

(19)



(11)

EP 1 657 379 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:
25.06.2008 Bulletin 2008/26

(51) Int Cl.:
E04H 12/22 ^(2006.01) **E01F 9/018** ^(2006.01)

(21) Application number: **05384601.0**

(22) Date of filing: **16.09.2005**

(54) **Anchorage system using an anisotropic coupling inserted into the foundation studs**

Verankerungssystem mit einer anisotropen Koppelung, die in der Fundamentbolzen eingeführt ist

Système d'anchorage utilisant un accouplement anisotrope inséré dans les goujons de base

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

(30) Priority: **20.09.2004 ES 200402274**

(43) Date of publication of application:
17.05.2006 Bulletin 2006/20

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US-A- 3 521 413 US-A- 3 837 752
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Description

FIELD OF THE INVENTION

[0001] It has application in the construction industry.

BACKGROUND OF THE INVENTION

[0002] Nowadays, the anchorage system is done by means of continuous studs which are inserted into the foundation and joined to the base with screws. The diameter of these studs may be variable, although it is usually of 20 or 22 mm, which gives it extreme stiffness, given the impact of a vehicle, provoking strong decelerations on it which lead to serious injuries or even the death of the occupants of the vehicle.

[0003] Anchorage systems for lampposts, masts and poles for supporting vehicular traffic signs are known from the prior art.

[0004] US-A-521 413 discloses a pole base support which breaks away when struck by a vehicle comprising elongated members mounting on studs. These elongated members include a reduced cross-sectional area and they support the weight of the pole and its loading caused by natural phenomena, but they break by said cross-sectional area when subjected to a lateral impact caused by the collision of a vehicle.

[0005] WO 01/36750 shows and describes a mast for traffic information, lighting or signs including a fastening profile with gripping members which are joined to corresponding gripping members on a mast profile included in the mast by means of friction, performing the retention of the mast to the base. The mast includes a plurality of elongated reinforcement members.

[0006] US-A-3 837 752 discloses an anchorage system for a pole that comprises a base plate and a break-away base assembly having two stiffener plates and a plurality of cylindrical couplers which breaks away if the force of impact upon the pole exceeds predetermined forces as for example, wind forces.

[0007] US-A-5 474 408 describes a break-away coupling for poles and masts with spaced weakened section including a central controlled breaking region and rigid threaded bolts at each end for connection to a base at one end and to a pole or mast at the other end. The breaking region comprises two axially spaced necked-down portions of small diameter and solid cross-section.

DESCRIPTION OF THE INVENTION

[0008] The present invention, as its own title states, makes reference to a completely new system of anchorage for lampposts and other elements of the urban furniture. The main objective of this invention is to create a system of anchorage with the necessary resistance under current regulations to hold the lamppost or the element, but it must also have a controlled resistance given the impact of a vehicle.

[0009] This is achieved by means of the insert of an anisotropic resistance coupling into the foundation studs, as it can be seen in the picture. This is a valid solution because there is a basic difference between the stresses during the life of the lamppost and the stresses generated by the impact of a vehicle.

[0010] During its normal use, a lamppost mainly undergoes the wind stresses and the weight of the own lamppost. These stresses will generate on the system of anchorage sharp stresses of little value and flexor moments which will cause traction-compression stresses in the foundation studs.

[0011] When the impact of a vehicle against the lamppost takes place, the main stresses generated are horizontal therefore, regarding the layout of the studs, they are of sharp type.

[0012] Taking all this into account, the coupling that has been designed presents a high resistance in case of traction-compression stresses, because it causes the overlap of geometries in a large area, and its dimensions have been designed so that it can support the stresses with some little deformations. When a horizontal stress on the lamppost, sharp on the couplings, takes place, taking into account their geometry, the two parts of the coupling can split up because the upper part of the coupling is stiffly joined to the upper stud and the lower part is joined to the other stud. Thus, the stress applied by the vehicle is transmitted to the upper part of the coupling, which will split up from the lower part because it is stiffly joined to the foundation. Thanks to its geometry in the shape of "C", and thanks to the fact that this movement is not completely guided, it allows that this type of coupling works properly in three directions, whereas there is one where there cannot be any separation between the two parts. Therefore, this direction must correspond with the direction of the vehicle which impacts from the exterior of the lane to the roadway because this is the direction that presents less possibility of accident.

[0013] It has been previously mentioned the controlled stiffness of the coupling, given an impact of a vehicle. This control is achieved by means of the use of a mechanical fuse which joins both parts, as it can be seen in figure 2. The dimension and position of this mechanical fuse can be calculated in such a way that when the impact of a vehicle against the support takes place, the mechanical fuse breaks by shear in the joint of both parts. By varying the diameter and/or the material of the mechanical fuse the stiffness of the coupling can be controlled, getting the anchorage of the lamppost not to yield in case of an impact at low speed, but getting it to do it when the impact is at high speed, avoiding the danger that involves their excessive stiffness nowadays.

DESCRIPTION OF THE DRAWINGS

[0014] The pictures included in the present report try, on the one hand, to show in a graphic way how these couplings must be placed in the system of anchorage

and, on the other hand, to give an idea about how the geometry of this anisotropic stiffness coupling must be.

[0015] Figure 1 shows an overview of the system of anchorage. In this figure it can be seen how a coupling must be assembled over each foundation stud and how it is necessary to do the foundation in two parts, one with little hardness concrete and the other with plain concrete. Each of the letters of reference in the picture show the following:

- A. lamppost base
- B. foundation studs
- C. anisotropic coupling
- D. inserted mechanical fuse
- E. foundation die
- F. little hardness concrete
- G. plain concrete

[0016] Figure 2 shows an idea about how this coupling can be made in order to get its suitable performance. Each of the letters of reference in the picture show the following:

- H. upper piece
- I. lower piece
- J. upper stud
- K. lower stud
- L. drill for the laying of the mechanical fuse.
- M. mechanical fuse

Claims

1. System of anchorage by means of anisotropic resistance couplings (C) into foundation studs (B) for a lamppost base (A), said foundation studs (B) comprising lower studs (K) fixed to plain concrete (G) and upper studs (J) fixed to the lamppost base (A), said anisotropic resistance couplings (C) couples the lower studs (K) to the upper studs (J) and each coupling (C) comprises an upper piece (H) fixed to the upper stud (J) and a lower piece (I) fixed to the lower stud (K), the system of anchorage **characterized in that** both pieces (H,I) being connected each other by C-shaped sections which are separated when a horizontal stress is received in the lamppost base (A).
2. System of anchorage by means of anisotropic resistance couplings (C) into foundation studs (B) for a lamppost base (A) according to claim 1, **characterized in that** each coupling (C) comprises a mechan-

ical fuse (M) in the interior of the upper piece (H) and the lower piece (I) fixing said pieces (H,I), the mechanical fuse designed to break when a stress with a predetermined value is received in the lamppost base (A) causing the separation of the upper piece (H) from the lower piece (I).

Patentansprüche

1. System zum Verankern eines Lampenmastfußes (A) in Bettungszapfen (B) mittels Kopplungen mit anisotropem Widerstand (C), wobei die Bettungszapfen (B) untere, an einfachem Beton (G) befestigte Zapfen (K) und obere, an dem Lampenmastfuß (A) befestigte Zapfen (J) aufweisen, wobei die Kopplungen mit anisotropem Widerstand (C) die unteren Zapfen (K) mit den oberen Zapfen (J) verbinden und jede Kopplung (C) ein oberes, am oberen Zapfen (J) befestigtes Stück (H) und ein unteres, am unteren Zapfen (K) befestigtes Stück (I) aufweist, wobei das System mit anisotropem Widerstand **dadurch gekennzeichnet ist, dass** beide Stücke (H, I) durch C-förmige Abschnitte miteinander verbunden sind, die getrennt werden, wenn vom Lampenmastfuß (A) eine horizontale Last aufgenommen wird.
2. System zum Verankern eines Lampenmastfußes (A) in Bettungszapfen (B) mittels Kopplungen mit anisotropem Widerstand (C) nach Anspruch 1, **dadurch gekennzeichnet, dass** jede Kopplung (C) im Inneren des oberen Stücks (H) und des unteren Stücks (I) eine mechanische Sicherung (M) aufweist, die die Stücke (H, I) befestigt, wobei die mechanische Sicherung dafür ausgelegt ist zu brechen, wenn im Lampenmastfuß (A) eine Last mit einem festgelegten Wert aufgenommen wird, wodurch die Trennung des oberen Stücks (H) vom unteren Stück (I) bewirkt wird.

Revendications

1. Système d'ancrage au moyen de couplages à résistance anisotrope (C) dans des goujons de fondation (B) pour une base de lampadaire (A), lesdits goujons de fondation (B) comprenant des goujons inférieurs (K) fixés à du béton ordinaire (G) et des goujons supérieurs (J) fixés à la base de lampadaire (A), lesdits couplages à résistance anisotrope (C) couplant les goujons inférieurs (K) aux goujons supérieurs (J) et chaque couplage (C) comprenant une pièce supérieure (H) fixée au goujon supérieur (J) et une pièce inférieure (I) fixée au goujon inférieur (K), le système d'ancrage étant **caractérisé en ce que** les deux pièces (H, I) sont mutuellement reliées par des sections en forme de C qui sont séparées lorsqu'une contrainte horizontale est reçue dans la base de lam-

padaire.

2. Système d'ancrage par couplages à résistance anisotrope (C) dans des goujons de fondation (B) pour une base de lampadaire (A) selon la revendication 1, **caractérisé en ce que** chaque couplage (C) comprend un fusible mécanique (M) à l'intérieur de la pièce supérieure (H) et de la pièce inférieure (I) fixant lesdites pièces (H, I), le fusible mécanique étant conçu pour se rompre lorsqu'une contrainte d'une valeur prédéterminée est reçue dans la base de lampadaire (A), provoquant la séparation de la pièce supérieure (H) par rapport à la pièce inférieure (I).

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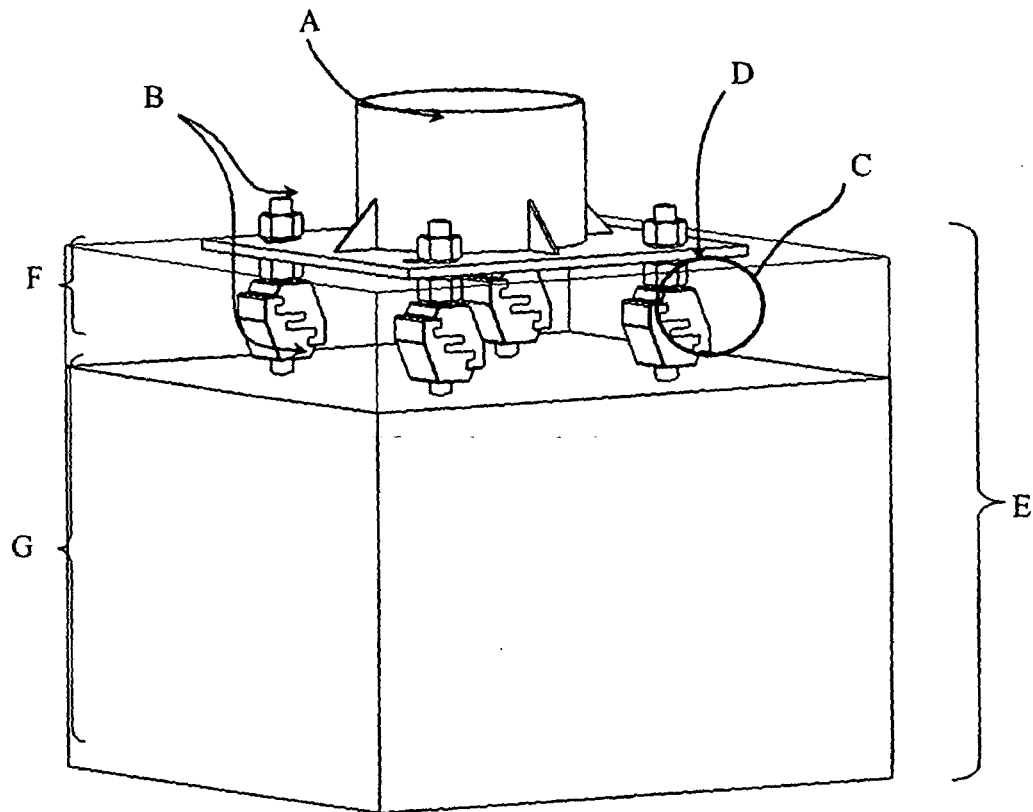


Figure 1 Configuration of the system of anchorage

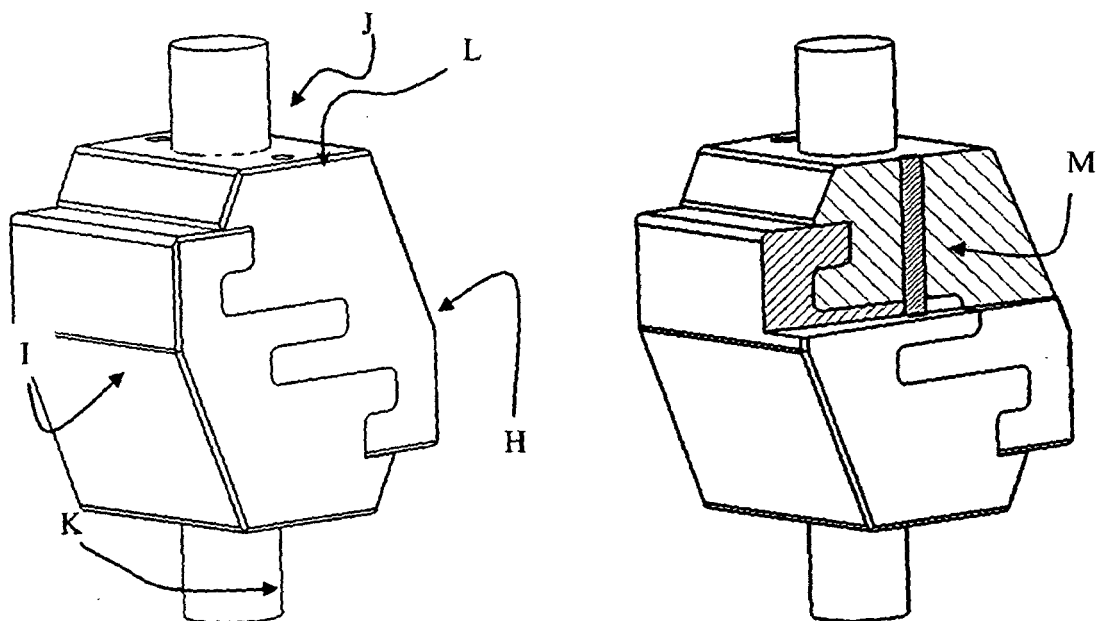


Figure 2 Overview of the anisotropic resistance coupling and the situation of the mechanical fuse.

REFERENCES CITED IN THE DESCRIPTION

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