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AN IMPROVED GROUND ANCHOR

This application relates to an improved ground anchor to facilitate the drive-in of the ground anchor. The prototype of the ground anchor was applied for patent in the United States, on November 10, 1983, bearing Serial Number 06/550,312, now still pending. According to the prototype, a pile with an anchor is provided. The ground anchor is driven into a depth and slightly pulled backward so that its swingable arms stretch out and anchors themselves in the ground. The pile is substantially a hollow elongate tube. The bore inside the tube provides a path to pump water into the ground to wash away the soil in the vicinity of the arms to facilitate further drive-in of the anchor. This invention is an improvement of the prototype.

In use of the ground anchor according to this invention, a front section including the anchor must first be driven into the ground to a depth until the driving force can no longer be transmitted to the front section. Then a first connecting unit is connected to the rear end of the front section. This makes it possible to drive the anchor to a greater depth. And then further connecting units may be added and the procedure is repeated until the anchor is driven to the desired depth. This invention mainly consists in the improvement of the front section.

This invention will be better understood when read in connection with the accompanying drawing in which:

BRIEF DESCRIPTION OF THE DRAWING

- Fig. 1 is a perspective view of this invention;
5 Fig. 2 is a fragmentary view of this invention;
Fig. 3 is a longitudinal section of this invention;
Fig. 4 is an embodiment of this invention.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENT

With reference to the drawing, the aforesaid front
10 section according to this invention mainly comprises
an anchor head (1), an plurality of outwardly swingable
arms (2), a hollow rod (3), a double threaded nut (9),
a thrust bearing (10), and a socket (11). At the tip
end of the anchor head (1) there is provided a drill
15 bit (4). The drill bit is provided with a water
outlet (5). The front end of the anchor head (1) is
internally provided with internal thread to engage with
the drill bit (4), whereas its rear end is externally
threaded to engage with the nut (9). The rear end of
20 the nut (9) is in connection with the anterior end of
the rod (3). A ball bearing (10) is received at the
anterior end of the rod (3). The rear portion of the
rod (3) is enlarged, and majority of the remaining

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portion of smaller diameter is nested in a socket (11).
Between the enlarged portion of the rod (3) and the
socket (11) there are two washers (13). These elements
are all formed by steel material. The socket (11)
5 is provided with a plurality of bores extending along
its wall, in each of which there is a steel rod (12).
The steel rods are welded and thus fixed in the bores.
These rods can be prestressed so that a pulling force
can be exerted by these rods to the finished above-
10 ground structure.

In operation, the front section comprising these
elements is driven into the ground by conventional
means to a depth until the power transmission can no
longer reach it. Then a connecting unit is connected
15 to the rear end of the rod (3). Preferably each
connecting unit comprises a connector (21), which is
externally threaded at both ends, and a connecting tube
(22), which is internally threaded at both ends. A
plurality of such units may be added until the desired
20 anchoring depth is reached. The front section, together
with the following series of connecting units, makes
an entire pile. Because of the hollow elements, a
channel is defined in the pipe, and water can be
introduced from the rear end of the pipe to the anchor
25 to wash away the soil to facilitate the drilling.
Upstream of the water outlet (5) there is provided a
spring-loaded ball (8), biased by a spring (7) to

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serve as a check valve of the water path to guard the anchor against backflow of the water pumped into the ground. A water pipe (15) is provided beside one of the steel rods (12). The pipe (15) extends from the rod (3) to the above ground position. It is not an indispensable element, but it can help remove the soil. The connector (21) and connecting tube (22) can be welded together to avoid the loosening of their joint. Reference numeral (14) refers to the welding seam. The length of the steel rods corresponds to the drive-in depth of the anchor. After the anchorage of the above ground structure is finished, if it is desired, the connecting units can be removed, leaving but the steel rods (12) (which may be pre-stressed) in the ground, so that the above-ground structure is firmly anchored. The bearing (10) can facilitate the rod (13) to be screwed into the nut (9) without causing undesired corotation of the latter.

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Claims.

1. A ground anchor means for anchoring an above-ground structure, comprising a front section with an anchor at its front end, and a plurality of like connecting units connected in series behind said front section, said front section and said connecting units being centrally hollow to define a channel from the rear end of the rearmost connecting unit to the front end of said front section, said front section comprising drilling means at its tip end, and a plurality of arms, one end of each said arm being pivoted to a definite spot of said front section so as to be able to swing within a range of no more than 90 degrees between a first position where each said arm lies substantially parallel to the axial direction of said front section with its free end pointing to the rear end of the rearmost connecting unit, and a second position where each said arm extends outwardly and radially and intersects with the central axis of said front section at an angle no more than 90 degrees, characterised in that said front section comprises elements arranged in series including a first element, of which the front end defines a drill bit and has an outlet for said channel, a second element to which said arms are pivotally mounted, the front end of



said element being engageable with the rear end of said first element, a third element, in the form of a double-thread nut, with its both ends internally threaded and its front end being engageable with the rear end of said second element, a fourth element with its front end engageable with the rear end of said third element and its rear end having an enlarged outer diameter, a fifth element in form of a socket encircling the majority of the length of the fourth element, said fifth element being provided with a plurality of rods extending axially and rearwardly to the rear end of the rearmost connecting unit.

2. The ground anchor means according to claim 1, further comprising bearing means disposed at the entrance of the rear end of said third element to avoid the corotation of said third and fourth elements when the latter is screwed into the former.

3. The ground anchor means according to claim 1, wherein the interior of said first and second element is structured and provided with means to allow a fluid to flow only in the direction toward the outlet of said first element.

4. The ground anchor means according to claim 1, further comprising a water pipe extending from the rear



end of the rearmost connecting unit to the rear end and outside of said fourth element.

5. A ground anchor means for anchoring an above-ground structure comprising a plurality of aligned interconnected units having anchor blades towards a forward end and located behind a drill head so as to be foldable inwards as the drill operates and anchor means is forwarded into the ground but foldable outwards to engage the ground when the anchor means has reached a desired portion; the interconnected units (a) jointly defining an axial bore for conveying water to, and through, the drill head (b) including a non-rotary surround and (c) being provided at the upper end with an interconnecting adaptation for an axial extension unit.

6. A ground anchor member as claimed in any of claims 1 to 5 and substantially as herein described with reference to the accompanying drawings.

