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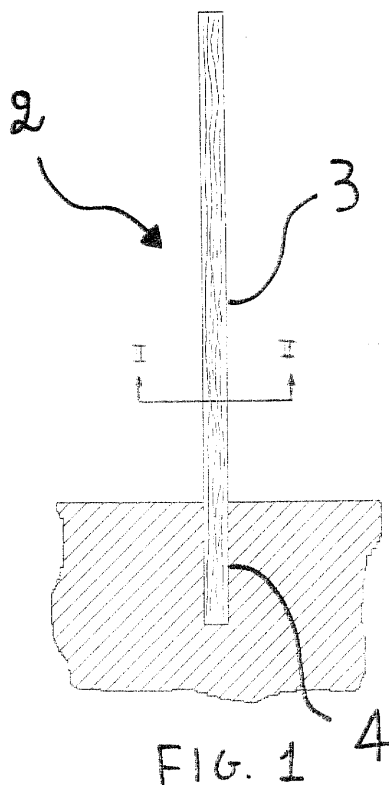
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(54) **Post, particularly for delimiting tracings**

(57) A post for delimiting tracings is made of composite materials and presents an axial body (2) comprising an active portion (3) and an anchoring portion (4) elastically connected to the active portion (3); the anchoring portion (4) is an uninterrupted continuation of said active portion (3). The reinforcing fibres are continuous and are arranged along the longitudinal axis of de-

velopment of the post (1), extending at least over the entire length of the active portion (3). An anchoring element (5) is glued to the anchoring portion of the post, presents an inner cavity (7) housing the anchoring portion (4) and friction means (8) for anchoring to the ground. An exterior coating (6) made of polyurethane foam surrounds the active portion (3) to attenuate the effects of an impact.



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Description

[0001] The present invention relates to a post for delimiting tracings, in particular for applications in the sporting field for delimiting tracks, supporting protec-

[0002] As is well known, posts that are widely employed in skiing facilities are made of plastic material or, more rarely, of wood; such posts are substantially shaped according to elongated forms, present an extremity suitable for being driven into the solid ground or into snow and can be used individually or in such a way as to constitute supports for safety nets. Other typical examples of such posts provide for their use as supports for signs or as border elements between areas devoted to sporting practice and areas devoted to other functions.

[0003] The posts constructed according to known solutions present several drawbacks, particularly severe if one considers that an essential feature of the posts should be their guaranteeing users' safety.

[0004] The first problem is given by the poor elasticity that posts currently in use generally have. The impact of the human body with one of them can therefore cause considerable injuries. In consideration of this hazard, traditional posts can be provided with protections made of softer materials. Since such protections must, out of practical necessity, be rather small in size, they can reduce only to a small extent the effects of an impact on a body at high speed which may run into the post, as occurs for instance in alpine skiing.

[0005] The use of posts, made of wood or plastic, that are deformable thanks to their reduced cross section can, on the other hand, have even worse consequences.

[0006] The nature of such materials is such that the post thus constructed will have dangerously low mechanical strength characteristics, so much so that in the impact it may easily break, often with the formation of splinters that are violently projected into the surrounding environment. Moreover, the permanence of the post stub is an additional hazard, as it constitutes a typically sharp protuberance. This not only defeats its purpose, when it is to delimit or provide protection, but may lead to injuries caused by the splintered parts of the post.

[0007] The common use of materials like plastic and wood also presents various drawbacks linked to environmental conditions. At low temperatures plastic is prone to a decay of its elastic properties, so that the application of a load nominally withstood by the post could cause its permanent warping under particularly adverse environmental conditions.

[0008] On the other hand, it is well known that using wood outdoors can cause its properties to decay due to humidity and low temperatures. These effects can be limited by subjecting the wood material to particular

treatments which, however, are absolutely disadvantageous in terms of the cost-effectiveness of the product.

[0009] Beside the known solutions introduced above, a different type of delimiting post is available on the market, and it finds particular use in routes for alpine skiing competitions. For instance, in the "slalom" speciality, a particular type of post is currently used, made of plastic, having tubular section and provided in its portion proximate to the ground with a ball joint, generally made of silicone resin. Essentially, the joint allows the lowering of the part of post emerging from the ground by athletes who impact thereon when skirting the post itself.

[0010] The first problem of such a construction is, yet again, safety. First of all, the athlete is subjected to a hard impact against the rigid material of the post; in the second place, the skier who has lowered it can be violently hit by the post as it returns upright, given that the elastic element concentrated in a single point close to the ground causes the rigid portion of the post to return violently, with considerable problems connected to the reactive impact of the post on the athlete's body. These facts today force slalom specialists to wear protections for all their limbs, their head and their teeth. Lastly, such a post presents considerable costs and constructive complexity, being constituted by a multiplicity of elements such as a ground anchoring body, a ball joint and an upper portion projecting from the ground.

[0011] In light of the above description, the fundamental aim of the present invention is to provide a new post able substantially to solve all the drawbacks mentioned previously.

[0012] A particular aim of the present invention is to provide a post with an extremely advantageous elastic behaviour in case of impact, i.e. able to provide adequate damping capabilities whilst maintaining a substantial structural integrity.

[0013] A further aim of the present invention consists of obtaining a post of considerable constructive simplicity, in terms of complexity and overall number of elements required.

[0014] Lastly, an aim of the present invention consists of enabling to obtain a post that is free of the phenomena of decay in mechanical characteristics in low-temperature environments.

[0015] The specified technical task and the aims set out above are substantially achieved by a post for delimiting tracings as described in the accompanying claims.

[0016] The description is now provided, purely by way of non limiting example, of some preferred but not exclusive embodiments of a post, in particular for delimiting tracings, illustrated in the accompanying drawings, in which:

- Figure 1 shows a longitudinal section of a post according to the invention;
- Figure 2 shows a section of the post according to the trace II-II of Figure 1;

- Figure 3 shows a longitudinal section of a different embodiment of the post according to the invention; and
- Figure 4 shows a section of the post of Figure 3 according to the trace IV-IV.

[0017] With reference to the aforementioned figures, the post according to the invention is globally indicated with the number 1.

[0018] It comprises a pole-like body 2 made of composite material; in reference to the described embodiments it is important to note that the composite material employed in the construction of this pole-like body 2 has its mechanically resisting fibres continuous, and substantially arranged along the axis of development of the pole-like body 2 itself. Delving in further detail, the fact should be stressed that the reinforcing fibres extend over the entire length of the pole-like body 2.

[0019] The reason for this structural choice advantageously resides in the fact that such a configuration is able to offer a homogeneous elastic behaviour to the entire pole-like body 2; in other words the pole-like body 2 simultaneously serves as a structural core and as an elastic element for the post 1 according to the present invention. The selection of composite material with which to manufacture the pole-like element 2 is dictated by the usual engineering and cost considerations; in particular, one can choose to manufacture the pole-like body 2 with fibreglass, but if circumstances so require, materials with more advanced mechanical characteristics can be adopted, such as aramid fibre compounds (i.e. Kevlar) or carbon fibre based composites.

[0020] The pole-like is formally divided into an active portion 3, which with the post 1 in the installed condition emerges from the ground and an anchoring portion 4 which on the contrary is buried when the post 1 is installed in the appropriate areas of the tracing to be delimited; with particular reference to Figures 1 and 3, one can note that the active portion 3 and the anchoring portion 4 are mutually connected without interruption, and at the same time the composite material with which the pole-like body 2 is constructed guarantees the elasticity of this connection.

[0021] According to the configuration just described, the active portion 3 is tasked with absorbing the kinetic energy of a body which may impact against the post, whereas the anchoring portion 4 operates in such a way as to maintain the post 1 secured to the ground especially during the occurrence of the impact itself; lastly, one should consider the fact that the pole-like body is designed to confer a sufficiently elastic behaviour to the entire structure of the post 1 according to the present invention, to avoid causing serious injuries or damage to the impacting body while maintaining the structural soundness of the post after the impact.

[0022] The pole-like body 2 presents a geometrically identical section along the entire axis of development and this section is preferably shaped according to an

axially symmetrical figure. The reason why the section of the pole-like body 2, with particular attention to the section of the active portion 3, should preferably be axially symmetrical resides in the fact that the post 1 according to the present invention must offer the same dynamic behaviour in case of impact in an undifferentiated manner according to all possible directions of incidence of the impact; in this view, as noted in Figure 2, the section of the pole-like body 2 advantageously has circular or slightly elliptical shape, but in case of given design and/or functional specifications the pole-like body 2 can be manufactured with constant measures of the section along the entire axis of longitudinal development or can have variable cross section measurements; in particular, a pole-like body 2 can be obtained which presents at least the active portion 3 tapered, with growing section proceeding from the top of the post towards the ground.

[0023] In some cases it is also possible to construct the pole-like body in two or more successive portions with geometrically differentiated section: for instance a body comprising a segment with circular section and then a segment with elliptical section.

[0024] Advantageously, the pole-like body 2 is suitable for being manufactured by profiling, given its simple geometric configuration; with particular reference to the employment of the composite material mentioned above (fibreglass), said pole-like body 2 is conveniently manufactured with the industrial process of pultrusion.

[0025] Accessories can be associated to the pole-like body 2 to improve the functionality of the post 1 in terms of easing the installation of the post 1 itself and to improve the ability to reduce the severity of the damage to any bodies which may impact it. For instance, observing Figure 3 one can note the presence of an anchoring element 5 associated to the anchoring portion 4, for instance by means of gluing; said anchoring body 5 is conveniently made of plastic material, and presents an inner cavity 7 destined to house at least partially the anchoring portion 4 (with reference to Figure 3, note that said inner cavity 7 is substantially counter-shaped relative to the anchoring portion 4), whilst on its own outer surface it houses friction means 8 destined to enhance the stability of the insertion of the post 1 into the ground; said friction means 8 are obtained by means of a projecting thread, which advantageously allows to insert the post 1 into the ground as if it were a self-threading screw. The anchoring element 5, as Figure 3 shows, presents substantially cylindrical shape, but it can advantageously be shaped as a cone or even as a cone frustum.

[0026] Also in reference to accessories installed on the post, in Figure 3 one can observe the presence of an exterior coating 6, made of porous plastic material, yielding on contact (preferably polyurethane foam), shaped in such a way as to encompass the active portion 3 emerging from the ground; at this point it should be noted that this exterior coating can cover only a part of the active portion 3, but is advantageously made to

cover the entire active portion 3.

[0027] The function of the exterior coating 6 substantially consists of dampening the effects of the impact on the delicate parts of the impacting body whilst preventing the hazardous ejection of splinters in case of an unfortunate sudden rupture of the pole-like body 2 as a result of the impact. the exterior coating 6 presents substantially cylindrical shape closed at one extremity and has an interior cavity shaped substantially counter to the active portion 3; the exterior coating 6 is mounted on the pole-like body 2 simply by fitting the exterior coating 6 on the active portion 3, so that the active portion 3 itself is housed in the inner cavity of the exterior coating 6.

[0028] The invention achieves important advantages.

[0029] First of all, note how the presence of the pole-like body 2 provides the entire post 1 with a much greater ability to absorb impacts than known posts, because of the intrinsic elasticity of the composite material and thanks to the fact that the elastic properties are distributed along the entire pole-like body 2 and not concentrated in a limited area.

[0030] Also with respect to behaviour in case of impact, note that the elasticity of the pole-like body 2, coupled with the substantial reversible deformation of the exterior coating 6, allows it to adapt to the shape of the impacting body, and this in effect determines a considerable reduction in the effects of sudden elastic return into position of the post 1.

[0031] Additionally, note that advantageously the adoption of the composite material limits the possibility of splinter formation in limit cases of structural collapse of the post, with significant benefits in terms of collateral damage reduction. The danger that any splinters may propagate is further attenuated by the presence of the exterior coating 6.

[0032] A further advantage deriving from the use of composite material resides in the fact that this category of materials in practice is not affected in terms of degradation of its mechanical characteristics as a result of prolonged exposure to low temperatures.

[0033] Yet another advantage, lastly, is the extreme simplicity of construction of the post according to the present invention, which substantially guarantees elasticity without having to introduce elastic joints into the structure or divide the structure itself into multiple parts manufactured separately and then interconnected; this leads to significant benefits in regard to production times.

Claims

1. A post, particularly for delimiting tracings, comprising:

- an active portions (3) of elongated shape; and
- an anchoring portion (4) destined to be secured to the ground, connected to said active portion

(3);

characterised in that at least the active portion (3) is made with a plastic matrix into which a plurality of reinforcing fibres is buried.

2. A post as claimed in claim 1, characterised in that it presents a pole-like body (2) comprising said active portion (3) and said anchoring portion (4), and characterised in that the anchoring portion (4) is elastically connected to the active portion (3), the anchoring portion (4) being an uninterrupted continuation of said active portion (3).

3. A post as claimed in either of the previous claims, characterised in that said reinforcing fibres are of the continuous type.

4. A post as claimed in claim 3, characterised in that said fibres are arranged according to the axis of longitudinal development of the post (1), preferably parallel to said axis.

5. A post as claimed in claim 3, characterised in that said fibres extend over the entire length of the active portion (3).

6. A post as claimed in any of the previous claims, characterised in that said reinforcing fibres are made of glass and/or aramidic and/or made of carbon.

7. A post as claimed in any of the previous claims, characterised in that said anchoring portion (4) is made with a plastic matrix into which a plurality of reinforcing fibres is buried.

8. A post as claimed in any of the previous claims, characterised in that it comprises an anchoring element (5), terminally associated to said anchoring portion (4).

9. A post as claimed in claim 8, characterised in that said anchoring element (5) is glued to the anchoring portion (4) of the post (1).

10. A post as claimed in claim 8, characterised in that said anchoring element (5) presents an inner cavity (7) able to house at least a part of the anchoring portion (4) and an exterior surface delimiting said body, said anchoring element (5) being associated to the anchoring portion (4) by the insertion of said anchoring portion (4) into said inner cavity (7).

11. A post as claimed in claim 10, characterised in that said anchoring element (5) presents, on its exterior surface, friction means (8) to increase its grip on the ground.

12. A post as claimed in claim 11, characterised in that said friction means (8) comprise a thread obtained on said exterior surface.
13. A post as claimed in any of the previous claims, characterised in that the active portion (3) has its cross section axially symmetrical relative to the axis of development. 5
14. A post as claimed in claim 13, characterised in that the active portion (3) presents circular cross section. 10
15. A post as claimed in any of the previous claims from 2 to 14, characterised in that the pole-like body (2) has variable section along the longitudinal axis of development, the pole-like body (2) preferably being tapered in the direction away from the ground. 15
16. A post as claimed in any of the previous claims, characterised in that the axial body (2) is obtained by profiling. 20
17. A post as claimed in claim 16, characterised in that the axial body (2) is obtained by pultrusion. 25
18. A post as claimed in any of the previous claims, characterised in that it presents an exterior coating (6) removably engaged on said active portion (3) and destined to attenuate the effects of an impact of a body against the post (1). 30
19. A post as claimed in claim 18, characterised in that said coating (6) is an elongated body presenting an inner cavity able to house at least a part of the active portion (3), said exterior coating (6) being associated to the active portion (3) through the insertion of said active portion (3) into said inner cavity of the exterior coating (6). 35
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20. A post as claimed in claim 19, characterised in that said inner cavity of the exterior coating (6) is shaped counter to the part of active portion (3) where to it is associated. 45
21. A post as claimed in claim 18, characterised in that said exterior coating (6) is made of polyurethane foam. 50
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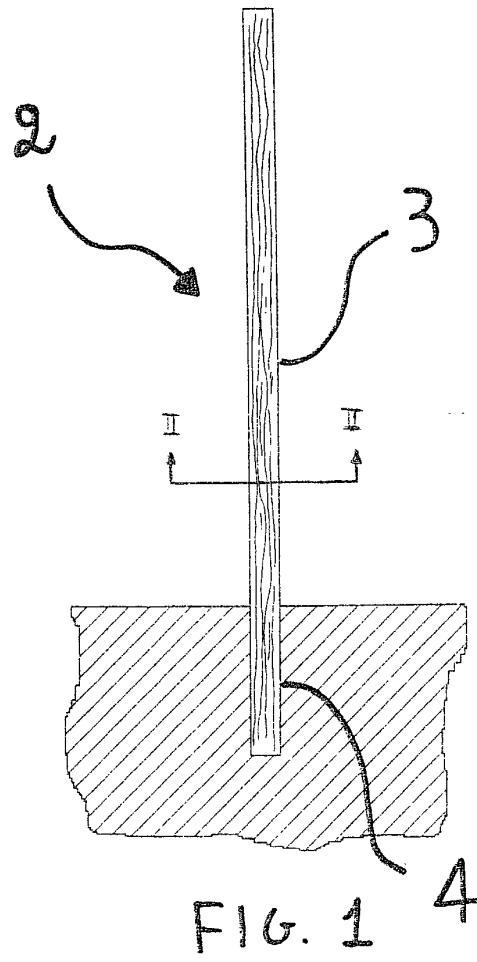


FIG. 2

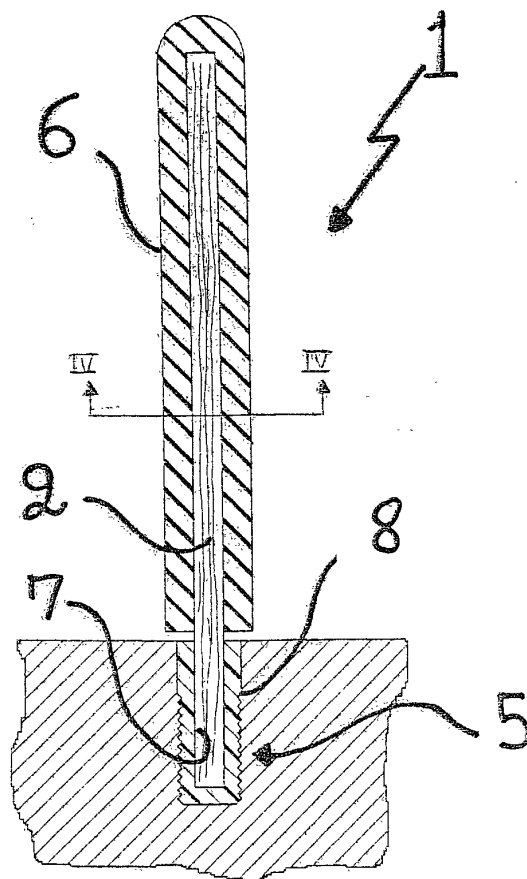


FIG. 3

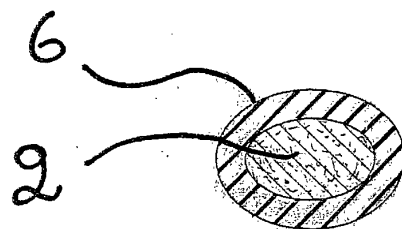


FIG. 4



European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 99 83 0809

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The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 19 June 2000	Examiner Steegman, R
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			

EPO FORM 1503 03/82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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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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