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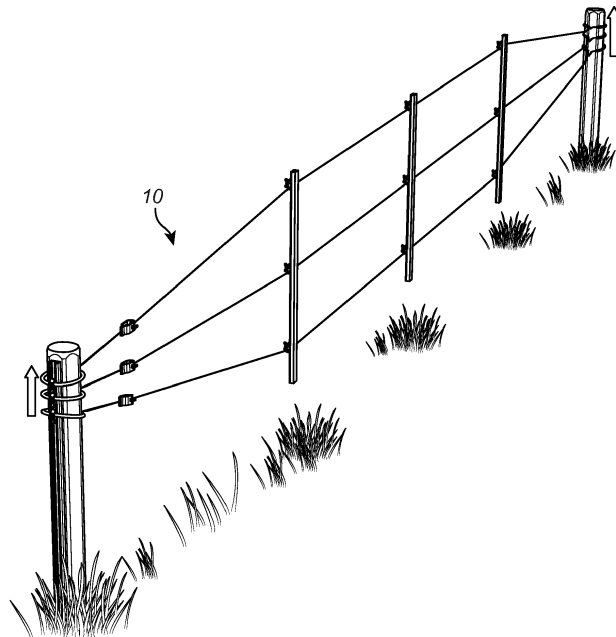
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**(54) Fence arrangement, and method for operating said fence arrangement**

(57) The present invention concerns a fence arrangement (10) comprising: at least two posts (11), each post comprising an elongated guide rail (12) extending along at least a part of the post, and at least two support elements (15) movable to, and securable at, selected positions along the guide rail; at least one support rail (30) arranged between the posts, said support rail comprising at least two support elements (15) movable to, and securable at, selected positions along the support

rail (30); at least two webs (23), ropes or wires extending at different heights from the support element on one post via the support elements on the support rail to the support elements on the second post; and one tensioning element (25) for each web, rope or wire arranged along the web, rope or wire. The invention furthermore relates to a method for operating the fence arrangement during cutting of vegetation.



*Fig. 2*

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## Description

### Field of the invention

**[0001]** The present invention relates to a fence arrangement, and a method for operating the fence arrangement during cutting of vegetation.

### Background of the invention

**[0002]** Different types of fences are used within different fields, such as for example the agricultural field in order to keep animals within an area, alternatively ensure that wild animals stay out of a fenced area.

**[0003]** Fences could be made from a wide variety of materials, depending on terrain, geographical location and animals that the fencing is intended to maintain within the selected area, alternatively intended to keep out of the fenced area.

**[0004]** One type of frequently used fences is wire fences supported mainly by tension. The wires are stretched between posts to prevent sagging of the fence, which raises the risk of entanglement or escape, by wire stretchers or other leverage devices.

**[0005]** In order to further improve the security of the fencing, the wire fence is combined with electric fencing. Synthetic webs or ropes with thin steel wires interwoven to carry the electrical charge are extending between the posts. A fence charger places electrical pulse to the wire and animals receive an uncomfortable but harmless shock when contacting the wires.

**[0006]** However, in order to ensure that the electrical fencing is working as intended, vegetation growing along the fence must be trimmed to avoid too much contact between the vegetation and the webs or ropes. This work is complicated and time consuming since the posts, ropes and wires makes it difficult to access the area around the posts and under the webs or ropes with efficient working tools.

**[0007]** There is consequently a need for a fencing arrangement that facilitates the work relating to cutting and trimming vegetation around and along the fence.

### Summary of the invention

**[0008]** The present invention, defined in the appended claims, relates to a fence arrangement that facilitate cutting and trimming vegetation under the fence, and a method for operating the fence arrangement.

**[0009]** The fence arrangement comprises:

at least two posts, each post comprising an elongated guide rail extending along at least a part of the post, and at least two support elements movable to, and securable at, selected positions along the guide rail;

at least one support rail arranged between the posts, said support rail comprising at least two support el-

ements movable to, and securable at, selected positions along the support rail;  
at least two webs, ropes or wires extending at different heights from the support element on one post via the support elements on the support rail to the support elements on the second post; and  
one tensioning element for each web, rope or wire arranged along the web, rope or wire.

**[0010]** The posts are intended to be permanently secured in the ground while the support rails will rest on the ground and support the webs, ropes or wires between the posts to maintain the desired height of the webs, ropes or wires along the fence thereby reducing the number of posts that needs to be secured in the ground. The reduced number of posts consequently reduces the installation work considerably.

**[0011]** The fence arrangement furthermore makes it possible to easily adapt the height / distance between the webs, ropes or wires to different types of animals to ensure that the animals remains within, or outside, the fence. The defined fence arrangement could furthermore be operated in accordance with the claimed advantageous method described more in detail below.

**[0012]** In one embodiment of the fence arrangement, the support elements are slidable along the guide rail / support rail to the selected position and secured by fastening means arranged on each support element. This embodiment is very favourable since the height of the webs, ropes or wires could be adjusted if desired.

**[0013]** In one embodiment of the fence arrangement, the number of support rails between the posts is within the range 1 to 20. The distance between the posts and the number of support rails must correspond to the character of the countryside. If the ground is flat, the distance between the posts could be increased and the number of support rails between the posts is increased accordingly, but if the countryside is changing the distance between the posts must be shorter.

**[0014]** In one embodiment of the fence arrangement, the guide rail extends along substantially the entire length of the posts. This embodiment provides maximum flexibility to the fence arrangement since the support element could be adjusted along the entire post, and moved upwards along the entire post to lift the support rails arranged between the posts to a position above the ground.

**[0015]** In one embodiment of the fence arrangement, the support rail and the posts have substantially the same height. This embodiment ensures that the height of the support elements and the webs, ropes or wires could be arranged at the same height along the fence.

**[0016]** In one embodiment of the fence arrangement, the support rail and guide rail have the same design, dimensions and material. The fact that the support rail and guide rail have the same design reduces the number of different components required for the system. The support / guide rails are either screwed to the posts or used separately as freestanding support rails between the

posts thereby ensuring that the fence arrangement could be used in different setups for a long period of time.

**[0017]** In one embodiment of the fence arrangement, the support rail and guide rail comprises a groove extending along the entire length of the support rail and the guide rail, and said support elements are slidable along the groove. This embodiment provides maximum flexibility to the fence arrangement since all wires, ropes or webs are movable along the entire length of the guide and support rails to desired positions depending on the intended user of the fence arrangement.

**[0018]** In one embodiment of the fence arrangement, the web, rope or wire comprises at least one electrically conductive wire, and the arrangement furthermore comprises an electrical charger connected to the web, rope or wire to place an electrical pulse on the web, rope or wire to improve the fence arrangement for use to maintain animals within, our outside, a fenced area.

**[0019]** In one embodiment of the fence arrangement, the support elements comprises an insulated recess or holder for the web, rope or wire to avoid that the conductive wire is unintentionally connected to surrounding structures.

**[0020]** The inventing furthermore relates to a method for operating the fence arrangement described above to facilitate the cutting / trimming of vegetation underneath and around the fence arrangement.

**[0021]** The method comprises the steps:

- a) slide the support elements from an initial position upwards along the guide rails on the posts to a selected position above the initial position;
- b) secure the support elements in the selected position such that the at least one support rail is elevated from the ground;
- c) maintain the support elements in the selected position, and the at least one support rail in the position elevated from the ground, during cutting of vegetation; and
- d) return the support elements, and the support rail, to the initial position along the posts and secure the support elements.

**[0022]** The defined method for operating the fence arrangement facilitates the cutting / trimming of vegetation considerably. By performing the specified steps, the webs, ropes or wires together with the support rail, or rails, arranged between the posts are lifted to an elevated position above the ground such that a vegetation cutter, i.e. a grass cutter, trimmer or large cutter driven by a tractor, could be used without damaging the fence arrangement, or the equipment used for cutting the vegetation.

**[0023]** One embodiment of the method according to the invention comprises two additional steps. The steps are:

- b2) after step b) is completed, increase the tension

in the web, rope or wire arranged at the lowest position along the posts with the tensioning element to lift and turn the at least one support rail to a tilted position above the ground to increase the accessibility of the area around the support rail and under the webs, ropes or wires; and

c2) after step c) is completed reduce the tension in the web, rope or wire arranged at the lowest position along the posts to return the at least one support rail from the tilted position.

**[0024]** This embodiment of the invention further improves the accessibility of the area around the posts and support rails, and under the webs, ropes or wires. This is achieved by the increased tension in the web, rope or wire arranged at the lowest position along the posts that lifts the web, rope or wire arranged at the lowest position along the posts well as the support rails between the posts further to a tilted position elevated from the ground. For a fence arrangement of ordinary height and size the distance between the ground and the support rails in the tilted elevated position typically is within the range of 0.6 metre to 1.0 metre. The specified distance makes it possible to use several different cutting tools and speed up the work considerably.

**[0025]** A further improved embodiment of the method comprises two additional steps. The steps are:

- b3) after step b2) is completed, reduce the tension in the web, rope or wire arranged at the highest position along the posts to further tilt the at least one support rail; and
- c1) after step c) is completed and before step c2), increase the tension in the web, rope or wire arranged at the highest position along the posts to the initial tension level.

**[0026]** This embodiment is very favourable since the additional steps relating to the tension in the upper web, rope or wire makes it possible to tilt the support rails all the way to a substantially horizontal position, or a position substantially parallel to the ground, thereby ensuring the maximum distance possible between the ground and the support rails between the posts. This is very advantageous if it is desired to use larger cutting tools or tractors to reduce the time required to complete the cutting of vegetation.

**[0027]** The different embodiment described above could of course be combined and modified in different ways without departing from the scope of the invention that will be described more in detail in the detailed description.

#### Brief description of the drawings

**[0028]** One embodiment of the fence arrangement according to the invention is illustrated in the appended figures.

Figure 1a illustrates a perspective view of the fence arrangement.

Figure 1b illustrates a perspective view of selected parts of the fence arrangement in figure 1a.

Figure 2 illustrates the fence arrangement in an elevated position.

Figure 3 illustrates the fence arrangement in elevated position, and an enlarged view of one of the tensioning elements.

Figure 4 illustrates the fence arrangement in an elevated and tilted position.

#### Detailed description

**[0029]** In figure 1, a perspective view of the fence arrangement 10 according to the invention is illustrated.

**[0030]** The fence arrangement 10 comprises at least two posts 11 that must be rigidly secured in the ground, for example grouted with cement, to ensure the required strength and stability of the fence arrangement. The distance between the posts depends on the character of the countryside and the dimensions of the area that the fence is intended to enclose. If the countryside is flat, the distance between the posts 11 could be increased while a more fluctuating countryside requires posts arranged at shorter distance from each other to ensure a reliable fencing of the area.

**[0031]** The fence arrangement 10 is intended to extend along a substantially straight line between the posts 11 and if the direction of the fence needs to be changed, for example in a corner, a post 11 must be arranged at the position where the direction of the fence is changed.

**[0032]** The posts 11 are substantially straight and preferably arranged in the ground such that they extend substantially vertically upwards to provide the required strength and stability to the fence arrangement. The posts 11 could be made of wood, metal or plastic materials and have a different cross-sections, such as for example circular, triangular or square. Furthermore the posts could be made of elongated tubes or pipes to save weight and material, alternatively formed as solid pieces.

**[0033]** Along each post, an elongated guide rail 12 extends. The guide rail 12 is rigidly secured to the post 11 for example with screws and/or adhesive depending on the material and design of the post 11. Each guide rail 12 has substantially constant cross-section along the entire length of the guide rail, and comprises an elongated groove 13 extending along the entire length of the guide rail. The guide rail 12 is preferably made of a metal or plastic material that is resistant to corrosion to ensure that the fence arrangement will work as intended for a long period of time. The cross-sectional shape of the guide rail is designed with a narrow opening 14 to the groove 13, and a wider interior such that support elements 15, illustrated in figure 1b, designed with a corresponding shape are movable along the guide rail 12 and maintained in the guide rail 12 by the narrow opening 14. The cross-sectional shape of the guide rail 12 could be

modified in many different ways as long as the support elements are configured to fit in the groove and be movable along the length of the guide bar 12.

**[0034]** One embodiment of a support element 15 is disclosed in figure 1b. The support element 15 comprises a protruding part 16 designed to fit in the groove 13 of the guide rail 12 to be able to slide along the guide rail 12. The support element 15 furthermore comprises fastening means 17 that makes it possible to secure the support element in the selected position along the guide rail. The fastening means 17 is embodied as a treaded shaft 18 extending through the support element 15 and the opening 14 of the guide rail substantially transverse to the longitudinal direction of the guide rail 12, and a corresponding wing nut 19. When the support element 15 is in the desired position along the guide rail 12, the wing nut 19 is turned to push the shaft 18 towards the interior of the groove 13 to secure the support element 15 in the selected position along the guide rail 12.

**[0035]** The support element 15 furthermore comprises a holder 20 for a web, rope or wire that will be described further down this description. The holder 20 is in the illustrated embodiment embodied as a passage 21 provided with a web, rope or wire support device 22. The size of the passage 21 is larger than the diameter or size of the web, rope or wire to make room for the support device 22 that maintains the web, rope or wire in the passage 21. The web, rope or wire extends through the support device 22 such that the web, rope or wire is protected from wear and the risk for damage to the web, rope or wire is reduced. The support device 22 is for example made of an insulating elastic plastic or rubber tube that the web, rope or wire extend through. In order to provide a reliable securing of the web, rope or wire to the post, which is essential to withstand the loads from the webs, ropes or wires, the guide rail is arranged on the side of the post that is facing away from the other post and the web, rope or wire extending around the post 11 such that the loads applied by the web, rope or wire on the guide rail and support element 15 not damages the securing of the guide rail in the post 11.

**[0036]** Between the posts, at least two webs 23, ropes or wires extend. The number of webs 23, ropes or wires depends on the desired overall height of the fence arrangement, as well as the desired distance between adjacent webs 23, ropes or wires which is selected depending on the intended use of the fence arrangement. The fence arrangement is very flexible since the number of webs 23, ropes or wires could be change easily by adding or removing support elements 15 along the guide rails 12.

**[0037]** Along each web 23, rope or wire one tensioning element 25 is arranged. The tensioning element 25 makes it possible to increase or reduce the tensioning in each web, rope or wire extending between the posts. One embodiment of the tensioning element is illustrated in figure 3. The tensioning member comprises a body 26 and a rotatable winding element 27 that is rotated by a lever 28 arranged on the outside of the body 26. The

web, rope or wire extend through an opening 29 in the body 26 to the winding element 27, and by rotating the winding element 27 the web, rope or wire is wound on to winding element 27 and the tension in the web, rope or wire increased. However, several different types of tensioning elements could be used as long as they provide a reliable and simple solution that makes it possible to adjust the tension in the web, rope or wire.

**[0038]** Between the posts 11, along the webs 23, ropes or wires at least one elongated support rail 30 is arranged. The number of support rails 30 could be up to about 20 if the distance between the posts 11 is long.

**[0039]** Each support rail comprises one support element 15 for each of the webs 23, ropes or wires extending between the posts 11 to support and maintain the webs 23, ropes or wires in the intended position between the posts 11 which is essential to provide a reliable fence arrangement with the required stability even though the distance between the posts 11 is large. Preferably, the web 23, rope or wire, is secured in the longitudinal direction of the web 23, rope or wire in each of the support elements 15 to avoid that the support rail 30 slides along the web 23, rope or wire which could reduce the stability of the fence arrangement. The web 23, rope or wire could be secured in the intended position in the holder 20 of the support element 15 by an elastic device, similar to the support device 22 but shorter, with a size and shape corresponding to the size and shape of the passage 21 in the support element 15. Once the support rail 30 is in the desired position between the posts 11, the elastic device is fitted in the passage 21 of the holder 20 to secure the web 23, rope or wire in the support element 15. Other arrangements for securing the web 23, rod or wire in the support element 15 could also be used.

**[0040]** The support rails 30 are intended to stand free on the ground and are maintained in the intended position by the tension in the webs 23, ropes or wires instead of being permanently secured in the ground. Each, or some, of the support rails could be provided with a narrow tip or rod in the end of the support rail 30 intended to stand on the ground. The narrow tip or rod maintains the guide rail in the intended position on the ground and improves the stability of the fence arrangement and prevent transverse movements of the support rails 30 if the fence is exposed to external forces in the transverse direction. The narrow tip or rod is not illustrated in the figures but could be designed in many different ways to provide the desired support in the transverse direction.

**[0041]** The support rails 30 and the guide rail 12 preferably have substantially the same length to ensure that the webs, ropes or wire extend at the substantially the same height above the ground along the fence arrangement.

**[0042]** The support rail 30 and the guide rail 12, described in detail above, preferably have the same design and dimensions as well as being made of the same material to reduce the number of different types of components in the fence arrangement 10. This means that the

guide rail 12 either is secured along the posts to movably support the desired number of support elements 15, and webs 23, ropes or wires along the posts, or used separately as a support rail 30 arranged between the posts 11 along the webs, ropes or wires to provide the desired support between the posts 11. The same type of support elements 15 are used both along the guide rail on the posts and the support rails. However, the invention is not limited to the embodiment where the support rail and guide rail have the same design since the two element could be modified in different ways as long as the function of each element correspond to the definition in the claims, and the description above.

**[0043]** In order to further improve the fence arrangement according to the invention, the webs, ropes or wires could be combined with electric fencing. Thin steel wires are interwoven in the webs or ropes to carry electrical charges and a fence charger is arranged to places electrical pulse to the conductive wire. Thereby animals will receive an uncomfortable, but harmless, shock when contacting the wires.

**[0044]** The support elements 15 are either made entirely of an insulating material like plastic or comprising an insulated holder for the web, rope or wire.

**[0045]** The invention furthermore relates to a method for operating the fence arrangement 10 described above to facilitate the cutting of vegetation in the area of the fence arrangement 10. When there is a need for cutting of vegetation along the fence arrangement the following steps are performed:

- a) slide the support elements 15 from an initial position along the posts 11 upwards along the guide rails 12 on the posts 11 to a selected position above the initial position (figure 2);
- b) secure the support elements 15 in the selected position such that the at least one support rail 30 is elevated from the ground (figure 2);
- c) maintain the support elements 15 in the selected position, and the at least one support rail 30 in the position elevated from the ground, during cutting of vegetation; and
- d) return the support elements 15, and the at least one support rail 30, to the initial position along the posts 11 and secure the support elements 15.

**[0046]** The fence arrangement operated according to the method defined above makes it possible to lift the at least one support rail from the ground and access the area under the webs, ropes or wires with a cutting tool. Thereby the time required for cutting vegetation along the fence arrangement is reduced considerably, especially if the fence arrangement has a significant length and the number of support rails is high.

**[0047]** A further improved embodiment of the method comprises two additional steps, said steps are:

- b2) after step b) is completed, increase the tension

in the web 23, rope or wire arranged at the lowest position along the posts 11 with the tensioning element to lift and turn the at least one support rail 30 to a tilted position above the ground to increase the accessibility of the area around the support rail 30 and under the webs 23, ropes or wires (figure 4); and c2) after step c) is completed, reduce the tension in the web 23, rope or wire arranged at the lowest position along the posts 11 to return the at least one support rail 30 from the tilted position.

**[0048]** This embodiment of the method further improves the accessibility of the area under and along the fence since the support rail, or rails, will be lifted further from the ground when they are tilted and make room for larger cutting tools for cutting vegetation.

**[0049]** A further improved embodiment of the method comprises two additional steps, said steps are

b3) after step b2) is completed, reduce the tension in the web, rope or wire arranged at the highest position along the posts to further tilt the at least one support rail (figure 4); and

c1) after step c) and before step c2), increase the tension in the web, rope or wire arranged at the highest position along the posts to the tension initial level.

**[0050]** This embodiment of the method ensures maximum accessibility under the webs 23, ropes or wires since the additional steps makes it possible to tilt the support rails all the way to a substantially horizontal elevated position which means that the distance between the support rail and the ground is the largest possible.

**[0051]** The embodiments described above could be combined and modified in different ways without departing from the scope of the invention that is defined by the appended claims.

## Claims

### 1. Fence arrangement (10) comprising:

at least two posts (11), each post comprising an elongated guide rail (12) extending along at least a part of the post, and at least two support elements (15) movable to, and securable at, selected positions along the guide rail;

at least one support rail (30) arranged between the posts, said support rail comprising at least two support elements (15) movable to, and securable at, selected positions along the support rail (30);

at least two webs (23), ropes or wires extending at different heights from the support element on one post via the support elements on the support rail to the support elements on the second post; and

one tensioning element (25) for each web, rope or wire arranged along the web, rope or wire.

2. Fence arrangement according to claim 1, wherein the support elements (15) are slidable along the guide rail / support rail to the selected position and secured by fastening means (17) arranged on each support element (15).

3. Fence arrangement according to anyone of the previous claims, wherein the number of support rails (30) between the posts is within the range 1 to 20.

4. The fence arrangement according to anyone of the previous claims, wherein the guide rail (12) extend along substantially the entire length of the posts (11).

5. The fence arrangement according to anyone of the previous claims, wherein the support rail (30) and the guide rail (12) have substantially the same length.

6. The fence arrangement according to anyone of the previous claims, wherein the support rail (30) and guide rail (12) have the same design, dimensions and material.

7. The fence arrangement according to anyone of the previous claims, wherein the support rail (30) and guide rail (12) comprises a groove (13) extending along the entire length of the support rail (30) and the guide rail (12), and said support elements (15) are slidable along the groove (13).

8. The fence arrangement according to anyone of the previous claims, wherein the web (23), rope or wire comprises at least one electrically conductive wire, and the arrangement furthermore comprise an electrical charger connected to the web, rope or wire to place an electrical pulse on the electrically conductive web, rope or wire.

9. The fence arrangement according to anyone of the previous claims, wherein each support element comprises an insulated recess or holder (20) for the web, rope or wire.

10. The fence arrangement according to anyone of the previous claims, wherein the support rail (30) in one end comprises a narrow tip or rod, said narrow tip or rod is arranged towards the ground.

11. Method for operating the fence arrangement (10) according to claim 1 during cutting of vegetation, said

method comprising the steps:

- a) slide the support elements (15) from an initial position upwards along the guide rails (12) on the posts (11) to a selected position above the initial position; 5
- b) secure the support elements (15) in the selected position such that the at least one support rail (30) is elevated from the ground;
- c) maintain the support elements (15) in the selected position, and the at least one support rail (30) in the position elevated from the ground, during cutting of vegetation; and 10
- d) return the support elements (15), and the at least one support rail (30), to the initial position along the posts (11) and secure the support elements (15). 15

**12.** Method according to claim 11, comprising two additional steps, said steps are: 20

- b2) after step b) increase the tension in the web (23), rope or wire arranged at the lowest position along the posts (11) with the tensioning element (25) to lift and turn the at least one support rail (30) to a tilted position above the ground to increase the accessibility of the area around the support rail (30) and under the webs (23), ropes or wires; and 25
- c2) after step c) reduce the tension in the web (23), rope or wire arranged at the lowest position along the posts (11) to return the at least one support rail from the tilted position. 30

**13.** Method according to claim 12, comprising two additional steps, said steps are: 35

- b3) after step b2) reduce the tension in the web (23), rope or wire arranged at the highest position along the posts (11) to further tilt the at least one support rail (30); and 40
- c1) after step c) and before step c2), increase the tension in the web (23), rope or wire arranged at the highest position along the posts (11) to the initial tension level. 45

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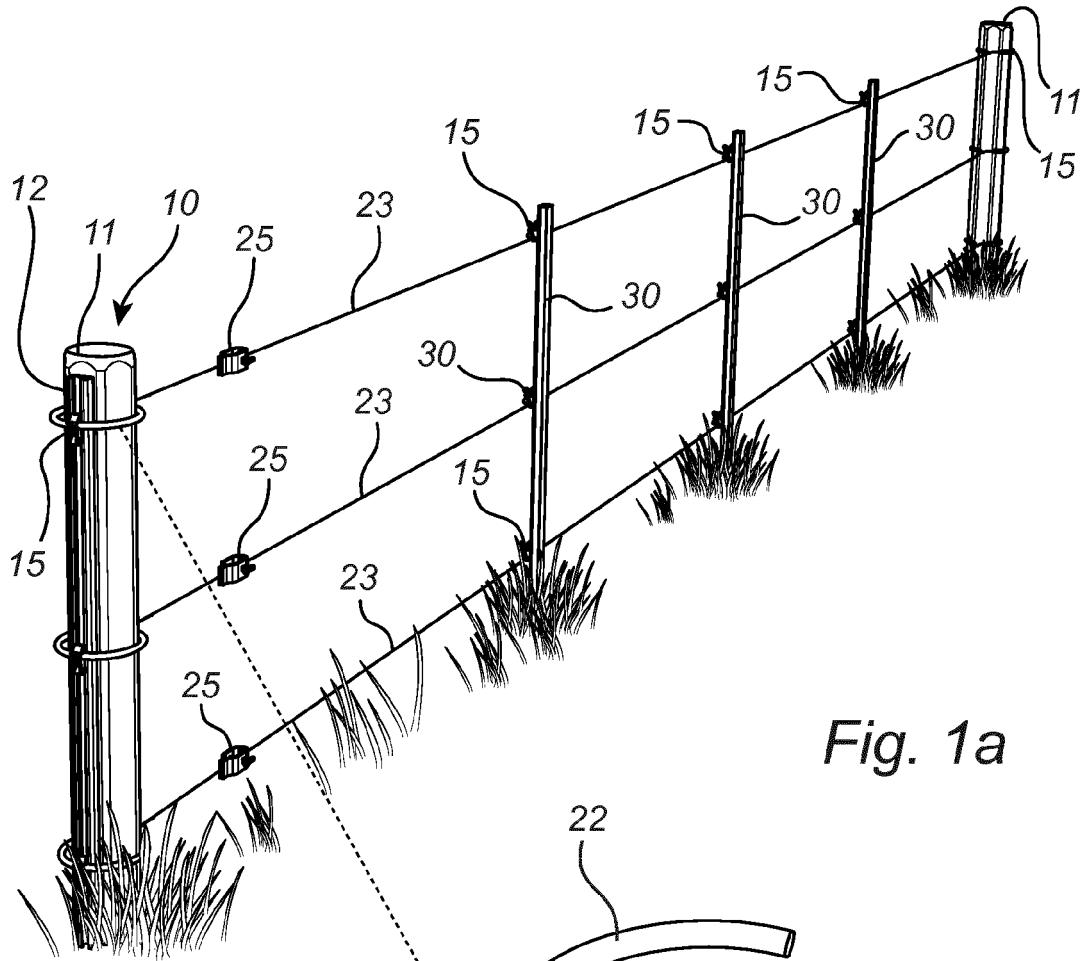


Fig. 1a

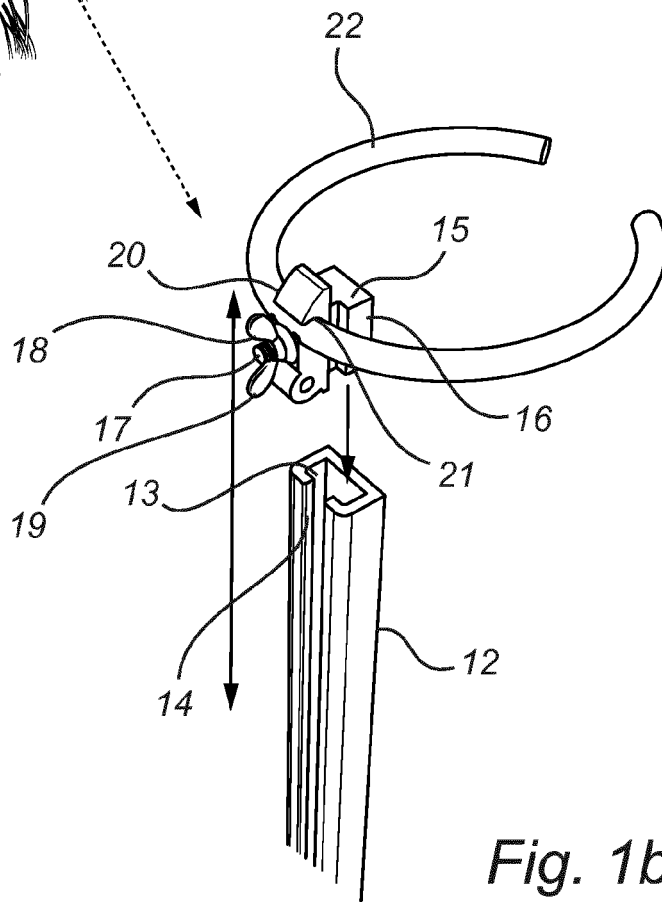


Fig. 1b

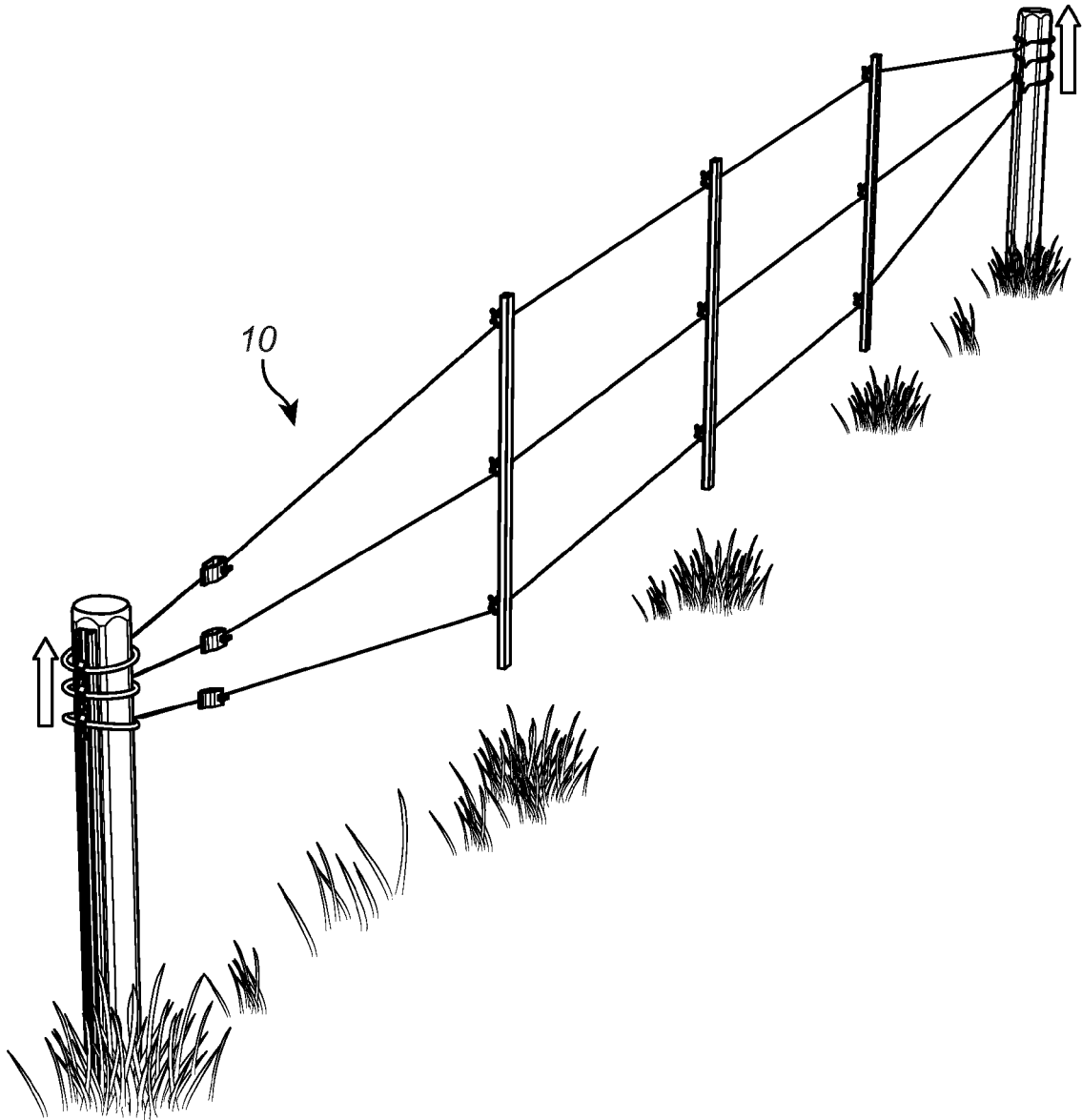


Fig. 2

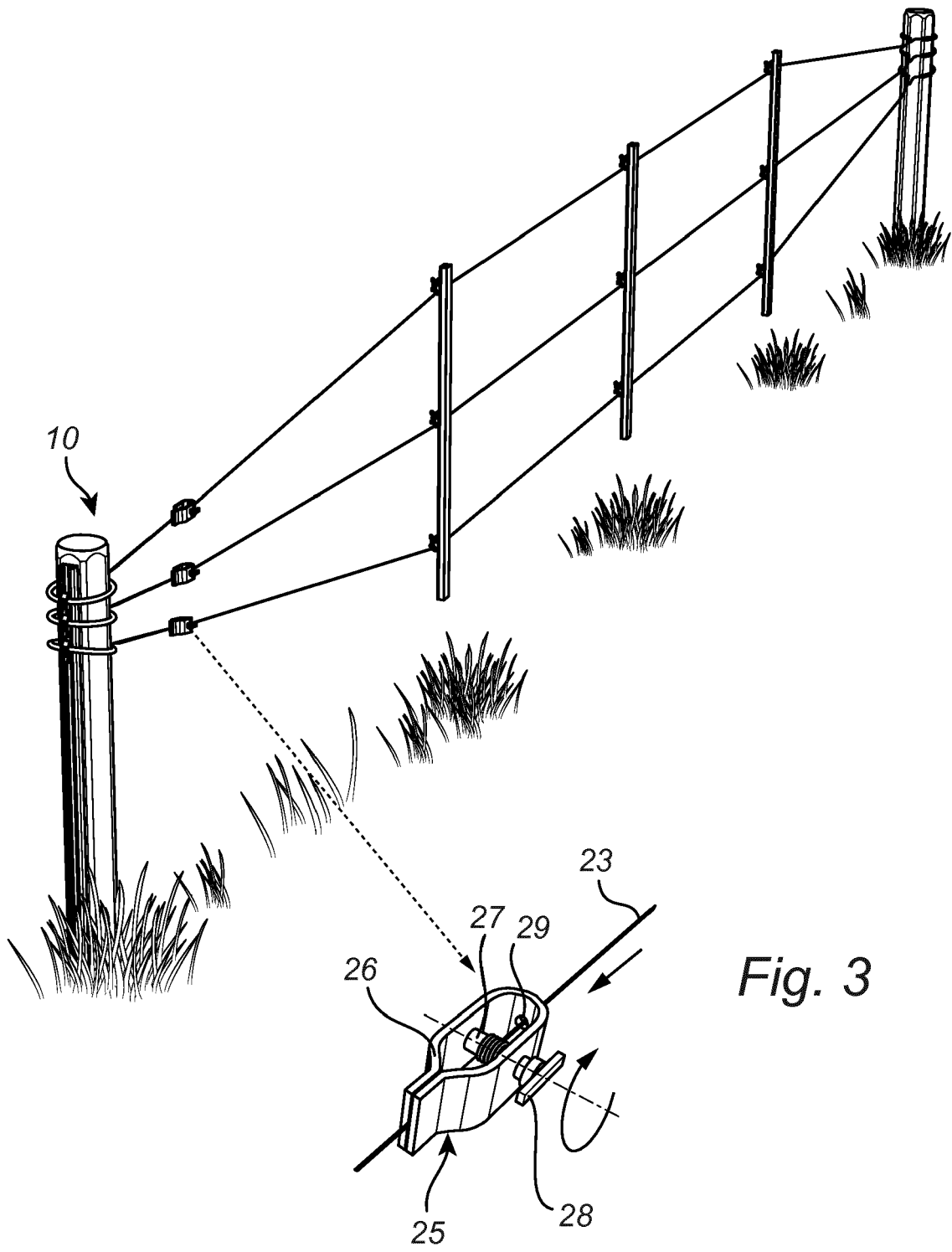
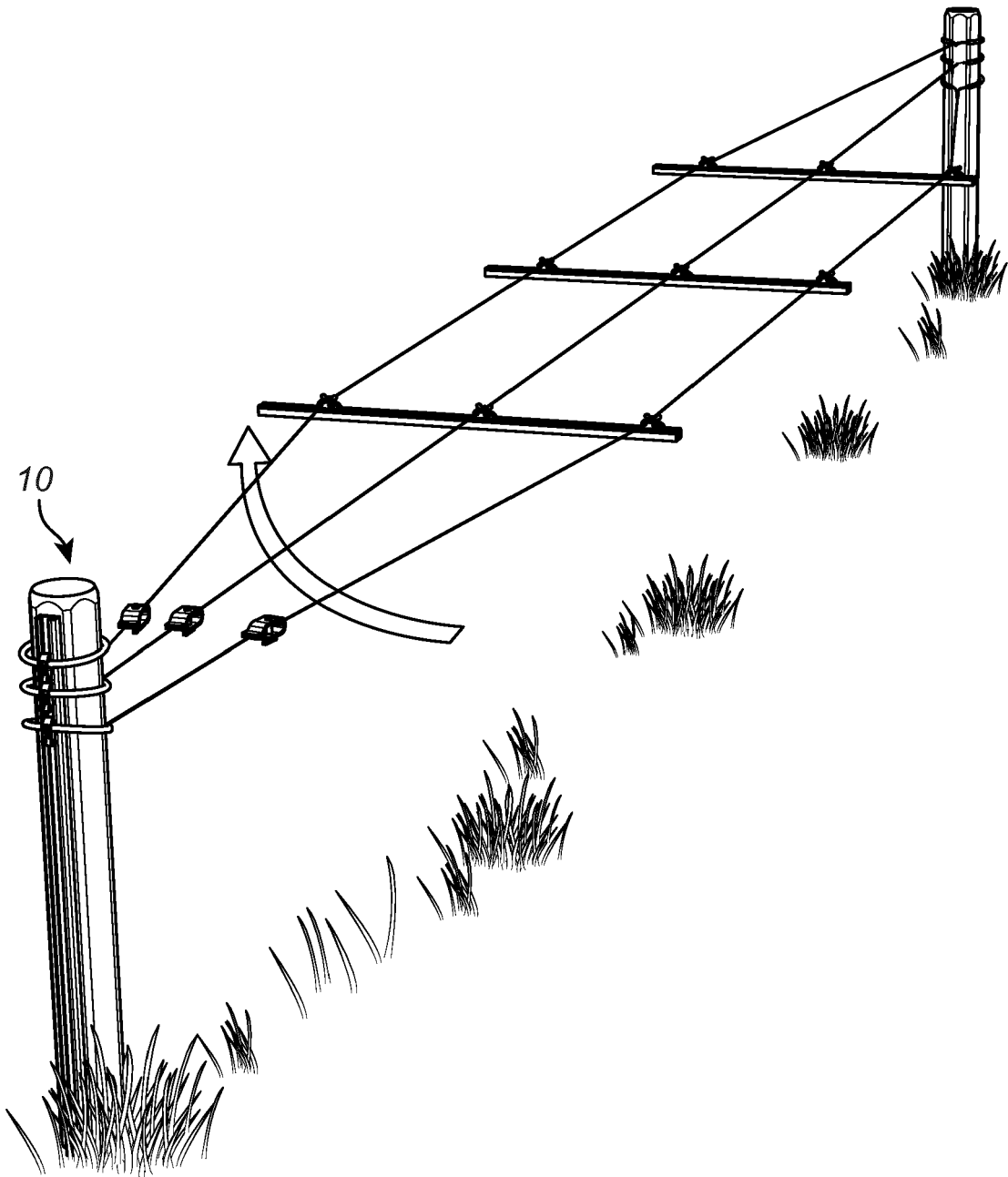


Fig. 3



*Fig. 4*



EUROPEAN SEARCH REPORT

Application Number  
EP 14 18 5354

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DOCUMENTS CONSIDERED TO BE RELEVANT			
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			E04H
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 25 February 2015	Examiner Rosborough, John
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