



(11) **EP 1 593 779 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
11.11.2009 Bulletin 2009/46

(51) Int Cl.:
E01F 9/017^(2006.01) E04H 12/00^(2006.01)

(21) Application number: **04425316.9**

(22) Date of filing: **04.05.2004**

(54) **Accident prevention articulation for posts**

Gelenk für Pfosten zur Unfallverhütung

Articulation de poteaux pour la prévention d'accident

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LI LU MC NL PL PT RO SE SI SK TR

(43) Date of publication of application:
09.11.2005 Bulletin 2005/45

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Description

[0001] The present invention refers to an accident prevention articulation that can be applied to an upright post, such as for example a lamp post, a traffic signpost, a supporting post and the like.

[0002] As is known, widespread use is made in many fields of posts fixed in the ground to support lighting, road signs and other types of services. Such posts are generally fixed rigidly to the ground. As a result, a violent impact against the post, for example by a vehicle, causes the post to be broken or permanently deformed.

[0003] In order to overcome this drawback, articulations in the form of harmonic steel springs disposed at the base of the post are known to art. As a result, following the impact suffered by the post, the articulation flexes and rapidly returns elastically to the original position. Consequently, the post also undergoes a series of oscillations around the vertical position. The return of the post to the vertical position is very sharp and sudden, giving rise to the so-called whiplash effect, with the result of a grave danger for any users who are in the vicinity of the post and risk being struck by the oscillating post, with the consequent serious physical damage.

[0004] Examples of such dangers are posts disposed at the edges of pavements which can be struck by vehicles and as a result of their oscillation, risk striking pedestrians or motorcyclists passing in the vicinity; or else posts placed in the country can be hit by agricultural machinery and as a result of their oscillation risk hitting the farm worker behind the machine.

[0005] EP 77 313 discloses an article which springs back after bending and comprises a flexible joint positioned between a first portion of a stick (for anchoring to the ground) and a second portion of a stick, where said first and second portions of stick are resiliently held together - movable relative one another - by a spring force acting against at least one of the portions and the flexible joint comprises a spring, through which a connecting member extends, to delay the return of the article after bending. It discloses an articulation for posts having the features of the preamble of claim 1.

[0006] The object of the present invention is to overcome the drawbacks of the prior art by providing an articulation for posts of the accident prevention type that is safe, reliable and able to avoid breakage or permanent deformation of the post and at the same time sharp oscillations of the post.

[0007] Another object of the present invention is to provide such an articulation for posts that is versatile and suitable to be applied to various types of posts. Another object of the present invention is to provide such an articulation for posts that is inexpensive and simple to produce.

[0008] These objects are achieved in accordance with the invention with the characteristics listed in appended independent claim 1. Advantageous embodiments of the invention are apparent from the dependent claims.

[0009] The articulation for posts according to the invention is designed to be disposed between a device for anchoring the post to the ground and the bottom part of the post. Said articulation is substantially tubular, cylindrical or frusto-conical in shape and is made of a material having a certain resistance to bending to be able to be bent and return slowly substantially to the original position, without oscillating around the axis of the original position.

[0010] In this manner, when the post is struck, the articulation bends and subsequently returns very slowly to the original substantially vertical position, without oscillating around the vertical axis of the original position, avoiding the risk of striking people in the vicinity of the post.

[0011] Further characteristics of the invention will be made clearer by the detailed description that follows, referring to a purely exemplary and therefore non limiting embodiment thereof, illustrated in the appended drawings, in which:

Figure 1 is a front view illustrating a post, partially broken off, provided with an articulation according to the invention;

Figure 2 is a front view of the post according to the invention;

Figure 3 is an axial sectional view, enlarged and partially broken off, of the articulation of Figure 2;

Figure 4 is a cross sectional view taken along the plane of section IV-IV of Figure 2, and

Figure 5 is a cross sectional view taken along the plane of section V-V of Figure 2.

[0012] The articulation according to the invention, denoted as a whole with reference numeral 1, is described with the aid of the figures.

[0013] With reference for now to Figure 1, the articulation 1, which is disposed between a point of anchoring to the ground 3 and a post 5, is illustrated.

[0014] The point of anchoring 3 comprises a base 30 substantially shaped as a rectangular plate wherefrom anchoring ribs 31, arranged crossed in a pyramid shape with the tip turned upside down, protrude downward. In this manner the point 3 can be driven into the ground by striking the base 30 with a hammer, until the base 30 is level with the ground.

[0015] At the four corners of the base 30 are four holes to receive adjusting screw means 32 for fixing of a supporting plate 4 disposed above the base 30 and at a distance therefrom. The inclination of the supporting plate 4 can be adjusted by acting on the adjusting screws 32. A cylindrical tang 40 hollow on the inside protrudes upward from the supporting plate 4 to receive the bottom part 11 of the articulation 1. On the other hand, the top part 12 of the articulation 1 is coupled to the bottom part of the post 5.

[0016] As shown in Figures 2-5, the articulation 1 has a substantially tubular shape and is hollow on the inside.

It is shown as cylindrical in shape, but it can also be frusto-conical.

[0017] The articulation 1 is made of a plastic material that ensures a certain resistance to bending. The material and the thickness of the articulation 1 are designed to allow bending of the articulation, when a bending load greater than a pre-set value is applied to the post 5.

[0018] Said bending of the articulation 1 does not cause it to break or be permanently deformed. In fact, once the bending load has been removed, the articulation 1 returns elastically and very slowly to its original position, without oscillating around the axis of its original position.

[0019] The articulation 1 comprises a cylindrical body 10 having a thickness t which can vary in the range of 3 mm to 7mm. The body 10 of the articulation has a bottom cylindrical portion 11 with a smaller outside diameter, to be disposed between the tang 40 of the supporting plate 4 and an upper cylindrical portion 12 with a larger outside diameter than the bottom portion, to receive the bottom end of the post 5.

[0020] It should be noted that the outside diameter of the bottom portion 11 of the articulation is slightly smaller than the inside diameter of the top portion 12 of the articulation. In this manner, one articulation can be stacked on top of another articulation, in a modular manner, by inserting the bottom end 11 of one articulation inside the top end 12 of the articulation beneath and so on until a stack of articulations of the desired height has been obtained.

[0021] In the bottom portion 11 of the articulation there are formed two through holes 13 aligned transversally to receive screw means for fixing to the tang 40 of the supporting plate 4. Two transversally aligned through holes 14 are also formed in the top portion 12 of the articulation to receive screw means for fixing to the bottom end of the post 5. Since the top portion 12 of the articulation 1 is disposed outside the post 5, one of the two holes 14 is formed in a hexagonal seat 15 to receive and block a hexagonal nut for tightening of the screw means.

[0022] A plurality of annular ribs 16, solid on the inside a protruding radially outward from the body 10, is provided in the central part of the body 10. The annular ribs 16 are concentric and parallel to each other so as to define a plurality of spaces 17 within which the articulation 1 can bend.

[0023] To ensure a slow return from the position of bending of the articulation 1, the ribs 16 have a thickness s in the longitudinal direction that is greater than the width in the longitudinal direction a of the spaces 17. Purely by way of non limiting example, each rib 16 has a thickness s which can vary in the range of 3 mm to 7 mm. On the other hand, each space 17 has a width in the longitudinal direction a that can vary in the range of 0.5 mm to 2 mm. The extension d in a radial direction of each rib 16 with respect to the body 10 can vary in the range of 5 mm to 10 mm.

[0024] It should therefore be noted that the central part of the body 10 of the articulation can also be obtained by

means of a cylindrical sleeve having a thickness equal to $t + d$ and provided with a plurality of radial slots 17.

[0025] Furthermore, as shown in Figures 3 and 4, the inside diameter of the top part 12 is greater than the inside diameter of the central part, therefore in the inside surface of the articulation 1, between the top part 12 and the central part, there is defined a collar 18 which protrudes radially inward so as to form an abutment surface on which the bottom end rim of the of the post 5 or of another articulation abuts.

[0026] The articulation 1 is made of plastic material, preferably of PE (polyethylene), polyamide (Nylon™) or PU (polyurethane). The articulation 1 can be made in a single piece by injection moulding.

[0027] A solid or internally hollow core can be inserted inside the body 10 of the articulation.

[0028] Returning to Figure 1, if a force of 30 kg is applied to the post in the horizontal direction, at a height from the ground of about 1.4 m, the post 1 bends with a bending angle of about 45° with respect to the horizontal. Once the force is removed, the articulation returns very slowly to the original substantially vertical position, without any whiplash effect or oscillations around the vertical position.

[0029] It must be considered that in this case, the time taken by the articulation to return to the original, substantially vertical position is about 10 minutes, thus any risk of possible impact of the post 5 with persons in the vicinity is avoided. In fact, after the time of 10 minutes the post 5 does not return exactly to the vertical position, but continues to have a minimal inclination of about 4°. However, this possible offset can be recovered manually by pushing the post 5 to bring it into a perfectly vertical position.

[0030] Obviously, in the case of a greater force applied to the post 1, the articulation 1 bends by an angle of about 90°. In this case the post will take longer to return to its original position and there will be an offset greater than 4° with respect to the vertical.

[0031] Numerous changes and modifications of detail within the reach of a person skilled in the art can be made to the present embodiment of the invention without thereby departing from the scope of the invention as set forth in claim 1.

Claims

1. An articulation (1) for posts, intended to be placed between a device for anchoring to the ground (3, 4) and the bottom part of a post (5), said articulation (1) having a body (10) being substantially tubular, cylindrical or frusto-conical in shape and being made of a material having a certain resistance to bending in order to be able to be bent and to return slowly substantially to the original position, without oscillations around the axis of the original position, said body (10) being hollow on the inside, **characterised in that** a plurality of parallel annular ribs (16), which

are centered along the longitudinal axis of said body (10), protrude radially from said body (10), so as to define between each other a plurality of empty spaces (17) within which said articulation (1) can bend, and **in that** said annular ribs (16) are solid and have a thickness (s) greater than the width (a) of said empty spaces (17), both measured in the direction of said longitudinal axis of said body (10).

2. An articulation (1) according to claim 1, **characterised in that** the thickness (s) of said annular ribs (16) is comprised in the range from 3 mm to 7 mm and the width in the longitudinal direction (a) of said empty spaces (17) is comprised in the range from 0,5 mm to 2 mm.
3. An articulation (1) according to any one of the preceding claims, **characterised in that** it comprises a cylindrical bottom portion (11) designed to engage with said device for anchoring to the ground (3, 4) and a cylindrical top portion (12) designed to engage with the bottom end of said post (5).
4. An articulation (1) according to claim 3, **characterised in that** said cylindrical bottom portion (11) and said cylindrical top portion (12) have respective holes (13, 14) to receive screw means for fixing respectively to said device for anchoring to the ground (3, 4) and to said post (5).
5. An articulation (1) according to claim 3 or 4, **characterised in that** the outside diameter of said cylindrical bottom portion (11) is slightly smaller than the inside diameter of said cylindrical top portion (12), so that the portion (12) of an articulation (1) can receive the bottom portion (11) of another articulation or the bottom part of the post (5) and that within the top part (12) of said articulation there is defined a radial abutment surface (18) on which the bottom end rim of the post (5) or of another articulation abuts.
6. An articulation (1) according to any one of the preceding claims, **characterised in that** it is made of plastic, such as PE (polyethylene).
7. An articulation (1) according to claim 6, **characterised in that** it is made in a single piece by injection moulding.
8. An articulation (1) according to any one of the preceding claims, **characterised in that** a core is inserted inside it.
9. An assembly comprising an articulation (1) according to any one of the preceding claims and said device for anchoring to the ground (3, 4), which device comprises:

- a base (3) wherefrom a point (3) destined to be driven into the ground protrudes downward, and

- a supporting plate (4) adjustably mounted on said base (3) and provided with a hollow cylindrical tang (40) inside which the bottom part (11) of said articulation (1) is disposed.

10 Patentansprüche

1. Gelenk (1) für Pfosten, das zur Anordnung zwischen einer Vorrichtung (3, 4) zur Verankerung im Boden und dem Unterteil eines Pfostens (5) gedacht ist, wobei das Gelenk (1) einen Körper (10) aufweist, der im Wesentlichen röhrenförmig, zylindrisch oder kegelstumpfförmig in der Form ist und aus einem Material mit einer bestimmten Biegefestigkeit hergestellt ist, um imstande zu sein, ohne Schwankungen um die Achse der Ursprungsposition gebogen zu werden und langsam im Wesentlichen in die Ursprungsposition zurückzukehren, wobei der Körper (10) auf der Innenseite hohl ist, **dadurch gekennzeichnet, dass** mehrere ringförmige Rippen (16), die entlang der Längsachse des Körpers (10) zentriert sind, derart von dem Körper (10) vorstehen, dass sie zwischen sich mehrere Leerräume (17) definieren, in denen sich das Gelenk (1) biegen kann, und dass die ringförmigen Rippen (16) fest sind und eine Stärke (s) aufweisen, die größer als die Breite (a) der Leerräume (17) ist, beides in der Richtung der Längsachse des Körpers (10) gemessen.
2. Gelenk (1) nach Anspruch 1, **dadurch gekennzeichnet, dass** die Stärke (s) der ringförmigen Rippen (16) im Bereich von 3 mm bis 7 mm liegt und die Breite in der Längsrichtung (a) der Leerräume (17) im Bereich von 0,5 mm bis 2 mm liegt.
3. Gelenk (1) nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** es einen zylindrischen unteren Abschnitt (11), der zur Ineingriffnahme mit der Vorrichtung (3, 4) zur Verankerung im Boden bestimmt ist, und einen zylindrischen oberen Abschnitt (12) umfasst, der zur Ineingriffnahme mit dem unteren Ende des Pfostens (5) bestimmt ist.
4. Gelenk (1) nach Anspruch 3, **dadurch gekennzeichnet, dass** der zylindrische untere Abschnitt (11) und der zylindrische obere Abschnitt (12) jeweilige Löcher (13, 14) zum Aufnehmen von Schraubenmitteln zum Befestigen an der Vorrichtung (3, 4) zum Verankern im Boden bzw. dem Pfosten (5) aufweisen.
5. Gelenk (1) nach einem der Ansprüche 3 oder 4, **dadurch gekennzeichnet, dass** der Außendurchmesser des zylindrischen unteren Abschnitts (11)

- geringfügig kleiner als der Innendurchmesser des zylindrischen oberen Abschnitts (12) ist, sodass der Abschnitt (12) eines Gelenks (1) den unteren Abschnitt (11) eines anderen Gelenks oder das Unterteil des Pfostens (5) aufnehmen kann, und dass innerhalb des Oberteils (12) des Gelenks eine radiale Anstoßfläche (18) definiert ist, an die der Rand des unteren Endes des Pfostens (5) oder eines anderen Gelenks anstößt.
6. Gelenk (1) nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** es aus Kunststoff, wie etwa PE (Polyethylen), hergestellt ist.
7. Gelenk (1) nach Anspruch 6, **dadurch gekennzeichnet, dass** es in einem Stück durch Spritzgießen hergestellt ist.
8. Gelenk (1) nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** ein Kern darin eingeführt ist.
9. Baugruppe, umfassend ein Gelenk (1) nach einem der vorhergehenden Ansprüche und die Vorrichtung (3, 4) zum Verankern im Boden, wobei die Vorrichtung Folgendes umfasst:
- eine Basis (3), von der ein Punkt (3), der dazu bestimmt ist, in den Boden getrieben zu werden, nach unten vorragt, und
 - eine Stützplatte (4), die einstellbar an der Basis (3) angebracht und mit einer hohlen zylindrischen Angel (40) versehen ist, in der das Unterteil (11) des Gelenks (1) angeordnet ist.
- Revendications**
1. Articulation (1) pour poteaux, destinée à être disposée entre un dispositif pour l'ancrage dans la sol (3, 4) et la partie inférieure d'un poteau (5), ladite articulation (1) possédant un corps (10) substantiellement tubulaire, de forme cylindrique ou tronconique et constitué d'un matériau présentant une certaine résistance à la flexion, afin de pouvoir être fléchi et revenir lentement substantiellement vers sa position initiale, ledit corps (10) étant creux à l'intérieur, **caractérisé en ce qu'**une pluralité de côtes annulaires parallèles (16) centrées le long de l'axe longitudinal dudit corps (10) font saillie radialement sur ledit corps (10), de manière à définir entre elles une pluralité d'espaces vides (17), à l'intérieur desquels ladite articulation (1) peut être se plier, et **en ce que** lesdites côtes annulaires (16) sont rigides et présentent une épaisseur (s) supérieure à la largeur (a) desdits espaces vides (17), tous deux mesurés dans la direction dudit axe longitudinal dudit corps (10).
2. Articulation (1) selon la revendication 1, **caractérisé en ce que** l'épaisseur (s) desdites côtes annulaires (16) est comprise entre 3 mm et 7 mm et la largeur desdits espaces vides (17) dans le sens longitudinal (a) est comprise entre 0,5 mm et 2 mm.
3. Articulation (1) selon l'une quelconque des revendications précédentes, **caractérisé en ce qu'**elle comprend une portion inférieure cylindrique (11) conçue pour s'engager avec ledit dispositif d'ancrage au sol (3, 4), et une portion supérieure cylindrique (12), conçue pour s'engager avec l'extrémité inférieure du poteau (5).
4. Articulation (1) selon la revendication 3, **caractérisé en ce que** ladite portion inférieure cylindrique (11) et ladite portion supérieure cylindrique (12) possèdent chacune des trous (13, 14) pour recevoir des moyens de vissage pour une fixation respective audit dispositif d'ancrage au sol (3, 4) et audit poteau (5).
5. Articulation (1) selon l'une des revendications 3 ou 4, **caractérisé en ce que** le diamètre extérieur de ladite portion inférieure cylindrique (11) est légèrement inférieur au diamètre intérieur de ladite portion supérieure cylindrique (12), si bien que la portion (12) d'une articulation (1) peut accueillir la portion inférieure (11) d'une autre articulation ou la portion inférieure du poteau (5), et de manière à définir une surface de butée (18) à l'intérieur de la portion supérieure (12) de ladite articulation, contre laquelle bute la couronne de l'extrémité inférieure du poteau (5) ou d'une autre articulation.
6. Articulation (1) selon l'une quelconque des revendications précédentes, **caractérisé en ce qu'**elle est constituée de plastique, tel que le PET (polyéthylène).
7. Articulation (1) selon la revendication 6, **caractérisé en ce qu'**elle est fabriquée en une seule pièce par moulage par injection.
8. Articulation (1) selon l'une quelconque des revendications précédentes, **caractérisé en ce qu'**un noyau est intégré à l'intérieur.
9. Assemblage comprenant une articulation (1) selon l'une quelconque des revendications précédentes ainsi que ledit dispositif d'ancrage au sol (3, 4), ledit dispositif comprenant :
- une base (3) à partir de laquelle un point (3) destiné à être entraîné dans le sol fait saillie vers le bas, et
 - une plaque de support (4) montée de façon réglable sur ladite base (3) et pourvue d'un tenon cylindrique creux (40) à l'intérieur duquel

est disposée la portion inférieure (11) de ladite articulation (1).

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FIG. 1

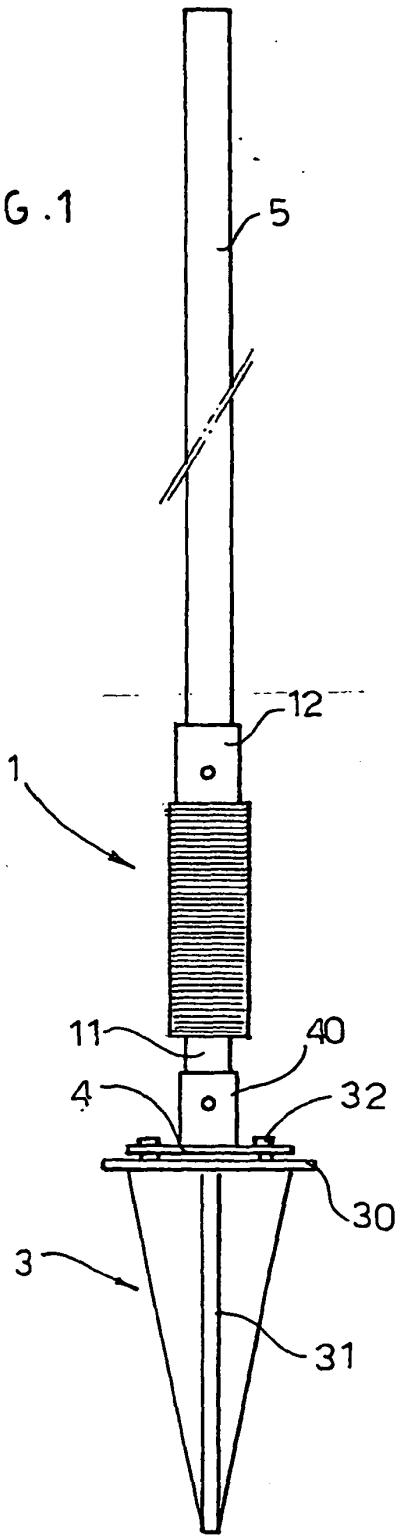
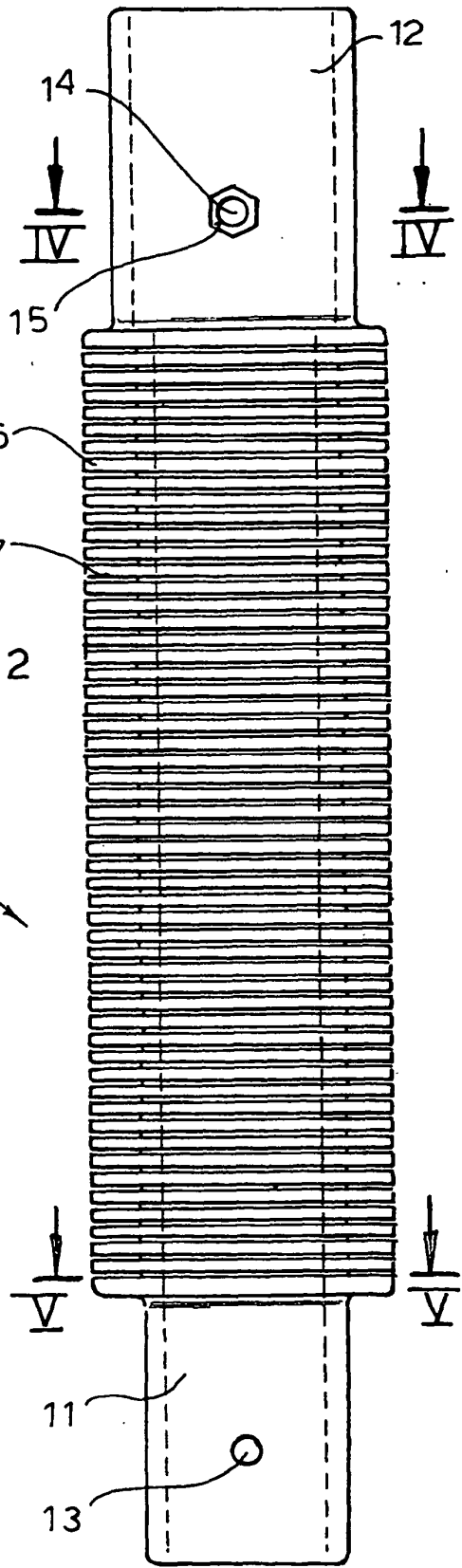


FIG. 2



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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