

(19)



(11)

EP 2 652 226 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:

08.04.2020 Bulletin 2020/15

(51) Int Cl.:

E04H 17/10 ^(2006.01) **E04H 17/12** ^(2006.01)
A01K 3/00 ^(2006.01) **H01B 17/14** ^(2006.01)
E04H 17/26 ^(2006.01)

(21) Application number: **11848059.9**

(86) International application number:

PCT/NO2011/000341

(22) Date of filing: **12.12.2011**

(87) International publication number:

WO 2012/081989 (21.06.2012 Gazette 2012/25)

(54) DEVICE AND METHOD OF ESTABLISHING A WIRE FENCE

VORRICHTUNG UND VERFAHREN ZUR HERSTELLUNG EINES DRAHTZAUNS

DISPOSITIF ET PROCÉDÉ PERMETTANT DE RÉALISER UNE CLÔTURE EN FILS DE FER

(84) Designated Contracting States:

**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO
PL PT RO RS SE SI SK SM TR**

(72) Inventor: **VESHOVDA, Svein Narve**
N-4370 Egersund (NO)

(30) Priority: **15.12.2010 NO 20101758**

(74) Representative: **Håmsø Patentbyrå AS**
P.O. Box 171
4301 Sandnes (NO)

(43) Date of publication of application:
23.10.2013 Bulletin 2013/43

(56) References cited:

FR-A- 1 559 618 US-A- 393 504
US-A- 1 998 185 US-A- 3 749 820
US-A- 4 982 932

(73) Proprietor: **Veshovda Gjerdessystem A/S**
4370 Egersund (NO)

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

EP 2 652 226 B1

Description

[0001] A wire fencing system including one or more fencing wires supported by at least two posts is described. A method of establishing and repairing a wire fencing system is described as well.

[0002] Fencing systems are used for many purposes, to prevent animals from moving out of a defined area, typically a pasture, or to prevent animals from moving into a defined area, for example a road or railway line, among other things. Setting up and maintaining such fencing systems is resource-intensive and such fencing systems often suffer from a short service life. To provide an effective, durable fence by the current techniques, woven fences with post-spacing of less than 2 metres are used to a great extent. A 100-metre roll of conventional sheep netting weighs 70-80 kg and is quite demanding to handle, especially in rugged terrain. It is also demanding to make a fence like that follow a hilly terrain satisfactorily. A further problem is to adapt the height of the fence to varying needs, for example when a portion of a fence needs to be heightened because of the shape of the terrain or locally large snow depths at, for example, a wildlife fence towards a road or railway. Yet another problem that occurs with the current fencing systems is corrosion in hanging means or fencing materials, which leads to reduced life for the fence in its entirety.

[0003] From US1998185A is known a wire stretcher comprising a cylinder with a wide exterior groove therein for receiving a portion of the wire, the wire being adapted to be attached to the cylinder by means of a bolt threaded in a hole in the cylinder slightly below the groove. The upper end of the cylinder is provided with ratchet teeth, and an annular row of holes is formed in the lower end of the cylinder to engage with a tool arranged for rotating the cylinder. An upper collar is attached to the post above the cylinder by a bolt. The collar has depending lugs attached to its exterior circumference with the lower ends of the lugs being bent inwardly to engage the upper shoulder formed by the groove. The collar is also formed with a notch for receiving a dog for cooperation with the ratchet teeth for holding the cylinder against retrograde movement. Neither a wire abutment being provided with a side opening nor with an elongated bore in a projecting portion of the cylinder for supporting a portion of the wire is disclosed.

[0004] FR1559618A discloses a sleeve shaped insulating electric fence wire attachment (insulator) provided with a flange arranged for attaching the insulator to a post. Two parallel first lugs extending from a sleeve and a second hook-shaped lug extending from the sleeve perpendicular to the first lugs are arranged to receive an end portion of a pig's tail formed wire holder, the wire passing through the helix of said holder in a direction perpendicular to the centre axis of said end portion. No wire abutment formed as an elongated bore in a projecting portion of the sleeve is disclosed.

[0005] From US393504A is known a fence clip assembly

bly for securing strands of fence wiring to posts, the clip comprising a pair of ears arranged to receive an insulator provided with a flange with a boss projecting from one face thereof and with oppositely extending fingers spaced outwardly on opposite face. A groove extends between the fingers and the fingers have tip ends respectively spaced from the flange by bridge members between the fingers. Each bridge member is grooved so that a taut wire will extend straight across the bridge members, between the flange and the fingers. No spool or sleeve formed fence wire attachment unit is disclosed. Furthermore, there is no wire abutment formed as an elongated bore in a projecting portion of the insulator.

[0006] The invention has for its object to remedy or reduce at least one of the drawbacks of the prior art or at least provide a useful alternative to the prior art.

[0007] The object is achieved through features which are specified in the description below and in the claims that follow.

[0008] A wire fencing system according to claim 1 is provided, formed with one or more fencing wires extending substantially parallel to the underlying terrain, in which a fence post has a sleeve-shaped attachment unit attached to it. The attachment unit has several functions, it functioning in general as a wire attachment fixed at a prescribed height above the terrain to a fence post, a centre bore of the sleeve-shaped attachment unit being arranged to accommodate a portion of the fence post, and the attachment unit being fixable to the fence post in an arbitrary position by means of one or more fixing screws arranged substantially radially. The attachment unit is arranged to anchor a fencing wire, for example an end portion of a fencing wire at the starting point of the fence or at a joint. Furthermore, the attachment unit is provided with fencing-wire supporting means, the attachment unit being provided with more cut-outs which are arranged to accommodate a portion of the fencing wire, the fencing wire being movable in the axial direction, but being restricted in the radial direction. At least a side opening of a first cut-out is opened and closed for the insertion of the fencing wire in a radial direction by an elastic lip being able to be pressed inwards from an abutment, thereby creating a passage for the fencing wire between the lip and the abutment.

[0009] A portion of the attachment unit is formed as a spool arranged in association with at least one wire attachment to which an end portion of the fencing wire is anchored, by the fencing wire being passed through a passage in a projecting end portion of the reel portion and being passed back externally and wound around the extended fencing wire in the immediate vicinity of the wire attachment. In one embodiment, the attachment unit is provided with two wire attachments arranged diametrically opposite each other. When terminating a stretch of fencing, the fencing wire is anchored, and then the attachment unit is rotated until the fencing wire has achieved the prescribed tightening, the fencing wire being spooled onto the spool portion.

[0010] When there is a break in a fencing wire, a suitable length of wire is advantageously spliced in, and the two loose wire ends are anchored to the nearest attachment unit. The attachment unit is then rotated, both wires being spooled simultaneously onto the spool portion, so that the desired tightening is achieved.

[0011] An end portion of the attachment unit is provided with a flange including several axial cut-outs. The flange forms a connecting portion for joining two opposite attachment units, as fastening means, typically screws, are passed through the cut-outs, fixing the two attachment units to each other. The combined, double attachment unit may thereby be used to extend a fence post.

[0012] A side portion of the attachment unit opposite the fencing-wire supporting means is provided with a radially arranged threaded hole which opens into a side-abutment surface arranged to receive the side-abutment surface of an adjacent attachment unit, the two attachment units arranged side by side being mutually joined together by means of a pin screw or the like arranged in the threaded hole. By slipping one of the two combined attachment units onto a fence post and placing the centre opening of the other one of the two combined attachment units at an angle relative to the centre opening of the first one, a diagonal rod may be extended from the combined attachment units into the ground for the stabilization of a fence post. By the side-abutment surface being arranged parallel to the elongated opening or openings in the fencing-wire supporting means, the diagonal rod will have a direction that coincides with the direction of the fencing wire. When there is a need for lateral support in some other direction, the fence post is provided with a set of combined attachment units which are positioned at a distance from the fencing wire(s) and oriented in a direction that provides a desired position for a diagonal rod.

[0013] In one embodiment, the attachment unit is formed out of an electrically insulating material. In one embodiment, the wire fencing system also includes a wire support unit provided with fencing-wire supporting means of the same type as those described for the attachment unit described above. The wire support unit is arranged for attachment to an arbitrary mantle portion of a wooden fence post, a ring segment forming a base for said fencing-wire supporting means. The ring segment is typically provided with holes extending radially through it, for the insertion of fastening means, for example screws. The wire support unit is typically used on fence stretches in which there is no need for tightening, that is to say axial anchoring of the fencing wire.

[0014] In one embodiment, the wire support unit is formed out of an electrically insulating material.

[0015] The disclosure also provides a method of setting up and repairing a wire fence by the use of the attachment unit and the wire support unit according to the invention.

[0016] In a first aspect, the disclosure relates more specifically to a wire fencing system including one or more fencing wires supported by at least two posts, at

least some of the posts being provided with one or more attachment units which are each arranged in a rotatable manner around a portion of the post, the attachment unit comprising a sleeve-shaped body being provided with means arranged to releasably fix the attachment unit relative to the post, at least one wire attachment arranged to fix a wire end portion in the axial direction of the fencing wire, a first wire abutment arranged to support a portion of the fencing wire, the first wire abutment being provided with a side opening being closable by an elastic lip and arranged for a portion of the fencing wire to be passed through it radially, said first wire abutment being arranged for surrounding said portion of the fencing wire and restricting the radial movement of said fencing-wire portion relative to the attachment unit, a spool portion arranged to receive the fencing wire externally, and an end flange provided with several bores directed axially, distributed in the circumferential direction of the flange, characterized in that a second wire abutment is formed as an elongated bore in a projecting portion of said body.

[0017] The spool portion may be in association with the at least one wire attachment. Diametrically opposite the wire abutment, a side-abutment surface may be arranged parallel to the centre axis of the wire abutment and to the centre axis of the sleeve-shaped body, and in the side-abutment surface, a radial bore arranged to receive a threaded bolt may be arranged.

[0018] A post-joining sleeve may include two attachment units of axially opposite directions, which are connected to each other by end flanges, which are arranged on the sleeve-shaped bodies, bearing against each other and being connected by means of coupling bolts extending through flange holes arranged axially.

[0019] A diagonal-rod attachment may include two attachment units which are connected to each other by side-abutment surfaces, arranged diametrically opposite the wire abutment and parallel to the centre axis of the wire abutment and to the centre axis of the sleeve-shaped body, being placed opposite each other in mutual abutment, the attachment units being held together by means of a threaded bolt arranged in a radial bore in the side-abutment surface, and the centre axis direction of a first attachment unit deviating from the centre axis direction of a second attachment unit.

[0020] At least some of the posts may be provided with one or more wire support units which are each arranged on a portion of the post, a body in the shape of a ring segment being provided with means arranged to secure the wire support unit to a portion of a mantle surface of the post and being provided with at least one wire abutment arranged to support a portion of the fencing wire, the wire abutment surrounding said portion of the fencing wire and restricting the radial movement of said fencing-wire portion relative to the wire support unit.

[0021] In a second aspect of the disclosure, the invention relates to a method according to claim 7 of establishing and repairing a wire fencing system, the method including the following steps:

providing a line of posts projecting up from a base; providing at least each one of the first and last posts in the line of posts with at least one attachment unit as defined in the first aspect of the invention fixed at a prescribed height above the base;

securing an end portion of a fencing wire to a wire attachment on the attachment unit of the first post; passing a second end portion of the fencing wire up to the last post as a portion of the fencing wire is passed through side openings (138) in first wire abutments (137) or through elongated bores (135') in projecting portions of sleeve bodies (131) forming second wire abutments (137a) of further attachment units (13), or through side openings in first wire abutments (142) or through elongated bores in projecting portions forming second wire abutments (142a) of wire support units (14) as defined in claim 6 provided at a prescribed height above the base (2) on the intermediate posts (11),

securing the second end portion of the fencing wire to a wire attachment on the attachment unit of the last post;

spooling a portion of the first or second end portion of the fencing wire onto the attachment unit of the respective post by rotating the respective attachment unit around its centre axis until the prescribed tightening of the fencing wire has been achieved;

characterized in that the method includes the further step of:

fixing the attachment unit by screwing at least one fixing screw into abutment against the mantle surface of the respective post.

[0022] A break in a fencing wire may be repaired by the method including the following further steps:

joining a splice wire and a first wire-break end portion together;

securing a second wire end portion and a splice-wire end portion to a wire attachment on the attachment unit of an adjacent post;

spooling a portion of the fencing wire and the splice wire onto the attachment unit by rotating the attachment unit around its centre axis until the prescribed tightening of the fencing wire has been restored; and fixing the attachment unit by screwing at least one fixing screw into abutment against the post.

[0023] Alternatively, a break in a fencing wire may be repaired by the method including the following further steps:

joining a splice wire and a first wire-break end portion together;

placing a first and a second attachment unit on an adjacent post, end portions of the attachment units facing each other;

securing a second wire end portion to a wire attach-

ment on one of the first and second attachment units; securing a splice-wire end portion to a wire attachment on the other one of the first and second attachment units;

spooling a portion of the fencing wire and the splice wire onto the respective attachment units by rotating the attachment units around their centre axes until the prescribed tightening of the fencing wire has been restored;

fixing the attachment unit by connecting the end portions to each other by means of one or more coupling bolts and screwing at least one fixing screw into abutment against the post.

[0024] Stabilization of a post may be provided by the method including further steps:

connecting a first attachment unit and a second attachment unit by a side-abutment surface on each of the attachment units being brought into supporting mutual abutment and held together by means of a threaded bolt arranged in a radial bore in the side-abutment surface, and the centre axis direction of the second attachment unit being placed at an angle relative to the centre axis direction of the first attachment unit;

fixing the first attachment unit on the post;

passing a diagonal rod through the centre bore of the second attachment unit into supporting abutment against the base; and

fixing the diagonal rod in the second attachment unit by screwing at least one fixing screw into abutment against the diagonal rod.

[0025] In what follows is described an example of a preferred embodiment which is visualized in the accompanying drawings, in which:

Figure 1 shows a wire fence according to the invention;

Figure 2 shows an attachment unit for a fencing wire arranged in an arbitrary position on a post with a diameter adapted to the centre bore of the attachment unit;

Figure 2a shows an attachment unit arranged on a top surface of a post with a larger cross section than the centre bore of the attachment unit;

Figure 3 shows a wire support unit for a fencing wire;

Figure 4 shows a side view of a combination of two attachment units for the formation of a post-joining sleeve;

Figure 5 shows a combination of two attachment

units for attaching a diagonal rod to a post; and

Figure 6 shows a wire support unit arranged on a post.

[0026] In figure 1, the reference numeral 1 indicates a wire fencing system provided from several spaced posts 11 arranged in line, projecting up from a base 2. Several fencing wires 12 are extended substantially parallel between first and last posts 11', 11" and are secured to the posts 11, 11', 11" by means of attachment units 13, possibly wire support units 14 which are secured to the posts 11, 11', 11" at a prescribed height above the base 2 (see figure 6). In figure 5, a post 11 provided with a diagonal rod 3 for extra stabilization of the post 11 is shown, a diagonal-rod attachment 5 having been provided by connecting first and second attachment units 13, 13' side by side. A post 11 which is provided with a post extension 113 is shown as well, a post-joining sleeve 4 having been provided by combining first and second attachment units 13, 13' end to end (see figure 4).

[0027] Reference is now made to figure 2, in which the attachment unit 13 is shown in greater detail. A sleeve-shaped body 131 is provided with a centre bore 132. Two diametrically opposite radial bores 133 extend through the body 131 and are arranged to receive fixing screws 133a as the radial bores 133 are provided with an internal threaded portion (not shown).

[0028] Perpendicularly to the diametrically opposite radial bores 133 and centred in a side-abutment surface 134 (see figures 4 and 5), a further radial bore arranged to receive a threaded bolt 134a is arranged.

[0029] At an end portion of the body 13, a spool-shaped portion 136 bounded by an end flange 139 is provided with several flange holes 139a distributed peripherally. At a distance from the end flange 139, the spool portion 136 is provided with two projecting wire attachments 135, each provided with a cut-out 135' arranged for the passing and securing of an end portion 121, 121' of the fencing wire 12.

[0030] Parallel to the opposite radial bores 133 and in a portion projecting from the body 131 opposite the side-abutment surface 134, a first wire abutment 137 and a second wire abutment 137a are arranged. The first wire abutment 137 is provided with a side opening 138 which is closable by means of an elastic lip 138a which is moved, when the side opening is being opened 138, inwards and away from a lip abutment 138b. The second wire abutment 137a is formed as an elongated bore in the projecting portion of the body 131, here identical to the earlier mentioned cut-out of the wire attachment 135.

[0031] In figure 2a the attachment unit 13 is attached to an end surface 111 of a post 11 with a cross section considerably larger than the centre bore 132, the end flange 139 resting against the end surface 111 and being secured by means of fastening means (not shown), typically screws or nails, which have been inserted through

the flange holes 139a and into the end surface 111.

[0032] Reference is then made to figure 3, in which a wire support unit 14 is provided with a body 141 formed as a ring segment. A first wire abutments 142 and a second 142a have been formed in a portion projecting from the body 141 and are formed like the first and second wire abutments 137, 137a of the attachment unit 13, see above. The body 141 is provided with several fixing holes 143 arranged to receive a fastening means, for example a fixing bolt (not shown).

[0033] The sleeve-shaped attachment unit 13 may be formed with a centre bore 132 that fits standardized post diameters of posts formed out of both metal, synthetic material and wood, whereas the wire support unit 14 in the shape of a ring segment is only meant for attachment to materials suitable for the insertion of fastening means, typically screws or nails, into a mantle surface, for example posts formed out of wood or synthetic materials.

[0034] Figure 4 shows two attachment units 13, 13' combined end flange to end flange 139 and held together by means of fastening means 139b, typically screws, which have been passed through the coinciding flange holes 139a. The combined attachment units 13, 13' form a post-joining sleeve 4 of sufficient axial length and rigidity. The post-joining sleeve 4 is secured to the top of a post 11 by means of the fixing screws 133a of the lower attachment unit 13, whereas a post extension 113 is correspondingly secured in the upper attachment unit 13'.

[0035] Reference is then made to figure 5, in which a combination of two attachment units 13, 13' side by side forms a diagonal-rod attachment 5, the respective side-abutment surfaces 134 bearing supportingly against each other, and the attachment units 13, 13' being held together by means of a threaded bolt 134a which is screwed into the threaded portion of the corresponding radial bores 133. The centre axis direction of the second attachment unit 13' is placed at an angle relative to the centre axis direction of the first attachment unit 13. The diagonal-rod attachment 5 is connected to the post 11 which is to be supported, or, possibly, the second attachment unit 13' has been connected to an attachment unit 13 which has already been applied for the attachment or support of the fencing wire 12. A diagonal rod 3 is passed through the centre bore 132 of the second attachment unit into support in the base 2 before the diagonal rod 3 is fixed in the diagonal-rod attachment 5 by means of the fixing screws 133a of the second attachment unit 13'.

[0036] A wire fence 1 is provided by the necessary posts 11 being secured to the base 2. The posts 11, 11', 11" are provided with the attachment units 13 necessary, and for the posts at which there is no need for axial anchoring of the fencing wire 12, wire support units 14 are possibly used. End posts 11', 11" and other posts 11 that need bracing are provided with diagonal rods 3 which are secured by means of diagonal-rod attachments 5. A first end portion 121 of a length of the fencing wire 12 is secured to the wire attachment 135 of an attachment unit 13 on the first post 11', and the fencing wire 12 is extend-

ed to the last post 11" where it is attached to the wire attachment 135 of a corresponding attachment unit 13. On the way, the fencing wire 12 may be passed through the second wire abutments 137a, 142a of intermediate posts 11, or it may, possibly after the fencing wire 12 has been extended, be inserted into the first wire abutments 137, 142 of the intermediate posts through the side openings 138. When a fencing wire length 12 has been extended and connected to the posts 11, it is tightened by one of the attachment units 13 being rotated in such a way that parts of a wire end portion 121, 121' is spooled onto the spool portion 136 of the attachment unit 13.

[0037] When there is a break in a fencing wire 12, the fencing wire 12 is spliced by a splice wire 123 being joined to a first wire-break end portion 122 in such a way that the spliced wire 12 reaches the next post 11, where a splice-wire end portion 124 is secured to the first wire attachment 135 of an attachment unit 13. The length of the second wire-break end portion 122' is adjusted relative to the position of said attachment unit 13 and is secured to the second wire attachment 135a of the attachment unit 13. See figure 1. The attachment unit 13 is then rotated until the spliced wire 12 has its prescribed tightening, and the attachment unit 13 is fixed to the post 11.

[0038] Alternatively, the tightening of the fencing wire 12 after a break may be done individually for the two wire portions 122, 123 by said attachment unit 13 being pulled up from the post 11, turned upside down and slipped onto the post again. A further attachment unit 13' is slipped onto the post as it is shown in figure 4. The wire portions 122, 123 are each secured to a respective attachment unit 13, 13' and tightened separately. After tightening, the two attachment units 13, 13' may possibly be connected to each other as it is described for the post-joining sleeve 4 above and shown in figure 4.

[0039] The tightening of the fencing wire 12 may be carried out by the use of a torque wrench not shown, provided with means arranged for releasable engagement with suitable portions of the attachment unit 13, 13', for example the fixing screws 133a.

Claims

1. A wire fencing system (1) including one or more fencing wires (12) supported by at least two posts (11), at least some of the posts (11) being provided with one or more attachment units (13) which are each arranged in a rotatable manner around a portion of the post (11), the attachment unit (13) comprising a sleeve-shaped body (131), which is provided with

at least one radial bore (133) arranged to receive a fixing screw (133a) for releasably fixing the attachment unit (13) relative to the post (11),
at least one wire attachment (135) arranged to fix a wire end portion (121, 121') in the axial direction of the fencing wire (12),

a first wire abutment (137) arranged for supporting a portion of the fencing wire (12), the first wire abutment (137) being provided with a side opening (138) being closable by an elastic lip (138a) being able to be pressed inwards from an abutment (138b) and arranged for a portion of the fencing wire (12) to be passed through it radially, said first wire abutment (137) being arranged for surrounding said portion of the fencing wire (12) and restricting the radial movement of said fencing-wire portion (12) relative to the attachment unit (13),
a spool portion (136) arranged to receive the fencing wire (12) externally, and
an end flange (139) provided with several bores (139a) directed axially, distributed in the circumferential direction of the flange (139), wherein a second wire abutment (137a) is formed as an elongated bore (135') in a projecting portion of said sleeve-shaped body (131).

2. A wire fencing system (1) in accordance with claim 1, wherein the spool portion (136) is in association with the at least one wire attachment (135).
3. A wire fencing system (1) in accordance with claim 1, wherein, diametrically opposite the first wire abutment (137), a side-abutment surface (134) is arranged parallel to the centre axis of the first wire abutment (137) and to the centre axis of the sleeve-shaped body (131), and in the side-abutment surface (134), a radial bore (133) arranged to receive a threaded bolt (134a) is arranged.
4. A wire fencing system (1) in accordance with claim 1, wherein a post-joining sleeve (4) includes two attachment units (13, 13') of axially opposite directions, which are connected to each other by end flanges (139), which are arranged on the sleeve-shaped bodies (131), resting against each other and being joined together by means of coupling bolts (139b) extending through flange holes (139a) arranged axially.
5. A wire fencing system (1) in accordance with claim 1, wherein a diagonal-rod attachment (5) includes two attachment units (13, 13') which are connected to each other by side-abutment surfaces (134), arranged diametrically opposite the wire abutment (137) and parallel to the centre axis of the wire abutment (137) and to the centre axis of the sleeve-shaped body (131), being placed opposite each other in mutual abutment, the attachment units (13, 13') being held together by means of a threaded bolt (134a) arranged in a radial bore (133) in the side-abutment surface (134), and the centre axis direction of a first attachment unit (13) deviating from the centre axis direction a second attachment unit (13').

6. A wire fencing system (1) in accordance with claim 1, wherein at least some of the posts (11) are provided with one or more wire support units (14) which are each arranged on a portion of the post (11), a body (141) in the shape of a ring segment being provided with means (143) arranged to secure the wire support unit (14) to a portion of a mantle surface (112) of the post (11) and being provided with at least one wire abutment (142) arranged to support a portion of the fencing wire (12), the wire abutment (142) surrounding said portion of the fencing wire (12) and restricting the radial movement of said fencing-wire portion (12) relative to the wire support unit (14).

7. A method of establishing and repairing a wire fencing system (1), the method including the following steps:

providing a line of posts (11, 11', 11'') which project up from a base (2);
providing at least each one of the first and last posts (11', 11'') in the line of posts (11, 11', 11'') with at least one attachment unit (13) as defined in claim 1 fixed at a prescribed height above the base (2);

securing an end portion (121) of a fencing wire (12) to a wire attachment (135) on the attachment unit (13) of the first post (11');

passing a second end portion (121') of the fencing wire (12) up to the last post (11'') as a portion of the fencing wire (12) is passed through side openings (138) in first wire abutments (137) or through elongated bores (135') in projecting portions of sleeve bodies (131) forming second wire abutments (137a) of further attachment units (13), or through side openings in first wire abutments (142) or through elongated bores in projecting portions forming second wire abutments (142a) of wire support units (14) as defined in claim 6 provided at a prescribed height above the base (2) on the intermediate posts (11);

securing the second end portion (121') of the fencing wire (12) to a wire attachment (135) on the attachment unit (13) of the last post (11'');
spooling a portion of the first or second end portion (121, 121') of the fencing wire (12) onto the attachment unit (13) of the respective post (11', 11'') by rotating the respective attachment unit (13) around its centre axis until the prescribed tightening of the fencing wire (12) has been achieved, wherein the method includes the further step of:

fixing the attachment unit (13) by screwing at least one fixing screw (133a) into abutment against the mantle surface (112) of the respective post (11', 11'').

8. A method in accordance with claim 7, wherein a break in a fencing wire (12) is repaired by the method

including the following further steps:

joining a splice wire (123) and a first wire-break end portion (122) together;

securing a second wire end portion (122') and a splice-wire end portion (124) to a wire attachment (135, 135a) on the attachment unit (13) of an adjacent post (11);

spooling a portion of the fencing wire (12) and the splice wire (123) onto the attachment unit (13) by rotating the attachment unit (13) around its centre axis until the prescribed tightening of the fencing wire (12) has been restored; and
fixing the attachment unit (13) by screwing at least one fixing screw (133a) into abutment against the post (11).

9. A method in accordance with claim 7, wherein a break in a fencing wire (12) is repaired by the method including the following further steps:

joining a splice wire (123) and a first wire-break end portion (122) together;

placing a first and a second attachment unit (13, 13') on an adjacent post (11), end portions (139) of the attachment units (13, 13') facing each other;

securing a second wire end portion (122') to a wire attachment (135, 135a) on one of the first and second attachment units (13, 13');

securing a splice-wire end portion (124) to a wire attachment (135, 135a) on the other one of the first and second attachment units (13, 13');

spooling a portion of the fencing wire (12) and the splice wire (123) onto the respective attachment units (13, 13') by rotating the attachment units (13, 13') around their centre axes until the prescribed tightening of the fencing wire (12) has been restored;

fixing the attachment unit (13) by connecting the end portions (139) to each other by means of one or more coupling bolts (139a) and screwing at least one fixing screw (133a) into abutment against the post (11).

10. A method in accordance with claim 7, wherein stabilization of a post (11, 11', 11'') is provided by the method including further steps:

connecting a first attachment unit (13) and a second attachment unit (13') by a side-abutment surface (134) on each of the attachment units (13, 13') being brought into supporting mutual abutment and being held together by means of a threaded bolt (134a) arranged in a radial bore (133) in the side-abutment surface (134), and the centre axis direction of the second attachment unit (13') being placed at an angle relative

to the centre axis direction of the first attachment unit (13);
 fixing the first attachment unit (13) on the post (11, 11', 11");
 passing a diagonal rod (3) through the centre bore (132) of the second attachment unit (13') into supporting abutment against the base (2);
 and
 fixing the diagonal rod (3) in the second attachment unit (13') by screwing at least one fixing screw (133a) into abutment against the diagonal rod (3).

Patentansprüche

1. Ein Drahtzaunsystem (1), aufweisend einen oder mehrere Zaundrahte (12), welche durch mindestens zwei Pfosten (11) gestützt sind, wobei mindestens einige der Pfosten (11) eine oder mehrere Befestigungseinheiten (13) aufweisen, welche jeweils in einer um einen Bereich des Pfostens (11) herum rotierbaren Weise angeordnet sind, wobei die Befestigungseinheit (13) einen hülsenförmigen Körper (131) aufweist, welcher aufweist

- mindestens eine radiale Bohrung (133), welche ausgestattet ist, um eine Fixierschraube (133a) aufzunehmen, um die Befestigungseinheit (13) in Bezug auf den Pfosten (11) lösbar zu befestigen,
- mindestens eine Drahtbefestigung (135), welche ausgestattet ist, um einen Drahtendbereich (121, 121') in der axialen Richtung des Zaundrahtes (12) zu fixieren,
- ein erstes Drahtauflager (137), zur Stützung eines Bereichs des Zaundrahtes (12), wobei das erste Drahtauflager (137) eine seitliche Öffnung (138) aufweist, welche durch eine von einem Anschlag (138b) her nach innen drückbare elastische Lippe (138a) verschliessbar ist, und ausgestattet ist, sodass ein Bereich des Zaundrahtes (12) radial hindurchgeführt werden kann, wobei das erste Drahtauflager (137) ausgestattet ist, den besagten Bereich des Zaundrahtes (12) zu umschliessen und die radiale Bewegung des besagten Bereiches des Zaundrahtes (12) in Bezug auf die Befestigungseinheit (13) zu begrenzen,
- einen Spulenbereich (136), welcher ausgestattet ist, um den Zaundraht (12) äusserlich aufzunehmen, und
- einen Endflansch (139), welcher mehrere axial ausgerichtete Bohrungen (139a) aufweist, welche in der Umfangsrichtung des Flansches (139) verteilt sind, wobei

ein zweites Drahtauflager (137a) als ein Langloch

(135') in einem überstehenden Bereich des besagten hülsenförmigen Körpers (131) gebildet ist.

2. Drahtzaunsystem (1) gemäss Anspruch 1, wobei der Spulenbereich (136) mit der mindestens einen Drahtbefestigung (135) in Verbindung steht.
3. Drahtzaunsystem (1) gemäss Anspruch 1, wobei diametral gegenüber vom ersten Drahtauflager (137), eine Seitenauflagefläche (134) parallel zur Mittelachse des ersten Drahtauflagers (137) und zur Mittelachse des hülsenförmigen Körpers (131) angeordnet ist, und wobei in der Seitenauflagefläche (134) eine radiale Bohrung (133) angeordnet ist, welche zur Aufnahme eines Gewindestiftes (134a) ausgestattet ist.
4. Drahtzaunsystem (1) gemäss Anspruch 1, wobei eine Pfosten-verbindende Hülse (4) zwei Befestigungseinheiten (13, 13') von axial unterschiedlichen Richtungen aufweist, welche miteinander durch Endflansche (139) verbunden sind, welche auf den hülsenförmigen Körpern (131) angeordnet sind, welche sich gegeneinander anlehnen und mittels Verbindungsstiften (139b), welche sich durch axial angeordnete Flanschlöcher (139a) erstrecken, miteinander verbunden sind.
5. Drahtzaunsystem (1) gemäss Anspruch 1, wobei eine Diagonalstabbefestigung (5) zwei Befestigungseinheiten (13, 13') aufweist, welche durch Seitenanschlagsflächen (134) miteinander verbunden sind, welche diametral gegenüber dem Drahtauflager (137) und parallel zur Mittelachse des Drahtauflagers (137) und zur Mittelachse des hülsenförmigen Körpers (131) angeordnet sind, und in gemeinsamem Anschlag gegenüber voneinander platziert sind, wobei die Befestigungseinheiten (13, 13') mittels eines in einer radialen Bohrung (133) in der Seitenanschlagsfläche (134) angeordneten Gewindestiftes (134a) zusammengehalten werden, und wobei die Richtung der Mittelachse einer ersten Befestigungseinheit (13) von der Richtung der Mittelachse einer zweiten Befestigungseinheit (13') abweicht.
6. Drahtzaunsystem (1) gemäss Anspruch 1, wobei mindestens einige der Pfosten (11) eine oder mehrere Stützeinheiten (14) aufweisen, welche jeweils an einem Bereich des Pfostens (11) angeordnet sind, wobei ein Körper (141) in Form eines Ringsegments ein Mittel (143) zur Befestigung der Drahtstützeinheit (14) an einen Bereich einer Mantelfläche (112) des Pfostens (11) aufweist und mindestens ein Drahtauflager (142) aufweist, welches ausgestattet ist, einen Bereich des Zaundrahtes (12) zu stützen, wobei das Drahtauflager (142) den besagten Bereich des Zaundrahtes (12) umschliesst und die ra-

diale Bewegung des besagten Bereichs des Zaundrahtes (12) in Bezug auf die Drahtstützeinheit (14) begrenzt.

7. Verfahren zum Aufbau und zur Reparatur eines Drahtzaunsystems (1), wobei das Verfahren die folgenden Schritte beinhaltet:

- Bereitstellen einer Reihe von Pfosten (11, 11', 11''), welche sich von einer Basis (2) aus nach oben hin erstrecken;
- Versehen von mindestens einem der ersten und mindestens einem der letzten Pfosten (11', 11'') in der Reihe von Pfosten (11, 11', 11'') mit mindestens einer Befestigungseinheit (13) wie in Anspruch 1 definiert, befestigt an einer vorbestimmten Höhe oberhalb der Basis (2);
- Befestigen eines Endbereichs (121) eines Zaundrahtes (12) an einer Drahtbefestigung (135) an der Befestigungseinheit (13) des ersten Pfostens (11');
- Durchführen eines zweiten Endbereichs (121) des Zaundrahtes (12) bis hin zum letzten Pfosten (11'') wenn ein Bereich des Zaundrahtes (12) durch Seitenöffnungen (138) in den ersten Drahtauflagern (137) durchgeführt wird, oder durch Langlöcher (135') in überstehenden Bereichen von Hülsekörpern (131), welche zweite Drahtauflager (137a) von weiteren Befestigungseinheiten (13) bilden, oder durch Seitenöffnungen in ersten Drahtauflagern (142) oder durch Langlöcher in überstehenden Bereichen, welche zweite Drahtauflager (142a) von Drahtstützeinheiten (14) bilden, wie in Anspruch 6 definiert, befestigt an einer vorbestimmten Höhe oberhalb der Basis (2) an den zwischenliegenden Pfosten (11);
- Befestigen des zweiten Endbereichs (121') des Zaundrahtes (12) an einer Drahtbefestigung (135) an der Befestigungseinheit (13) des letzten Pfostens (11'');
- Spulen eines Bereichs des ersten oder zweiten Endbereichs (121, 121') des Zaundrahtes (12) auf die Befestigungseinheit (13) des betreffenden Pfostens (11', 11'') durch Rotieren der betreffenden Befestigungseinheit (13) um ihre Mittelachse bis die vorgeschriebene Spannung des Zaundrahtes (12) erreicht worden ist,

wobei das Verfahren ferner den folgenden Schritt aufweist:

- Fixieren der Befestigungseinheit (13) durch Schrauben der mindestens einen Befestigungsschraube (133a) bis zu einem Anschlag gegen die Mantelfläche (112) des betreffenden Pfostens (11', 11'').

8. Verfahren gemäss Anspruch 7, wobei ein Bruch in einem Zaundraht (12) repariert wird durch das Verfahren einschliesslich der folgenden weiteren Schritte:

- Zusammenfügen eines Spleissdrahtes (123) und eines ersten Drahtbruch-Endbereichs (122);
- Befestigen eines zweiten Draht-Endbereichs (122') und eines Spleissdraht-Endbereichs (124) an eine Drahtbefestigung (135, 135a) an der Befestigungseinheit (13) eines benachbarten Pfostens (11);
- Spulen eines Bereichs des Zaundrahtes (12) und des Spleissdrahtes (123) auf die Befestigungseinheit (13) durch Rotieren der Befestigungseinheit (13) um ihre Mittelachse bis die vorgeschriebene Spannung des Zaundrahtes (12) wiederhergestellt wurde;
- und
- Befestigen der Befestigungseinheit (13) durch Schrauben von mindestens einer Befestigungsschraube (133a) bis zum Anschlag am Pfosten (11).

9. Verfahren gemäss Anspruch 7, wobei ein Bruch in einem Zaundraht (12) repariert wird durch das Verfahren einschliesslich der folgenden weiteren Schritte:

- Zusammenfügen eines Spleissdrahtes (123) und eines ersten Drahtbruch-Endbereichs (122);
- Platzieren einer ersten und einer zweiten Befestigungseinheit (13, 13') an einem benachbarten Pfosten (11), wobei die Endbereiche (139) der Befestigungseinheiten (13, 13') einander gegenüberstehen;
- Befestigen eines zweiten Draht-Endbereichs (122') an eine Drahtbefestigung (135, 135a) an einer der ersten und zweiten Befestigungseinheiten (13, 13');
- Befestigen eines Spleissdraht-Endbereichs (124) an eine Drahtbefestigung (135, 135a) an der anderen der ersten und zweiten Befestigungseinheiten (13, 13');
- Spulen eines Bereichs des Zaundrahtes (12) und des Spleissdrahtes (123) auf die betreffenden Befestigungseinheiten (13, 13') durch Rotieren der Befestigungseinheiten (13, 13') um ihre Mittelachsen bis die vorgeschriebene Spannung des Zaundrahtes (12) wiederhergestellt wurde;
- Fixieren der Befestigungseinheit (13) durch Verbinden der Endbereiche (139) aneinander mittels einem oder mehreren Verbindungsstiften (139a) und Schrauben der mindestens einen Befestigungsschraube (133a) bis zum Anschlag

gegen den Pfosten (11).

10. Verfahren gemäss Anspruch 7, wobei die Stabilisierung eines Pfostens (11, 11', 11'') erreicht wird durch das Verfahren einschliesslich weiterer Schritte:

- Verbinden einer ersten Befestigungseinheit (13) und einer zweiten Befestigungseinheit (13') durch eine Seitenanschlagsfläche (134) an jeder der Befestigungseinheiten (13, 13'), welche zu einem gegenseitigen stützenden Anschlag gebracht werden und mittels eines in einer radialen Bohrung (133) in der Seitenanschlagsfläche (134) angeordneten Gewindestiftes (134a) zusammengehalten werden, und wobei die Richtung der Mittelachse der zweiten Befestigungseinheit (13') in einem Winkel in Bezug auf die Richtung der Mittelachse der ersten Befestigungseinheit (13) platziert wird;
- Fixieren der ersten Befestigungseinheit (13) am Pfosten (11, 11', 11'');
- Durchführen eines Diagonalstabs (3) durch die zentrale Bohrung (132) der zweiten Befestigungseinheit (13') bis zu einem stützenden Anschlag gegen die Basis (2); und
- Fixieren des Diagonalstabs (3) in der zweiten Befestigungseinheit (13') durch Schrauben der mindestens einen Befestigungsschraube (133a) bis zu einem Anschlag gegen den Diagonalstab (3).

Revendications

1. Un système de clôture en fil métallique (1) comprenant un ou plusieurs fils métalliques de clôture (12) supportés par au moins deux poteaux (11), au moins certains des poteaux (11) étant munis d'une ou plusieurs unités de fixation (13) qui sont chacune arrangées de manière rotative autour d'une partie du poteau (11), l'unité de fixation (13) comprenant un corps en forme de manchon (131), qui est muni

d'au moins un alésage radial (133) arrangé pour recevoir une vis de fixation (133a) pour fixer de manière libérable l'unité de fixation (13) par rapport au poteau (11)

d'au moins une pièce de fixation de fil métallique (135) arrangée pour fixer une partie d'extrémité de fil métallique (121, 121') dans la direction axiale du fil métallique de clôture (12), d'au moins une première butée de fil métallique (137) arrangé pour supporter une partie du fil métallique de clôture (12), la première butée de fil métallique (137) étant muni d'une ouverture latérale (138) pouvant être fermée par une lèvre élastique (138a) pouvant être poussée vers l'intérieur à partir de la butée (138b) et arrangée

pour le passage d'une partie du fil métallique de clôture (12) à travers de celle-ci de manière radiale, la dite première butée de fil métallique (137) étant arrangé de manière à entourer ladite partie du fil métallique de clôture (12) et limiter le mouvement radial de ladite partie du fil métallique de clôture (12) par rapport à l'unité de fixation (13),

une partie de bobine (136) arrangée pour recevoir le fil métallique de clôture (12) de manière externe, et

une bride d'extrémité (139) munie de plusieurs alésages (139a) dirigés axialement, distribués dans la direction circonférentielle de la bride (139),

dans lequel une seconde butée de fil métallique (137a) est formée en tant que alésage allongé (135') dans une partie saillante du dit corps en forme de manchon (131).

2. Un système de clôture en fil métallique (1) selon la revendication 1, dans lequel la partie de bobine (136) est en association avec l'au moins une fixation de fil métallique (135).

3. Un système de clôture en fil métallique (1) selon la revendication 1, dans lequel, diamétralement opposé à la première butée de fil métallique (137), une surface de butée latérale (134) est arrangée parallèlement à l'axe central de la première butée de fil métallique (137) et à l'axe central du corps en forme de manchon (131), et dans la surface de butée latérale (134), un alésage radial (133) arrangé pour recevoir un boulon fileté (134a) est arrangé.

4. Un système de clôture en fil métallique (1) selon la revendication 1, dans lequel un manchon de jonction de poteaux (4) comprend deux unités de fixation (13, 13') de directions axialement opposées, qui sont connectées l'une à l'autre par des brides d'extrémité (139), qui sont arrangées sur les corps en forme de manchon (131), en appui l'une contre l'autre, et étant jointes au moyen de boulons de couplage (139b) s'étendant à travers des trous de bride (139a) arrangés axialement.

5. Un système de clôture en fil métallique (1) selon la revendication 1, dans lequel une fixation à tige diagonale (5) comprend deux unités de fixation (13, 13') qui sont connectées l'une à l'autre par des surfaces de butée latérale (134), arrangées diamétralement opposées à la butée de fil métallique (137) et parallèle à l'axe central de la butée de fil métallique (137) et à l'axe central du corps en forme de manchon (131), étant placées en opposition l'une par rapport à l'autre en butée mutuelle, les unités de fixation (13, 13') étant maintenues ensemble au moyen d'un boulon fileté (134a) arrangé dans un alésage radial (133)

dans la surface de butée latérale (134), et la direction de l'axe central d'une première unité de fixation (13) déviant de la direction de l'axe central d'une seconde unité de fixation (13').

6. Un système de clôture en fil métallique (1) selon la revendication 1, dans lequel au moins certains des poteaux (11) sont munis d'une ou plusieurs unités de support de fil métallique (14) qui sont chacune arrangées sur une partie du poteau (11), d'un corps (141) en forme de segment d'anneau étant muni de moyens (143) arrangés pour fixer l'unité de support de fil métallique (14) à une partie d'une surface de manteau (112) du poteau (11) et étant munis d'au moins une butée de fil métallique (142) arrangée pour supporter une partie du fil métallique de clôture (12), la butée de fil métallique (142) entourant ladite partie du fil métallique de clôture (12) et limitant le mouvement radial de ladite partie de fil métallique de clôture (12) par rapport à l'unité de support de fil métallique (14).

7. Un procédé pour établir et réparer un système de clôture en fil métallique (1), le procédé comprenant les étapes suivantes:

fournir une ligne de poteaux (11, 11', 11'') qui font saillie à partir d'une base (2);
fournir au moins chacun des premier et dernier poteaux (11', 11'') dans la ligne des poteaux (11, 11', 11'') avec au moins une unité de fixation (13) comme définie dans la revendication 1 fixée à une hauteur prescrite au-dessus de la base (2);
sécuriser une partie d'extrémité (121) d'un fil métallique de clôture (12) à une fixation de fil métallique (135) sur l'unité de fixation (13) du premier poteau (11');
passage d'une seconde partie d'extrémité (121') de du fil métallique de clôture (12) jusqu'au dernier poteau (11'') tandis qu'une partie du fil métallique de clôture (12) est passée à travers des ouvertures latérales (138) dans des premières butées de fil métallique (137) ou à travers des alésages allongés (135') dans des parties saillantes des cors de manchon (131) formant des secondes butées de fil métallique (137a) d'autres unités de fixation (13), ou à travers des ouvertures latérales dans des premières butées de fil métallique (142) ou à travers des alésages allongés (135') dans des parties saillantes formant des secondes butées de fil métallique (142a) d'unités de support de fil métallique (14) comme définies dans la revendication 6 prévues à une hauteur prescrite au-dessus de la base (2) sur les poteaux intermédiaires (11);
sécuriser une partie d'extrémité (121) d'un fil métallique de clôture (12) à une fixation de fil

métallique (135) sur l'unité de fixation (13) du dernier poteau (11'');

enrouler une partie de la première ou de la seconde partie d'extrémité (121, 121') du fil métallique de clôture (12) sur l'unité de fixation (13) du poteau respectif (11', 11'') en faisant tourner l'unité de fixation respective (13) autour de son axe central jusqu'à ce que le serrage prescrit du fil métallique de clôture (12) ait été réalisé, dans lequel le procédé comprend en outre l'étape de:

fixer l'unité de fixation (13) en vissant au moins une vis de fixation (133a) en butée contre la surface de manteau (112) du poteau respectif (11', 11'').

8. Un procédé selon la revendication 7, dans lequel une rupture d'un fil métallique de clôture (12) est réparée par le procédé comprenant les étapes supplémentaires suivantes:

jointure d'un fil d'épissure (123) et d'une première partie d'extrémité de rupture de fil métallique (122);

fixer une seconde partie d'extrémité de fil métallique (122') et une partie d'extrémité de fil d'épissure (124) à une fixation de fil métallique (135, 135a) sur l'unité de fixation (13) d'un poteau adjacent (11);

enrouler une partie du fil métallique de clôture (12) et du fil d'épissure (123) sur l'unité de fixation (13) en faisant tourner l'unité de fixation (13) autour de son axe central jusqu'à ce que le serrage prescrit du fil métallique de clôture (12) soit rétabli; et

fixer l'unité de fixation (13) en vissant au moins une vis de fixation (133a) en butée contre le poteau (11).

9. Un procédé selon la revendication 7, dans lequel une rupture d'un fil métallique de clôture (12) est réparée par le procédé comprenant les étapes supplémentaires suivantes:

métallique d'un fil d'épissure (123) et d'une première partie d'extrémité de rupture de fil métallique (122);

placer une première et une seconde unités de fixation (13, 13') sur un poteau adjacent (11), les parties d'extrémité (139) des unités de fixation (13, 13') se faisant face;

fixer une seconde partie d'extrémité de fil métallique (122') à une fixation de fil métallique (135, 135a) sur l'une des première et seconde unités de fixation (13, 13');

fixer une partie d'extrémité de fil d'épissure (124) à une fixation de fil métallique (135, 135a) sur l'autre des première et seconde unités de fixa-

tion (13, 13');
 enrouler une partie du fil métallique de clôture
 (12) et du fil d'épissure (123) sur les unités de
 fixation respectives (13, 13') en faisant tourner
 les unités de fixation (13, 13') autour de leurs
 axes centraux jusqu'à ce que serrage prescrit
 de la clôture le fil métallique (12) soit rétabli;
 fixer l'unité de fixation (13) en connectant les
 parties d'extrémité (139) entre elles au moyen
 d'un ou plusieurs boulons de couplage (139a)
 et en vissant au moins une vis de fixation (133a)
 en butée contre le poteau (11).

10. Un procédé selon la revendication 7, dans lequel la
 stabilisation d'un poteau (11, 11', 11'') est assurée
 par le procédé comprenant les étapes supplémen-
 taires:

connecter une première unité de fixation (13) et
 une seconde unité de fixation (13') par une sur-
 face de butée latérale (134) sur chacune des
 unités de fixation (13, 13') étant amenées dans
 une butée mutuelle de support et maintenues
 ensemble au moyen d'un boulon fileté (134a)
 disposé dans un alésage radial (133) dans la
 surface de butée latérale (134), et la direction
 de l'axe central de la seconde unité de fixation
 (13') étant placée à un angle par rapport à la
 direction de l'axe central de la première unité de
 fixation (13);
 fixer la première unité de fixation (13) sur le po-
 teau (11, 11', 11'');
 faire passer une tige diagonale (3) à travers l'alé-
 sage central (132) de la seconde unité de fixa-
 tion (13') dans une butée de support contre la
 base (2); et
 fixer la tige diagonale (3) dans la seconde unité
 de fixation (13') en vissant au moins une vis de
 fixation (133a) en butée contre la tige diagonale
 (3).

45

50

55

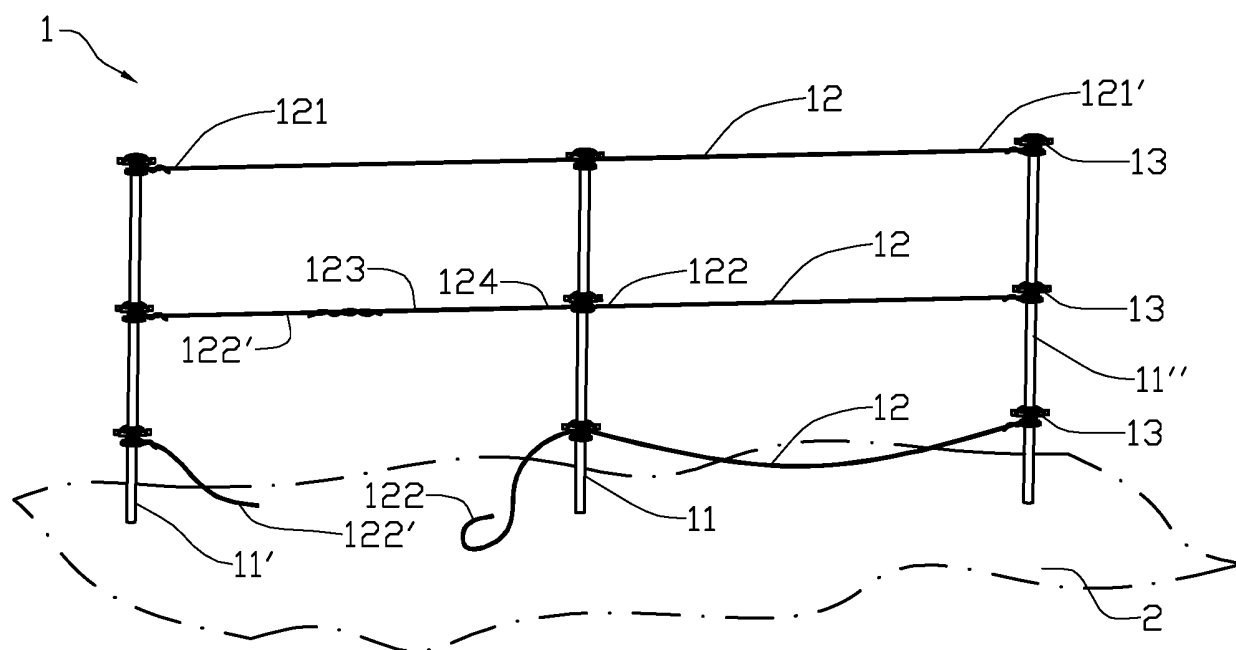


Fig. 1

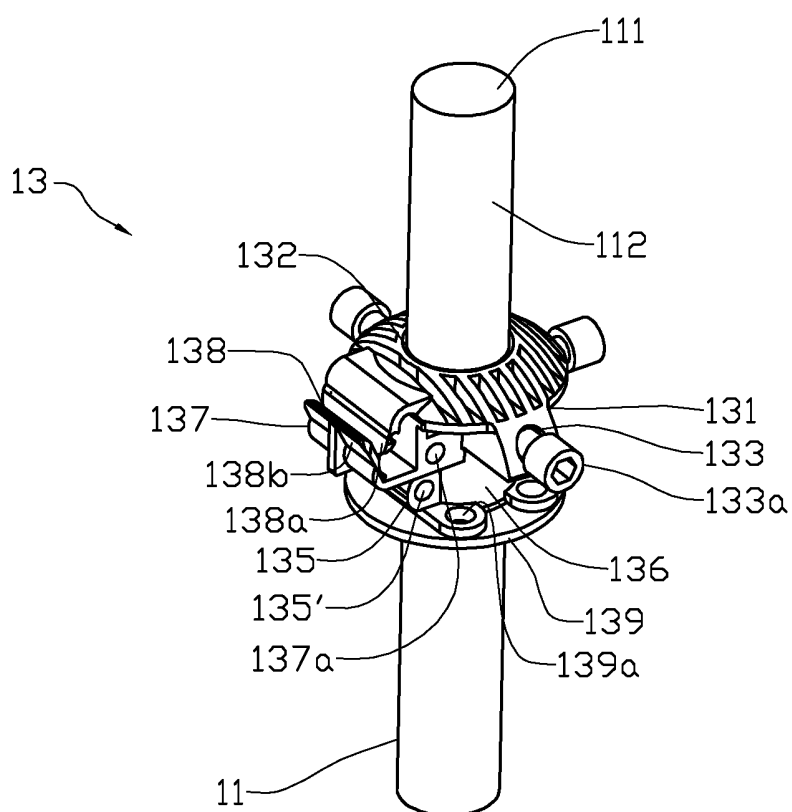


Fig. 2

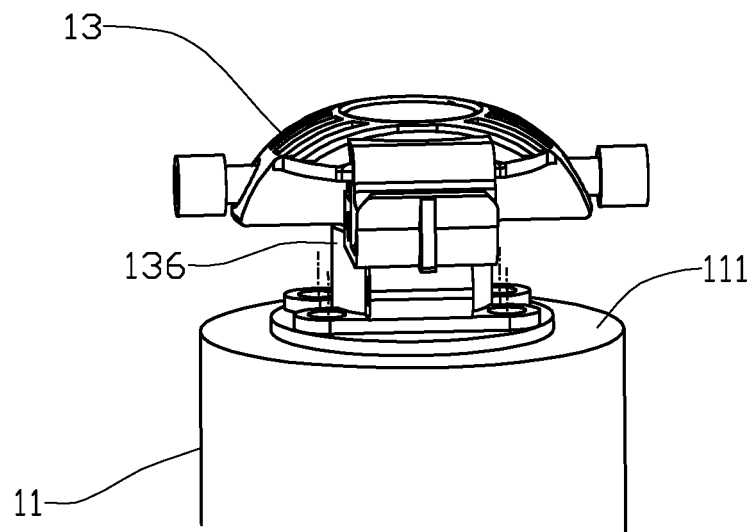


Fig. 2a

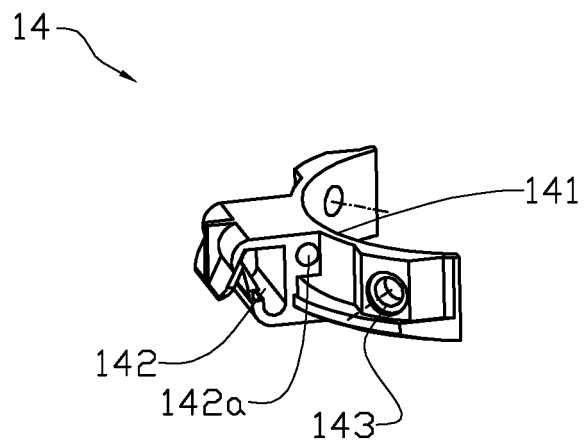
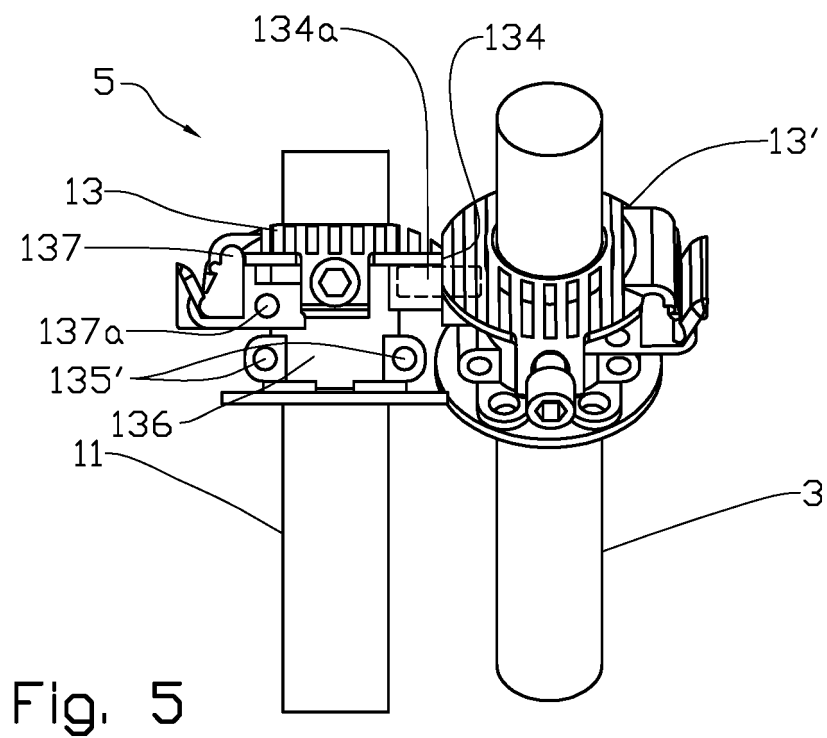
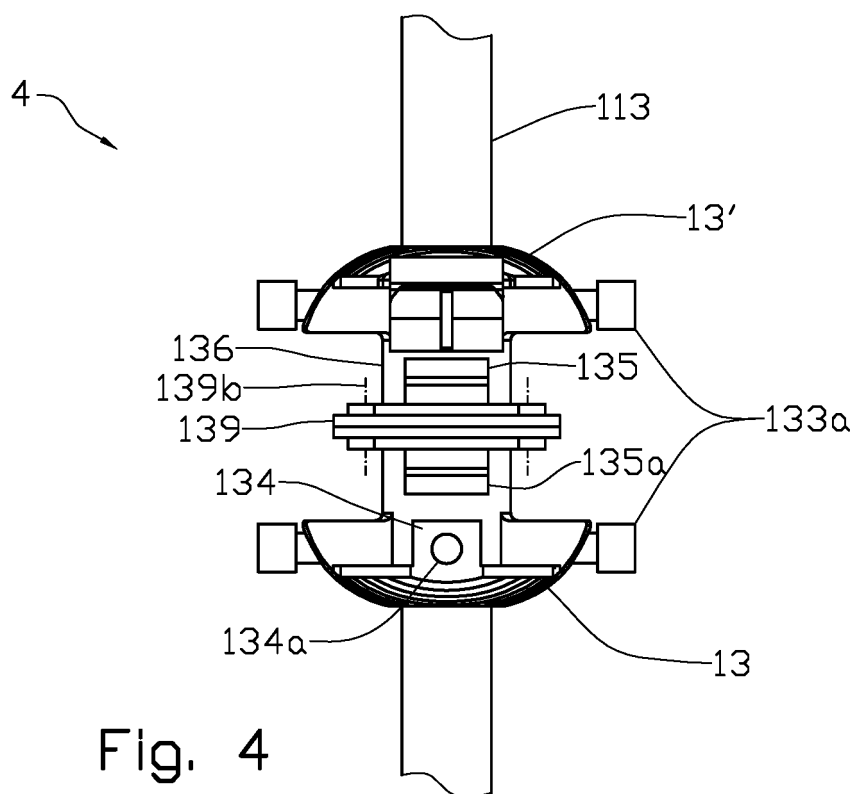


Fig. 3



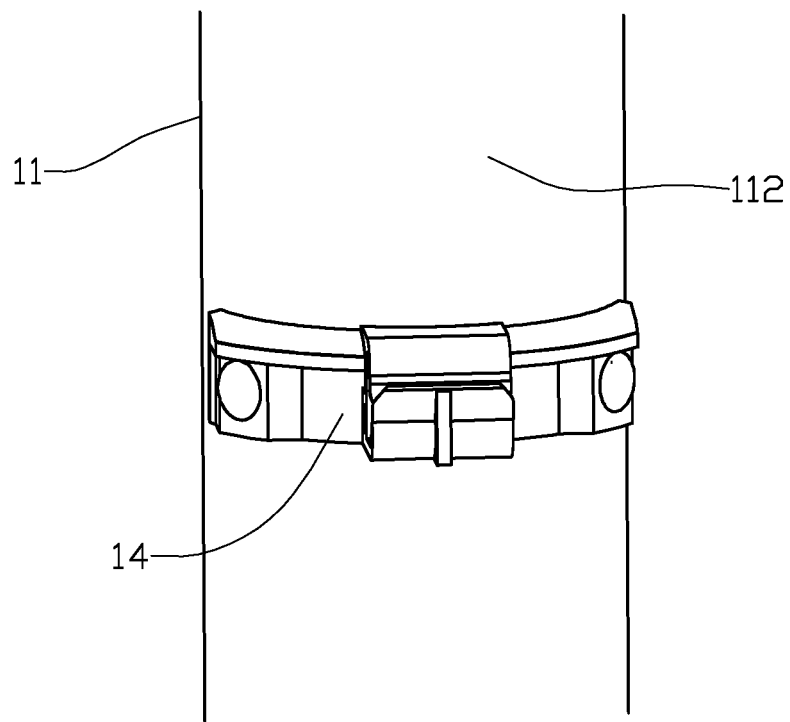


Fig. 6

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- US 1998185 A [0003]
- FR 1559618 A [0004]
- US 393504 A [0005]