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(54) **DEVICE FOR WIRE CABLE USED IN CRASH BARRIERS ALONG ROADS**

VORRICHTUNG FÜR IN LEITPLANKEN ENTLANG STRASSEN VERWENDETES DRAHTSEIL

DISPOSITIF POUR CABLES METALLIQUES UTILISES DANS DES BARRIERES DE SECURITE
SUR DES ROUTES

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EP 1 587 990 B1

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Description

[0001] The present invention relates to an arrangement for splicing of wire cables used in crash barriers along roads which are intended to extend along the side of a carriageway and are supported by uprights distributed along the aforementioned carriageway, in that an external conical clamping component, which is arranged divided in its longitudinal sense and exhibits an internally transcurrent hole with an internal thread, is so arranged as to be capable of being connected to a cable made of metal in that the end of a respective metal cable of the kind in question is so arranged as to be accommodated in an aforementioned clamping component, and in that the aforementioned external conical clamping component is capable of being accommodated in an internally conical splicing sleeve.

[0002] Previously disclosed arrangements for causing the splicing of cables made of steel that are intended to provide protection for traffic on roads comprise splicing means which require expensive equipment at the site of erection of the cables, for example in the form of presses to bring about connection of a tubular sleeve to the end of a cable with the help of a press of this kind which costs ca. one hundred thousand kronor, for example such a press which brings about such clamping of the tubular sleeve around the cable and is illustrated in Fig. 13.

[0003] Previously disclosed through US 6,065,738 A is a cable anchor intended specifically for cables alongside carriageways, where anchoring takes place to the ground or to a foundation in the ground. Keyed joints between the cable and internally in a conical hole in a fixing sleeve are used for this purpose, and the cable which extends through the aforementioned fixing sleeve is bolted securely to a ground-anchored attachment. This solution is not applicable, however, for the splicing of cables in the air at a distance from the ground.

[0004] The splicing arrangement previously disclosed through US 2,180,866A comprises a common splicing sleeve (1). Rotation of the aforementioned splicing sleeve causes the clamping effect to be identical at both of its ends. Separate actuation of the respective clamping component is thus not permitted in the aforementioned previously disclosed arrangement, but both pairs of clamping components (5, 6) are actuated jointly by the aforementioned splicing sleeve (1).

[0005] Previously disclosed through US 3,163,904 A is a strand chuck used for line connectors and as anchor grip for wire cable. Breaking strength of the cable is achieved by told strand chuck having teeth inside jaws and with the chuck v-formed and conical and a sleeve having a frusto-conical axial bore and a cylindrical bore. This solution is very complicated and needs expensive special machines.

[0006] The principal object of the present invention is thus, in the first instance, to solve the above-mentioned problem by simple and efficient means and to bring about the secure splicing of cables without the need to use ex-

pensive special machines and tools for this purpose.

[0007] The aforementioned object is achieved by means of an arrangement in accordance with the present claim 1. The clamping components are each connected together with an interconnecting component or an, interconnecting holding stop via its own threaded rod or via its own pair of threaded rods, which threaded rods are connected to one another with the common interconnecting component or the common interconnecting stop.

[0008] The arrangement in accordance with the present invention is described below as a preferred illustrative embodiment, in conjunction with which reference is made to the accompanying drawings, in which:

Fig. 1 shows schematically and in cross section a first embodiment of a splice in accordance with the present invention;

Fig. 2 shows one end of the connecting means which is included in a splice;

Fig. 3 shows schematically a crash barrier which is in the form of steel cables with splices in accordance with the invention;

Figs. 4-5 show a clamping component included in the splice shown respectively in the extended position and in the contracted position;

Figs. 6-8 show an illustrative embodiment of a splice which is not part of the invention;

Fig. 9 shows a sectioned view along the line IX-IX in Fig. 8;

Fig. 10 shows a third illustrative example of a splice viewed from the side;

Fig. 11 shows a fourth illustrative example of a splice in accordance with the invention;

Fig. 12 shows an interconnecting disc included in the aforementioned splice arrangement viewed from its one side; and

Fig. 13 shows a previously disclosed method of splicing cables. The arrangement defined in Claim 1 enables the respective clamping components to be adjusted separately independently of one another, if required. This is not previously disclosed, and it cannot be considered to be obvious to a person skilled in the art.

[0009] The so-called central crash barrier is normally erected in the form of steel cables between the carriageways on roads of a kind which are hazardous due to oncoming traffic, or where the decision has not yet been taken to widen the road into a motorway, although crash barriers of this kind are also erected between motorway carriageways which lie close to one another and in order to prevent vehicles from ending up on oncoming carriageways when overtaking or in the event of accidents involving leaving the road. In order to facilitate the splicing of such cables 1, it is now possible to use an arrangement 2 in accordance with the present invention. The aforementioned cables 1, which are intended to extend along the side 3 of a carriageway 4,5 of the kind in question,

supported by a number of uprights 6 distributed along the carriageway 4, 5 and anchored to the ground, are preferably in the form of strong steel cables 1, as shown in Fig. 9 as the preferred illustrative example.

[0010] A splicing arrangement 2 of this kind is formed by an externally conical clamping component 7, which is so arranged as to be divided into the desired number of parts 7A, 7B, 7C in its longitudinal sense 8 and which exhibits an internally transcurrent hole 9 which is provided with an internal thread 10. The aforementioned clamping component 7 is so arranged as to be capable of being connected to a cable 1 of the kind in question made of metal, in that one end 11 of the respective cable 1 is so arranged as to be capable of being accommodated in an aforementioned clamping component 7. The aforementioned externally conical clamping component 7 is so arranged as to be capable of being accommodated in a splicing sleeve 12 that is internally conical at one end 12A.

[0011] In accordance with the embodiment illustrated in Figs. 1-2, the aforementioned clamping arrangement 2 comprises a threaded bar 13, which is capable of being connected with an attachment component 14 that is also provided with a thread 15, 16. The aforementioned attachment component 14 is capable of being screwed securely with its external thread 16 to an internal thread 17 in each splicing sleeve 12. A common interconnecting component 19 containing threads and capable of being connected to the threads 18 in the respective rod 13 is so arranged as to connect the cables 1, which extend in a direction from one another 20, 21, to one another via clamping components 7 and attachment components 14. Preferably arranged between the attachment components 14 and the clamping components 7 are interacting stop components 22, which can be formed by a number of pins projecting axially from the aforementioned connecting component 14 and/or attachment component 7, a ring or some similar pressure device integrated with the respective attachment component 14. A number of pins is preferably arranged distributed around the periphery of the aforementioned attachment component 14 and/or the clamping component 7.

[0012] Instead of arranging separate projecting stop components 22, the threaded rod 13 can be caused to press directly against the free end 1A of the cable, so that this is forced securely into the clamping component 13, which in turn is clamped in the splicing sleeve.

[0013] The aforementioned clamping component 7 is in three parts in the illustrated example, and the aforementioned parts 7A, 7B, 7C are so arranged as to be held together by an all-round annular element 23, such as an o-ring, which is accommodated in an all-round groove 24 in the aforementioned clamping component 7, which can naturally consist of a different number of components than the aforementioned three. The clamping component 7 also exhibits an internal fine thread 10, preferably an M18 x 1.5 thread, so that the grip on a cable 1 is strong and the cable is retained in the desired grip

in the clamping component 7 when it is caused to move axially 20, 21 into the conical part 25 of the clamping component 7.

[0014] In order to be able to withstand the weather and the wind when erected in the open, the splicing sleeve 12 is manufactured so that it is formed preferably from stainless steel or hot-dip galvanized steel. The clamping component 7 can be executed from carbon steel, for instance.

[0015] The function of the aforementioned arrangement should have emerged from the foregoing, although it can be summarized briefly here in that the conical splicing sleeves 12 are first introduced onto the respective end of the cable so that the end of the cable and the splicing sleeve are situated axially more or less on the same level as one another. The clamping components 7 are then introduced onto the ends of the cables and engage with them so that the keyed joint enters into effect. The next stage involves drawing the cable connections towards one another, for example with the help of a hydraulic jack, using the force at which the cables will subsequently be pre-tensioned. With this force continuing to be applied, the clamping component 14 with the interacting stop components 22 is then screwed onto the respective splicing sleeve, after which the attachment component is tightened, for example with the help of key holes on the flat surface of the attachment component. In the next operation, the threaded rods 13 are screwed onto the respective attachment component. Finally, the two threaded rods are connected to the common interconnection component 19, after which the applied force is released.

[0016] The splicing arrangement 102 illustrated in Figs. 6-8 functions in a different fashion to the splicing arrangement 2 described above and is not a part of the invention. Pairs of round bars 119 then adopt the function of an interconnecting component, and each of these is securely attached to its own internal clamping component 107, in the inner conical cavity 109 of which an end 101 of a cable is capable of being accommodated and so arranged as to be securely clamped. Told arrangement 102, which does not form part of the invention but represents background art, is useful for better understanding of the invention.

[0017] Fig. 10 illustrates a larger splicing arrangement 202, in which the inside of its external tube 219 exhibits right-hand and left-hand threads, and where its keyed joint is externally threaded.

[0018] The disadvantage of this variant is that special tools are then required in order to secure a grip around the cable 101 when its ends require to be clamped.

[0019] Illustrated in Fig. 11 is a variant of the splicing arrangement 302, in which each of the cables 301 enters its own clamping component 307, 312, whereby each of these is connected via its own pair of threaded rods 350, 351 to an interconnection stop 352 via its matching holes 353. Each threaded rod 350, 351 is so arranged by means of its own nut 354 as to be capable of being drawn

into the respective hole 353 when the nuts are tightened. The clamping components 307, 312 can then be introduced in the direction of the arrows 375, 376, so that the cables are tensioned.

[0020] Fig. 13 illustrates the function of an ordinary method of splicing cables with the help of a tube or a sleeve pressed or rolled onto the end of the cable. This method calls for expensive equipment, however, in order to be able to press the associated tube/sleeve with a threaded bar securely onto the cable. equivalent technology, without departing from the area of protection afforded to the invention, as defined in the patent Claims.

Claims

1. Arrangement (1) for splicing of wire cables (1) used in crash barriers along roads which are intended to extend along the side (3) of a carriageway (4, 5) and are supported by uprights (6) distributed along the aforementioned carriageway (4, 5), in that an external conical clamping component (7), which is arranged divided in its longitudinal sense (8) and exhibits an internally transcurrent hole (9) with an internal thread (10), is so arranged as to be capable of being connected to a cable (1) made of metal in that the end (11) of a respective metal cable (1) of the kind in question is so arranged as to be accommodated in an aforementioned clamping component (7), and in that the aforementioned external conical clamping component (7) is capable of being accommodated in an internally conical splicing sleeve (12), **characterized in that** the clamping components (7: 307, 312) are each connected together with an interconnecting component (19) or an interconnecting holding stop (352) via its own threaded rod (13) or via its own pair of threaded rods (350, 351), which threaded rods (13:350, 351) are connected to one another with the common interconnecting component (19) or the common interconnecting stop (352).
2. Arrangement in accordance with Patent Claim 1, **characterized in that** an attachment component (14) provided with threads (15, 16) capable of being connected to a threaded rod (13) at its respective end is so arranged as to be capable of being screwed securely to an internal thread (17) in each splicing sleeve (12), and **in that** a common interconnecting component (19) containing threads and capable of being connected to the threads (18) in the respective rod (13) is so arranged as to connect the cables to one another via clamping components (7) and attachment components (14).
3. Arrangement in accordance with one or other of Patent Claims 1-2, **characterized in that** interacting stop components (22) are arranged between the attachment components (14) and the clamping com-

ponents (7).

4. Arrangement in accordance with Patent Claim 3, **characterized in that** the aforementioned stop components are in the form of a number of pins (22), ring or similar projecting axially (20, 21) from the aforementioned connecting component (14) and/or attachment component and integrated with the same.
5. Arrangement in accordance with Patent Claim 4, **characterized in that** a number of pins (22) is arranged distributed around the periphery of the attachment component (14) and/or the clamping component (7).
6. Arrangement in accordance with one or other of the foregoing Patent Claims, **characterized in that** the clamping component (7) is divided into three parts (7A, 7B, 7C), for example, and is so arranged as to be held together by an all-round annular element (23), such as an o-ring.
7. Arrangement in accordance with Patent Claim 6, **characterized in that** the annular element (23) is accommodated in an all-round groove (24) in the aforementioned clamping component (7).
8. Arrangement in accordance with one or other of the foregoing Patent Claims, **characterized in that** the clamping component (7) exhibits an internal fine thread (10).
9. Arrangement in accordance with Patent Claim 8, **characterized in that** the thread (10) is in the form of an M18 x 1.5 thread.
10. Arrangement in accordance with one or other of Patent Claims 1-9, **characterized in that** the splicing sleeve (12) is formed from stainless or hot-dip galvanized steel.

Patentansprüche

1. Anordnung (1) zum Spleißen von Drahtseilen (1), die in Leitplanken entlang von Straßen verwendet wird, welche sich entlang der Seite (3) einer Fahrbahn (4, 5) erstrecken sollen und durch Pfosten (6) abgestützt sind, die entlang der vorstehend erwähnten Fahrbahn (4, 5) verteilt sind, indem ein außen konisches Klemmbauteil (7), das in seiner Längsrichtung (8) geteilt eingerichtet ist und ein inneres Durchgangsloch (9) mit einem Innengewinde (10) aufweist, derart eingerichtet ist, dass es mit einem aus Metall hergestellten Seil (1) verbunden sein kann, indem das Ende (11) des jeweiligen Metallseils (1) der betreffenden Art derart eingerichtet ist, dass

es in einem vorstehend erwähnten Klemmbauteil (7) aufgenommen ist, und indem das vorstehend erwähnte außen konische Klemmbauteil (7) in einer innen konischen Spleißhülse (12) aufgenommen sein kann, **dadurch gekennzeichnet, dass** die Klemmbauteile (7:307, 312) jeweils mit einem Verbindungsbauteil (19) oder einem Verbindungshalteanschlag (352) über ihren eigenen Gewindestab (13) oder über ihr eigenes Paar Gewindestäbe (350, 351) miteinander verbunden sind, wobei die Gewindestäbe (13:350, 351) mit dem gemeinsamen Verbindungsbauteil (19) oder dem gemeinsamen Verbindungsanschlag (352) miteinander verbunden sind.

2. Anordnung nach Patentanspruch 1, **dadurch gekennzeichnet, dass** ein Befestigungsbauteil (14), das mit Gewinden (15, 16) versehen ist, die mit einem Gewindestab (13) an seinem jeweiligen Ende verbunden sein können, derart eingerichtet ist, dass es sicher an ein Innengewinde (17) in jeder Spleißhülse (12) geschraubt sein kann, und dass ein gemeinsames Verbindungsbauteil (19), das Gewinde enthält und mit den Gewinden (18) in dem jeweiligen Stab (13) verbunden sein kann, derart eingerichtet ist, dass die Seile über Klemmbauteile (7) und Befestigungsbauteile (14) miteinander verbunden sind.
3. Anordnung nach dem einen oder anderen der Patentansprüche 1 - 2, **dadurch gekennzeichnet, dass** wechselwirkende Anschlagbauteile (22) zwischen den Befestigungsbauteilen (14) und den Klemmbauteilen (7) angeordnet sind.
4. Anordnung nach Patentanspruch 3, **dadurch gekennzeichnet, dass** die vorstehend erwähnten Anschlagbauteile in der Form einer Anzahl von Stiften (22), eines Rings oder Ähnlichem vorliegen, die axial (20, 21) von dem vorstehend erwähnten Verbindungsbauteil (14) und/oder Befestigungsbauteil vorstehen und mit selbigem integriert sind.
5. Anordnung nach Patentanspruch 4, **dadurch gekennzeichnet, dass** die Anzahl von Stiften (22) um den Umfang des Befestigungsbauteils (14) und/oder des Klemmbauteils (7) herum verteilt ist.
6. Anordnung nach dem einen oder anderen der vorstehenden Patentansprüche, **dadurch gekennzeichnet, dass** das Klemmbauteil (7) beispielsweise in drei Teile (7A, 7B, 7C) geteilt ist, und derart eingerichtet ist, dass es durch ein vollständig rundes Ringelement (23), wie etwa einen O-Ring, zusammengehalten ist.
7. Anordnung nach Patentanspruch 6, **dadurch gekennzeichnet, dass** das Ringelement (23) in einer

vollständig runden Nut (24) in dem vorstehend erwähnten Klemmbauteil (7) aufgenommen ist.

8. Anordnung nach dem einen oder anderen der vorstehenden Patentansprüche, **dadurch gekennzeichnet, dass** das Klemmbauteil (7) ein inneres Feingewinde (10) aufweist.
9. Anordnung nach Patentanspruch 8, **dadurch gekennzeichnet, dass** das Gewinde (10) in der Form eines M18 x 1,5-Gewindes vorliegt.
10. Anordnung nach dem einen oder anderen der Patentansprüche 1 - 9, **dadurch gekennzeichnet, dass** die Spleißhülse (12) aus rostfreiem oder feuerverzinktem Stahl gebildet ist.

Revendications

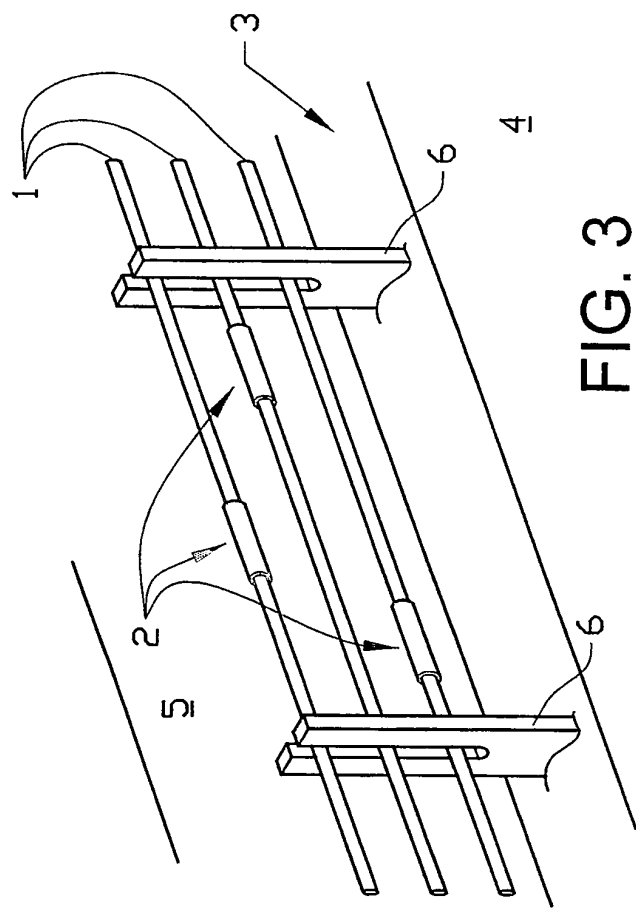
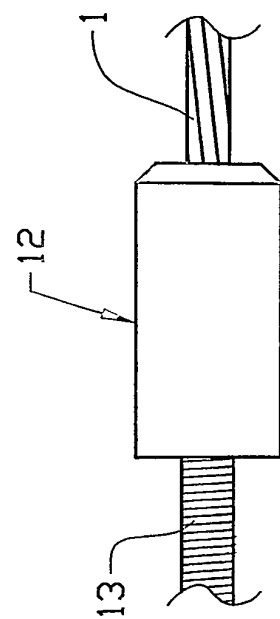
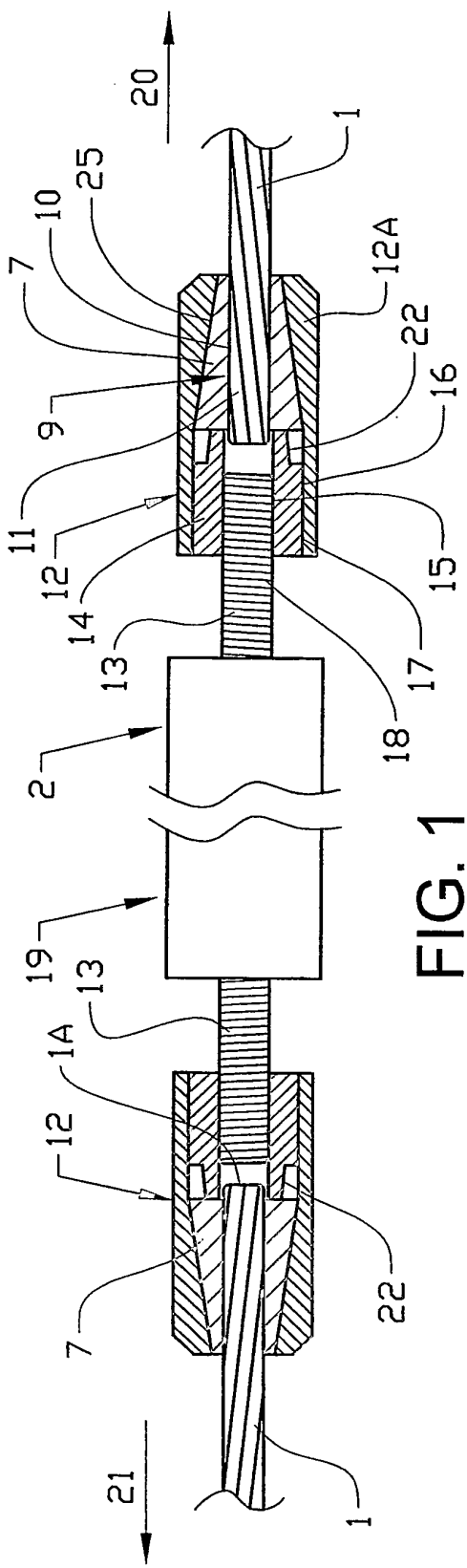
1. Dispositif (2) pour le raccordement de câbles métalliques (1) utilisés dans les glissières de sécurité le long des routes qui sont prévues pour s'étendre le long d'un côté (3) d'une chaussée (4, 5) et qui sont portées par des montants (6) espacés le long de la chaussée susmentionnée (4, 5), selon lequel un élément de serrage à partie externe conique (7), qui est scindé dans le sens longitudinal (8) et qui présente un orifice traversant interne (9) avec un filetage interne (10), est prévu pour être raccordé à un câble métallique (1), selon lequel l'extrémité (11) d'un câble métallique (1) respectif du type en question est prévu pour être logé dans un élément de serrage (7) susmentionné, et selon lequel l'élément de serrage à partie externe conique (7) susmentionné peut être logé dans une douille d'épissure (12) à partie interne conique, **caractérisé en ce que** les éléments de serrage (7:307, 312) sont chacun raccordés à un élément de raccordement (19) ou à une butée de maintien de raccordement (352) par l'intermédiaire de sa propre tige filetée (13) ou par l'intermédiaire de sa propre paire de tiges filetées (350, 351), lesquelles tiges filetées (13:350, 351) sont raccordées les unes aux autres avec l'élément de raccordement (19) commun ou avec la butée de raccordement (352) commune.
2. Dispositif selon la revendication 1, **caractérisé en ce qu'un** élément de fixation (14) présentant des filetages (15, 16) pouvant être raccordés à une tige filetée (13) à son extrémité respective est prévu pour être vissé solidement dans un filetage interne (17) de chaque douille d'épissure (12), et **en ce qu'un** élément de raccordement (19) commun présentant des filetages et pouvant être raccordé aux filetages (18) dans la tige respective (13) est prévu pour raccorder les câbles les uns aux autres par l'intermédiaire d'éléments de serrage (7) et d'éléments de

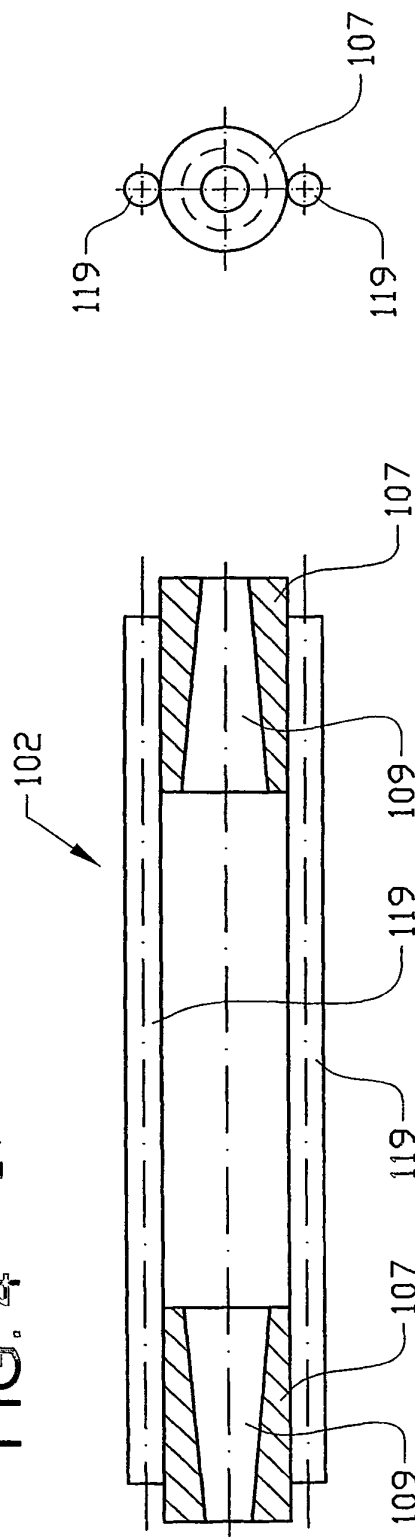
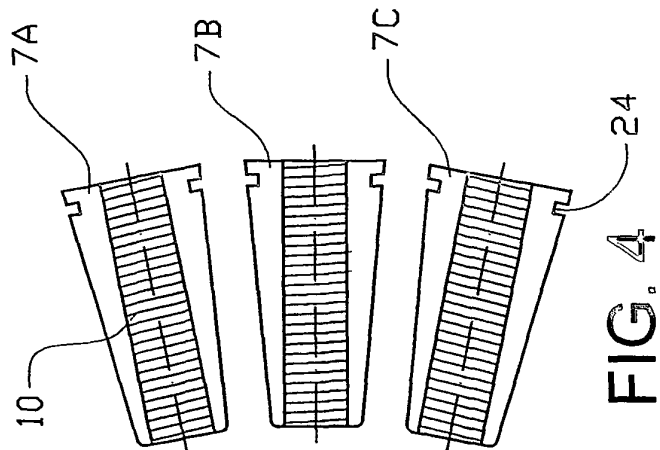
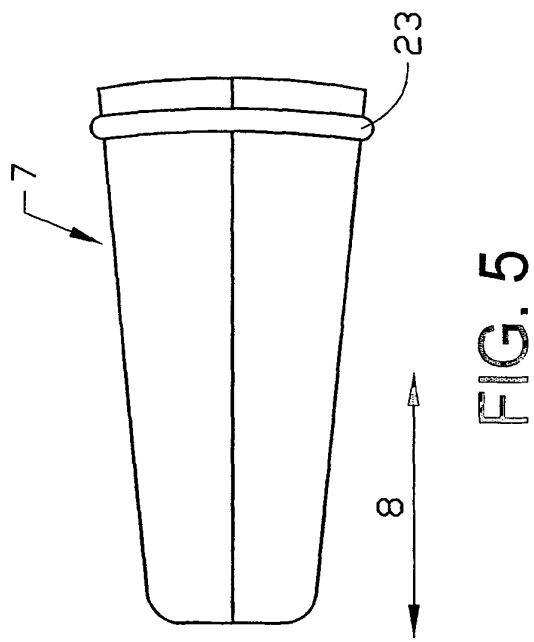
fixation (14).

3. Dispositif selon l'une quelconque des revendications 1 à 2, **caractérisé en ce que** des éléments de butée agissant l'un sur l'autre (22) sont prévus entre les éléments de fixation (14) et les éléments de serrage (7). 5
4. Dispositif selon la revendication 3, **caractérisé en ce que** les éléments de butée susmentionnés sont sous la forme d'un certain nombre de goupilles (22), d'anneaux ou analogues faisant saillie de manière axiale (20, 21) hors de l'élément de fixation (14) susmentionné et/ou de l'élément de fixation et d'une seule pièce avec celui-ci. 10 15
5. Dispositif selon la revendication 4, **caractérisé en ce qu'un** certain nombre de goupilles (22) sont prévues réparties sur le pourtour de l'élément de fixation (14) et/ou de l'élément de serrage (7). 20
6. Dispositif selon l'une quelconque des revendications précédentes, **caractérisé en ce que** l'élément de serrage (7) est scindé par exemple en trois parties (7A, 7B, 7C), et est prévu pour être groupé par avec un élément annulaire (23) périmétrique, tel qu'un anneau torique. 25
7. Dispositif selon la revendication 6, **caractérisé en ce que** l'élément annulaire (23) est logé dans une gorge (24) périmétrique de l'élément de serrage susmentionné (7). 30
8. Dispositif selon l'une quelconque des revendications précédentes, **caractérisé en ce que** l'élément de serrage (7) présente un filetage fin interne (10). 35
9. Dispositif selon la revendication 8, **caractérisé en ce que** le filetage (10) est sous la forme d'un filetage M18 x 1,5. 40
10. Dispositif selon l'une quelconque des revendications 1 à 9, **caractérisé en ce que** la douille d'épissure (12) est réalisée en acier inoxydable ou en acier galvanisé à chaud. 45

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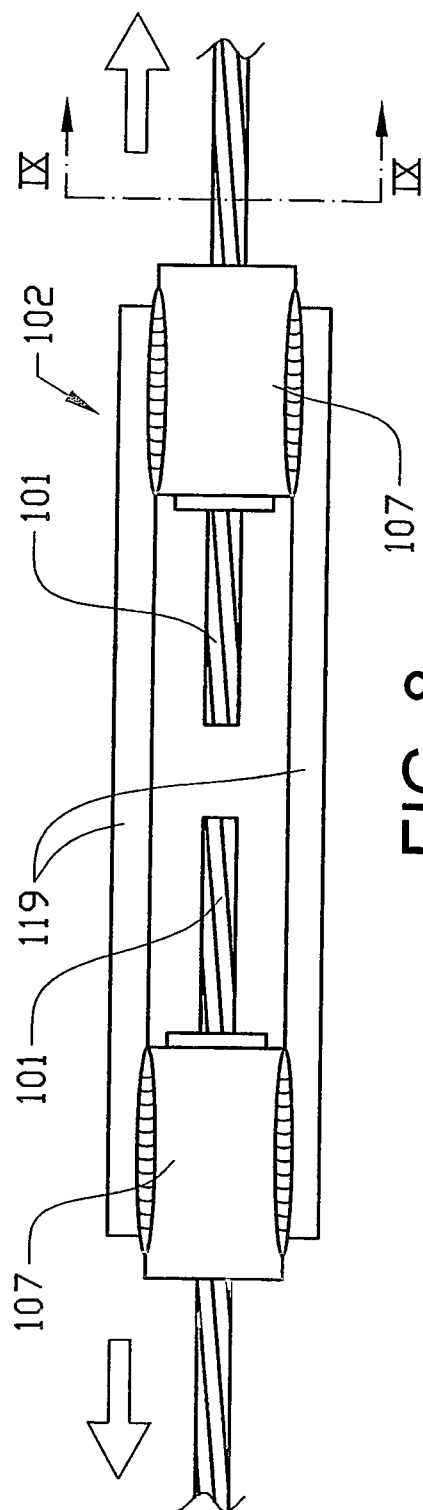


FIG. 8

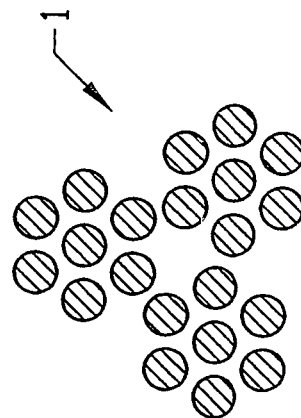


FIG. 9

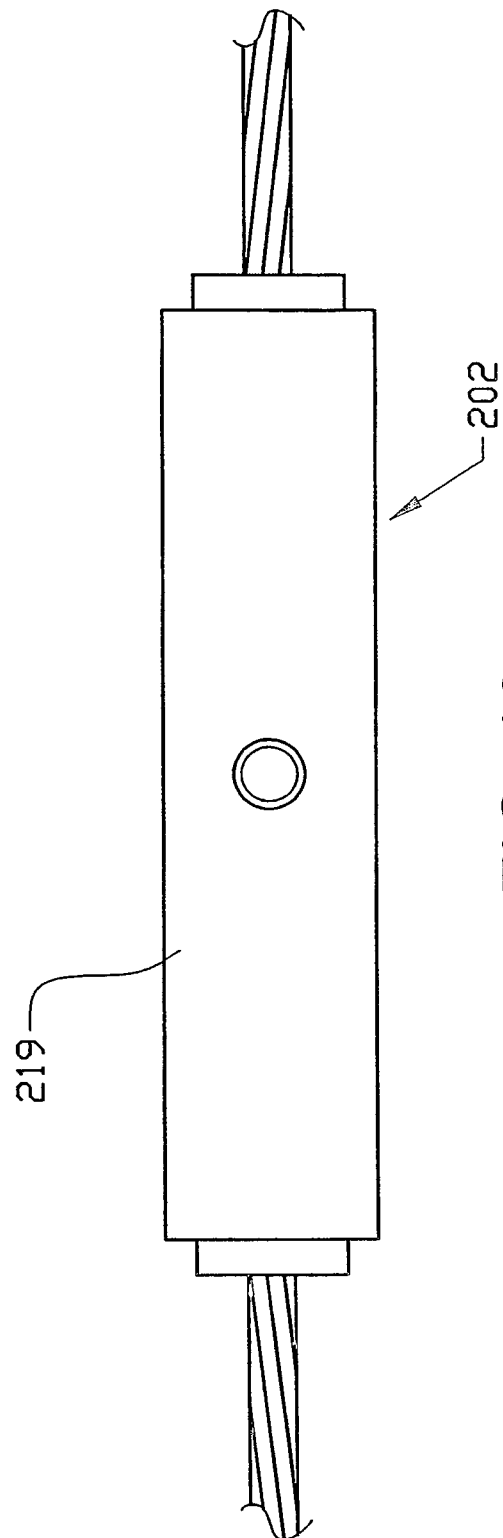
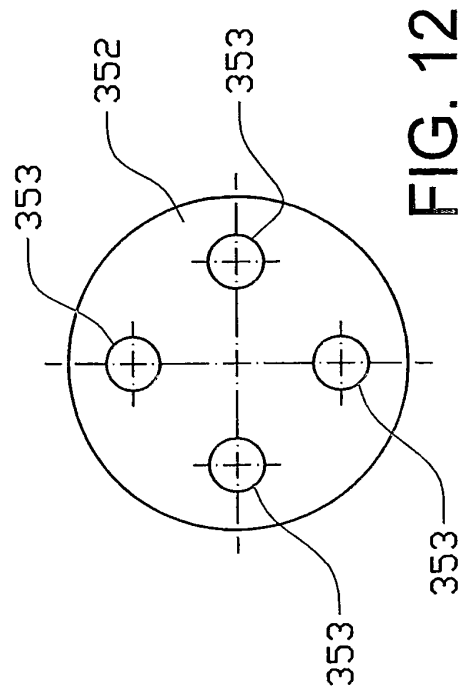
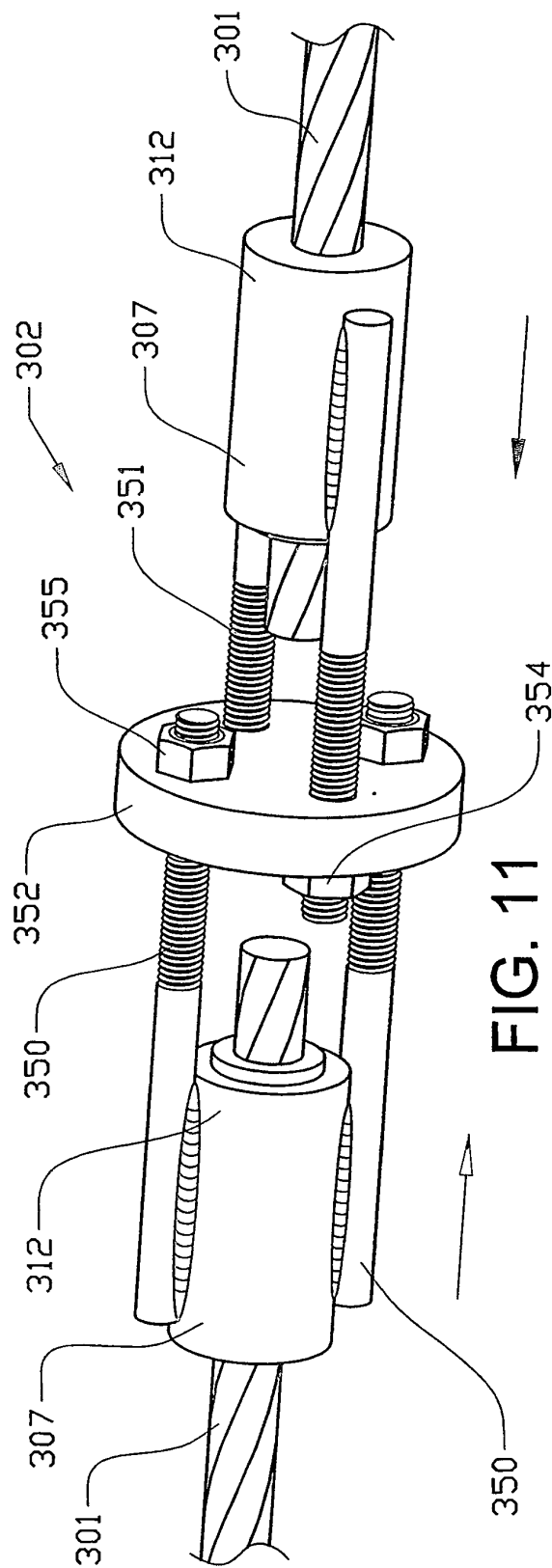


FIG. 10



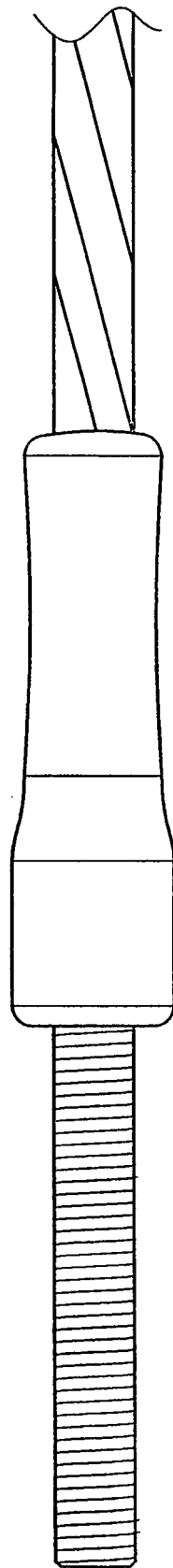


FIG. 13

REFERENCES CITED IN THE DESCRIPTION

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