular or square block 8 having a bore for receiving the top end of the shank. The block 8 is welded to the top end of the shank. The block 8 may be used for mounting a tool for screwing the anchor into the ground.

 The Figure shows furthermore that near the blade at least one more or less helically extending bore is provided in the wall of the shank 1 so that the passage 9 in the interior of the shank communicates with the

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outer side of the ground anchor through said more or less radial bore 10. In general, a plurality of such bores will be provided along the length and the circumference of the shank.

After the anchor shown in the Figure is screwed into the ground in a manner known per se, a hose or the like can be connected with the open top end of the passage so that with the aid of a pump or the like air or gas can first be injected through the passage 9 and the bore(s) 10 into the ground surrounding the anchor. The introduced air will drive away the water contained in the ground surrounding the ground anchor. Subsequently with the aid of a pump or by means of pressurized air or the like a fluid can be injected through the passage 9 and the bore(s) 10 into the ground surrounding the ground anchor. The composition of the fluid employed is such that after a comparatively short time this fluid will solidify in the ground so that the ground surrounding the anchor is consolidated. By using a comparatively thin-liquid fluid all cracks set free of any ground water in the ground surrounding the anchor will be effectively filled with this fluid so that a particularly effective consolidation of the ground surrounding the anchor is obtained., which has a positive effect on the magnitude of the force that can be absorbed by the anchor, when after the solidification of the fluid the materials to be supported by the anchor are coupled with the top end of the shank of the anchor remaining in the ground.

It has been found that by supplanting the ground water the soil surrounding the ground anchor prior to the injection of the fluid an improved penetration of the hardening fluid in the ground is obtained. As a matter or course, after the introduction of air or gas into the ground surrounding the anchor the pressure of the air or the gas in the passage of the ground anchor will preferably be maintained during the change-over from the injection of air or gas to the injection of the fluid.

As a matter of course further developments and/or modifications of the embodiment described above are possible. For example, it will be preferred to provide bores 10 beneath and above the blade 2 in order to obtain consolidation of the ground both beneath and above the blade, which is particularly important when in use the anchor may be exposed both to tensile and pressing forces.

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The blade 2 may, of course, be designed so that it extends through more than 360° around the shank.

As an alternative, the shank may be provided with a plurality of blades overlapping one another in the direction of length of the shank.

- 5 By injecting fluid between the overlapping parts of the blades, the ground located between said blades will be solidified, which is advantageous for withstanding both tensile and pressing forces. As a matter of course, also in this case the injection can be carried out beneath and above the lower and upper blades respectively by providing suitable bores
- 10 10 in the shank.

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Claims

1. A method of arranging a ground anchor in the ground, said anchor comprising a shank and at least one helically extending blade on the outer side of said shank, the shank with the blade being screwed into the ground, characterized in that after the ground anchor is screwed into the ground,
5 air or gas is first injected into the ground surrounding the blade, after which a hardening fluid is injected.
2. A method as claimed in claim 1, characterized in that the injection is carried out through the hollow shank.
3. A ground anchor particularly intended for use in the method claimed
10 in claim 1 characterized in that the shank has, over at least part of its length, at least one passage which is open near the top side of the anchor and which communicates with the external side of the anchor through at least one hole located near the helical blade in the wall of the shank.

