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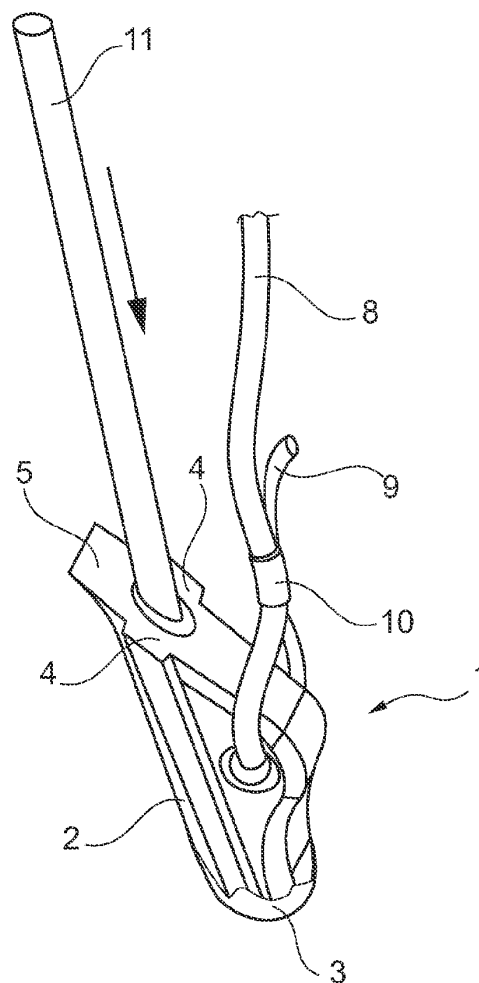
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(54) **Biodegradable ground anchor**

(57) The invention relates to a ground anchor (1) comprising an elongate body (2) with a blind hole (6) running in axial direction and an attachment point arranged on the elongate body, wherein the attachment point lies at a distance from the centre of gravity of the elongate body, characterized in that the ground anchor is manufactured from a biodegradable material.



**Fig. 1**

## Description

**[0001]** The invention relates to a ground anchor comprising an elongate body with a blind hole running in axial direction and an attachment point arranged on the elongate body, wherein the attachment point lies at a distance from the centre of gravity of the elongate body.

**[0002]** Ground anchors are used for long-term attachment of a cable or belt in the ground. These cables or belts are used for instance to anchor trees. Trees can be anchored, among other methods, by having cables run as guy wires from the crown of the tree and anchoring them in the ground. This above-ground anchoring has the advantage that the anchoring can easily be removed after a period of time, but has the drawback that the tree is statically anchored. This means that the tree top can hardly move back and forth, whereby the natural growth process of the root ball is impeded. In addition, the use of an above-ground anchoring is less aesthetic. Another way of anchoring a tree is under the ground. Here a number of ground anchors are arranged around the root ball of the tree, and tensioned between these ground anchors are belts which run over the upper side of the root ball. The root ball is thus fixed while the tree top is allowed the necessary movement. In the case of this underground tree anchoring the ground anchors and belts must also be removed after a period of time so as to not adversely affect the growth of the root ball.

**[0003]** Because ground anchors are in the ground for a long time and are then removed again, it is usual in the prior art to make ground anchors durable. For this purpose the ground anchors are embodied in aluminium, or iron ground anchors are provided with a corrosion protection, usually by being galvanized.

**[0004]** The drawback of these prior art ground anchors is that they impede the root growth of plants if they are not removed from the ground in good time. In addition, the ground will be contaminated because the ground anchors corrode. The ground anchors hereby release for instance aluminium and zinc into the ground, and this is undesirable.

**[0005]** It is now an object of the invention to provide a ground anchor wherein the above stated drawbacks are alleviated or even obviated.

**[0006]** This objective is achieved according to the invention in that the ground anchor is manufactured from a fully biodegradable material.

**[0007]** Owing to the use of a fully biodegradable material it is no longer necessary to remove the ground anchors from the ground after a period of time. Nor can the use of biodegradable material bring about any contamination of the ground as is the case with prior art ground anchors.

**[0008]** Now that the ground anchors no longer need to be removed from the ground, it is possible to use the ground anchors in more ways. Such a ground anchor can in any case be used where a temporary attachment point to the ground is desired. When the attachment point

is no longer necessary, the ground anchor can be left in the ground, where it will degrade naturally in the course of time. The ground anchor according to the invention can therefore be used not only for anchoring of trees but also for the purpose of for instance securing a beach tent or for providing an attachment point during work in the countryside. The ground anchor according to the invention is placed in the ground by inserting a metal rod in the blind hole of the anchor. A cable is for instance further fastened to the attachment point. The anchor is then struck into the ground by means of the metal rod. Once the ground anchor is at the desired depth, the metal rod is pulled out of the ground, wherein the anchor remains behind. The cable is then pulled, whereby the anchor tilts in the ground and provides resistance, so that the cable can be loaded. This tilting is the result of the placing of the attachment point relative to the centre of gravity of the elongate body.

**[0009]** In a preferred embodiment of the ground anchor according to the invention the biodegradable material is polylactic acid, starch or a combination thereof.

**[0010]** In another embodiment of the ground anchor according to the invention the attachment point comprises an eye. A rope or cable can easily be fastened to the eye, after which the ground anchor is driven into the ground.

**[0011]** Yet another embodiment of the ground anchor according to the invention comprises at least one rib arranged in longitudinal direction on the elongate body. This rib provides for a better guiding during striking of the ground anchor into the ground.

**[0012]** Another preferred embodiment of the ground anchor according to the invention comprises a cable fastened with an end to the attachment point. This cable is preferably of a biodegradable material, for instance hemp rope.

**[0013]** It will in any case be easily possible to remove the cable from the ground once the ground anchor has degraded. In the case of an underground application of the cable it is recommended that the cable is biodegradable so that, once the ground anchor and the cable have been arranged, no additional removal operations are necessary.

**[0014]** The invention further relates to a combination for anchoring a root ball of a plant such as a tree, the combination comprising:

- a ground anchor according to the invention;
- a plate-like element; and
- a cable with one end arranged on the ground anchor and with the other end arranged on the plate-like element.

**[0015]** Both the plate-like element and the cable are preferably of a biodegradable material.

**[0016]** Because the ground anchor can be left in the ground and so no longer need be removed, it is possible to secure the root ball of a plant such as a tree in other

manner than is usual. Using the combination according to the invention it is possible to drive a ground anchor through the root ball into the ground and subsequently anchor the root ball by arranging the plate-like element on top of the root ball and there secure the other end of the cable. The advantage of this new attachment method is that the strength of the root ball is used and that there is no risk of a cable or belt sliding off the root ball, as is the case in the conventional method of underground anchoring in which cables or belts are tensioned over the ball.

**[0017]** In a preferred embodiment of the combination according to the invention the plate-like element comprises at least one opening for passage of the cable and a cleat for securing the cable to the plate-like element. A root ball of a tree can hereby be secured quickly and effectively.

**[0018]** The plate-like element can optionally be embodied as a flexible net arranged at least partially round the ball of the plant. It is also possible to wind the cable round the root ball.

**[0019]** These and other features of the invention are further elucidated with reference to the accompanying drawings.

Figure 1 shows an embodiment of a ground anchor according to the invention during insertion into the ground.

Figure 2 shows the ground anchor according to figure 1 in anchored position.

Figure 3 shows an embodiment of a combination according to the invention.

Figures 1 and 2 show an embodiment of a ground anchor 1 according to the invention. Ground anchor 1 has an elongate body 2 with a nose 3. Arranged on either side of elongate body 2 are ribs 4 which provide for stability during driving of ground anchor 1 into the ground. On the rear side 5 of elongate body 2 an opening 6 is provided with a blind hole.

**[0020]** An eye 7 is provided on the top of elongate body 2 as attachment point for a cable 8. Cable 8 is placed through eye 7 and the free end 9 of cable 8 is clamped onto cable 8 by a clamping bush 10.

**[0021]** In this embodiment eye 7 is formed integrally with elongate body 2. This is advantageous in the case the ground anchor is manufactured by means of injection moulding.

**[0022]** As shown in figure 1, an iron pin 11 with which ground anchor 1 can be driven into the ground is placed in blind hole 6. After insertion of ground anchor 1 into the ground and removal of pin 11 tension can be applied to cable 8, whereby ground anchor 1 rotates in the ground and the elongate body comes to lie roughly at a right angle to cable 8, as shown in figure 2.

**[0023]** Figure 3 shows a combination according to the invention. Placed through the root ball 13 of a tree 12 is a ground anchor 1 which is anchored in the ground under

root ball 13. The cable 8 attached to ground anchor 1 runs through the root ball and protrudes from a plate-like element 14.

**[0024]** This plate-like element 14 is provided with an opening 15 through which the cable 8 passes. Provided on the top side of plate-like element 14 is a cleat 16 around which cable 8 can be trained and secured.

**[0025]** Further arranged on a plate-like element 14 are four clamping elements 17 in which the free end 18 of cable 8 can be fixedly clamped.

**[0026]** Protrusions can optionally be provided on the underside of plate-like element 14 which fix plate-like element 14 onto root ball 13.

## Claims

1. Ground anchor comprising an elongate body with a blind hole running in axial direction and an attachment point arranged on the elongate body, wherein the attachment point lies at a distance from the centre of gravity of the elongate body, **characterized in that** the ground anchor is manufactured from a biodegradable material.
2. Ground anchor as claimed in claim 1, wherein the biodegradable material is polylactic acid, starch or a combination thereof.
3. Ground anchor as claimed in claim 1 or 2, wherein the attachment point comprises an eye.
4. Ground anchor as claimed in any of the foregoing claims, comprising at least one rib arranged in longitudinal direction on the elongate body.
5. Ground anchor as claimed in any of the foregoing claims, comprising a cable fastened with an end to the attachment point.
6. Ground anchor as claimed in claim 5, wherein the cable is hemp rope.
7. Combination for anchoring a root ball of a plant such as a tree, the combination comprising:
  - a ground anchor as claimed in any of the foregoing claims;
  - a plate-like element; and
  - a cable with one end arranged on the ground anchor and with the other end arranged on the plate-like element.
8. Combination as claimed in claim 7, wherein the plate-like element comprises at least one opening for passage of the cable and a cleat for securing the cable to the plate-like element.

9. Combination as claimed in claim 7 or 8, wherein both the plate-like element and the cable are of a biodegradable material.

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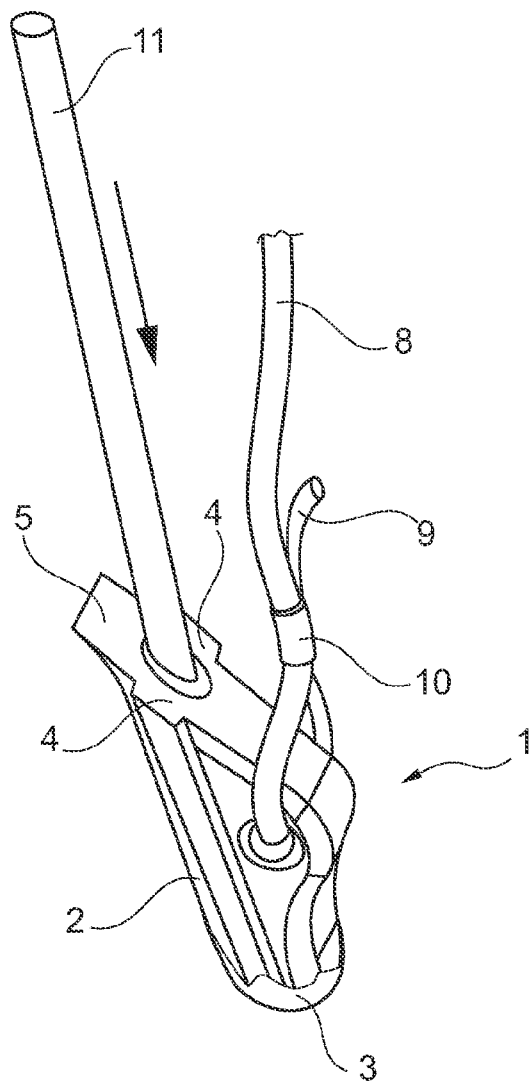


Fig. 1

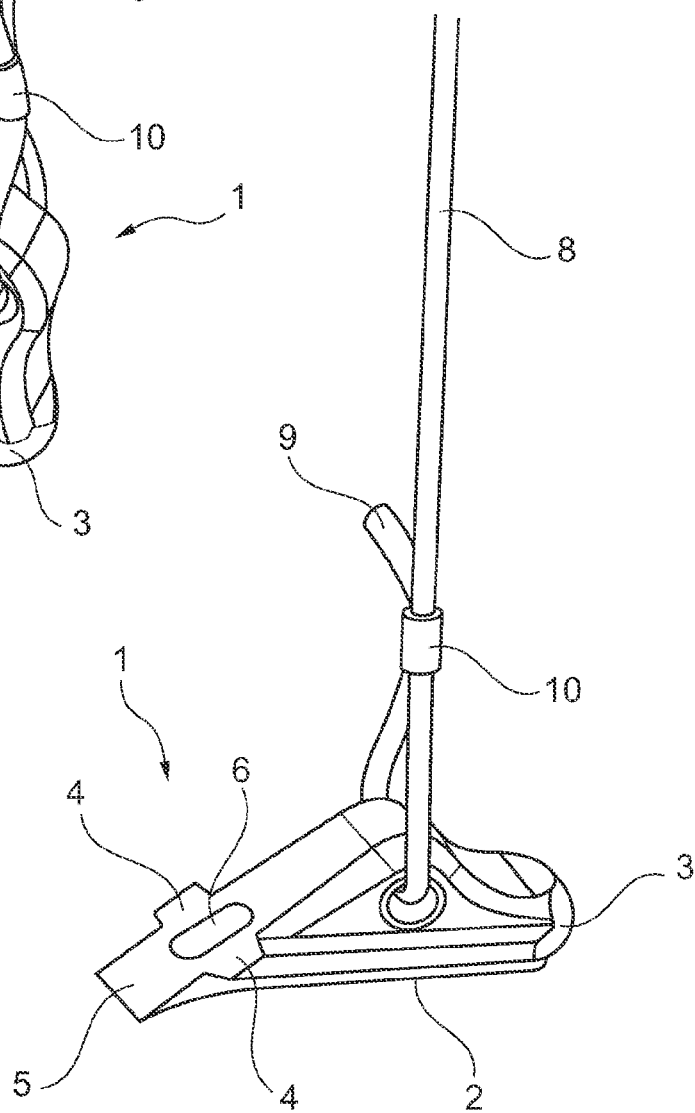


Fig. 2

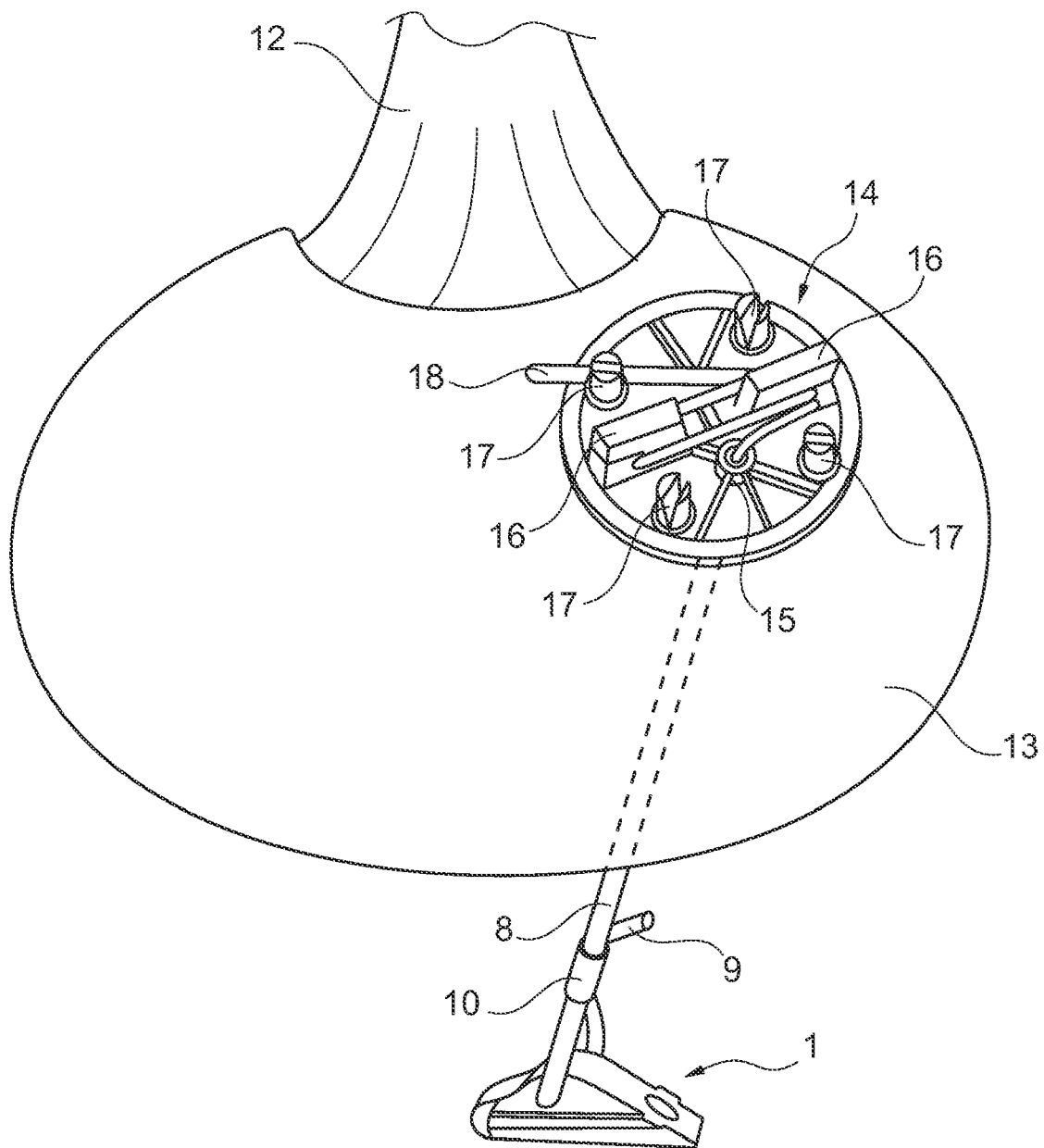


Fig. 3



## EUROPEAN SEARCH REPORT

Application Number  
EP 10 19 0753

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	FR 2 883 579 A1 (PYRAMID SARL [FR]) 29 September 2006 (2006-09-29)	1-4	INV. E02D5/80
Y	* claim 10; figure 2 *	5-9	
Y	----- EP 0 884 420 A1 (TECNIVALOR [FR]) 16 December 1998 (1998-12-16) * figure 1 *	5-9	
A	----- US 2004/202512 A1 (SMITH MICHAEL C [US]) 14 October 2004 (2004-10-14) * abstract *	2	
A	----- US 2002/014570 A1 (JENNY RUDOLF [CH]) 7 February 2002 (2002-02-07) * paragraphs [0032] - [0034] *	1-9	
A	----- US 2009/041548 A1 (STAHM WILLIAM G [US]) 12 February 2009 (2009-02-12) * figure 1 *	1-9	
			TECHNICAL FIELDS SEARCHED (IPC)
			E02D
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		27 January 2011	Leroux, Corentine
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 10 19 0753

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on  
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27-01-2011

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
FR 2883579 A1	29-09-2006	EP 1724398 A2	22-11-2006
EP 0884420 A1	16-12-1998	FR 2764618 A1	18-12-1998
US 2004202512 A1	14-10-2004	NONE	
US 2002014570 A1	07-02-2002	DE 20013087 U1	12-10-2000
		EP 1176258 A1	30-01-2002
US 2009041548 A1	12-02-2009	AU 2008287512 A1	19-02-2009
		CA 2694145 A1	19-02-2009
		CN 101939490 A	05-01-2011
		EP 2173950 A2	14-04-2010
		US 2010269422 A1	28-10-2010
		WO 2009023108 A2	19-02-2009