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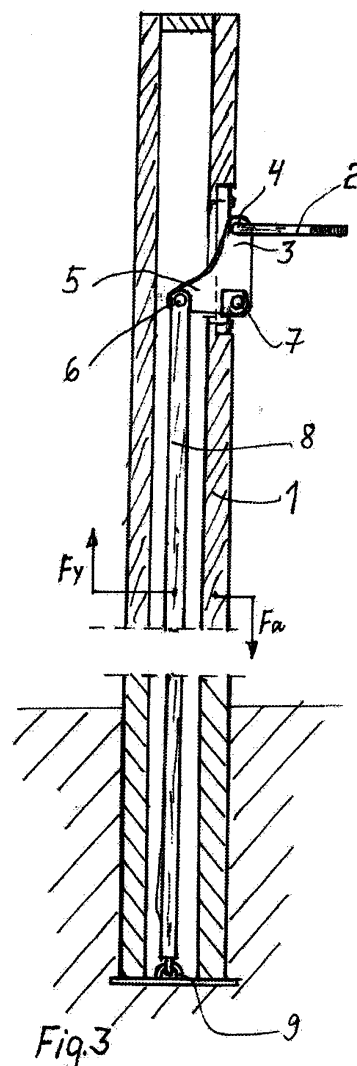
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(54) **APPARATUS ARRANGED IN WOODEN POLE FOR REDUCING POLE DEFLECTION**

(57) An apparatus arranged in a wooden pole (1) for reducing the deflection of the wooden pole when said wooden pole is subjected to a lateral tensile load affecting at a particular height. The apparatus includes a coupling element (2) receiving said lateral tensile load and a mechanism which is connected to said coupling element and which, on its first arm portion (3), has a fixing point (4) arranged with the chance to move in the direction of the tensile load, and a fixing point (6) on a second arm portion (5) arranged with the chance to move in the vertical direction. Said arm portions are interconnected to move by turning around a common axle (7), and the second arm portion is coupled by its fixing point to a counterpart (9) belonging to a base part of said wooden pole by means of a tensile member (8) running within said wooden pole.



Description

[0001] The invention relates to an apparatus arranged in a wooden pole for reducing the deflection of the wooden pole when said wooden pole is subjected to a lateral tensile load affecting at a particular height.

[0002] Prior art knows guy ropes which are used to support wooden poles under lateral forces and which are installed between the top part of a wooden pole and a suitable fixing point usually built in the ground so that the guy rope prevents the wooden pole from deflecting in the direction of the pulling lateral load. Such guy ropes are awkward almost everywhere, such as in built-up areas, fields, and even forests, in particular because they are usually located transversely in relation to a power line, for example, spanning along the wooden poles.

[0003] With the aid of the apparatus according to the invention, the deflection of a wooden pole, caused by a lateral load, may substantially be reduced by largely transferring the stress moment increasing towards the bottom part in conventional prior art poles into tensile and compression load. The apparatus according to the invention is characterised in that the apparatus includes a coupling element receiving said lateral tensile load, a mechanism which is connected to said coupling element and which, on its first arm portion, has a fixing point arranged with the chance to move in the direction of the tensile load, and a fixing point on a second arm portion is arranged with the chance to move in the vertical direction, whereby said arm portions are interconnected to move together by turning around a common axle, and in that the second arm portion is coupled by its fixing point to a counterpart in a base part of said wooden pole by means of a tensile member running within said wooden pole.

[0004] An advantage of the invention is that a wooden pole will deflect less than prior art wooden poles by means of the apparatus according to the invention when lateral load is present. As a result, wooden poles may be used without guys as originating or terminating poles of, for example, overhead cables, without unaesthetic deflection being caused in them.

[0005] In the following, the invention will be explained in closer detail with reference to the accompanying drawing, in which

Figure 1 shows a prior art wooden pole deflected due to a load.

Figure 2 shows a wooden pole according to the invention essentially undeflected.

Figure 3 is a sectional view of a wooden pole according to the invention.

Figure 4 shows a wooden pole according to the invention on a metal base.

[0006] Figures 1 and 2 both show a wooden pole positioned on a sturdy base. The bases remain stationary, even if a force F loads the wooden poles in the lateral direction. The wooden pole in Figure 1 has a conventional

structure and it deflects due to the load when stretch is created in said pole on the outer edge of the deflection arc. The wooden pole of Figure 2 has the apparatus according to the invention installed in it, which receives the tensile stress on behalf of the wooden structure through a tensile member 8 and thus reduces the deflection of the wooden pole to almost unnoticeable.

[0007] Figure 3 shows in greater detail a way to fix the tensile member 8 to the bottom part of a wooden pole to a metal baseplate by means of a counterpart 9, the tensile member 8 pulling the plate upward by a force F_y . The same baseplate also receives a downward force F_a from the right-hand side portion of the wooden pole 1. The mechanism according to the invention, capable of turning around an axle 7, transfers the force pulling on the coupling element 2 into force F_y pulling on the tensile member 8. The force is converted inversely proportional to the length of first 3 and second arm portion 5. Loading force from the mechanism transfers through the axle 7 to the right edge of the wooden pole into force F_a . Because wood can withstand compression force well, the right edge of the wooden pole will not give in even with considerable force F_a . The compression of the wood or the stretching of the tensile member 8 has no importance in this case, because said compression or stretching does not reduce the force causing them.

[0008] Figure 4 shows a wooden pole installed in a metal base 10. At the end of the tensile member 8 there is a nut that may be used to adjust the length of the tensile member 8. The wooden pole 1 is supported by a flange 11 in the top part of the base 10. The lower end of the tensile member 8 may be connected to said flange.

[0009] The fixing points 4, 6 of the first 3 and second arm portion 5 are substantially at a 90° angle with respect to each other in relation to the common axle 7.

[0010] Further, the common axle 7 included in the mechanism is arranged outside of the wooden pole 1 or substantially on the edge part of the pole 1.

[0011] The fixing point 4 belonging to the first arm portion 3 is located at least as far from the common axle 7 as the fixing point 6 of the second arm portion 5.

[0012] The distance of the fixing point 4 belonging to the first arm portion 3 from the common axle 7 is at least twice the distance of the fixing point 6 of the second arm portion 5.

[0013] In an embodiment, the first 3 and the second arm portion 5 are of the same structure.

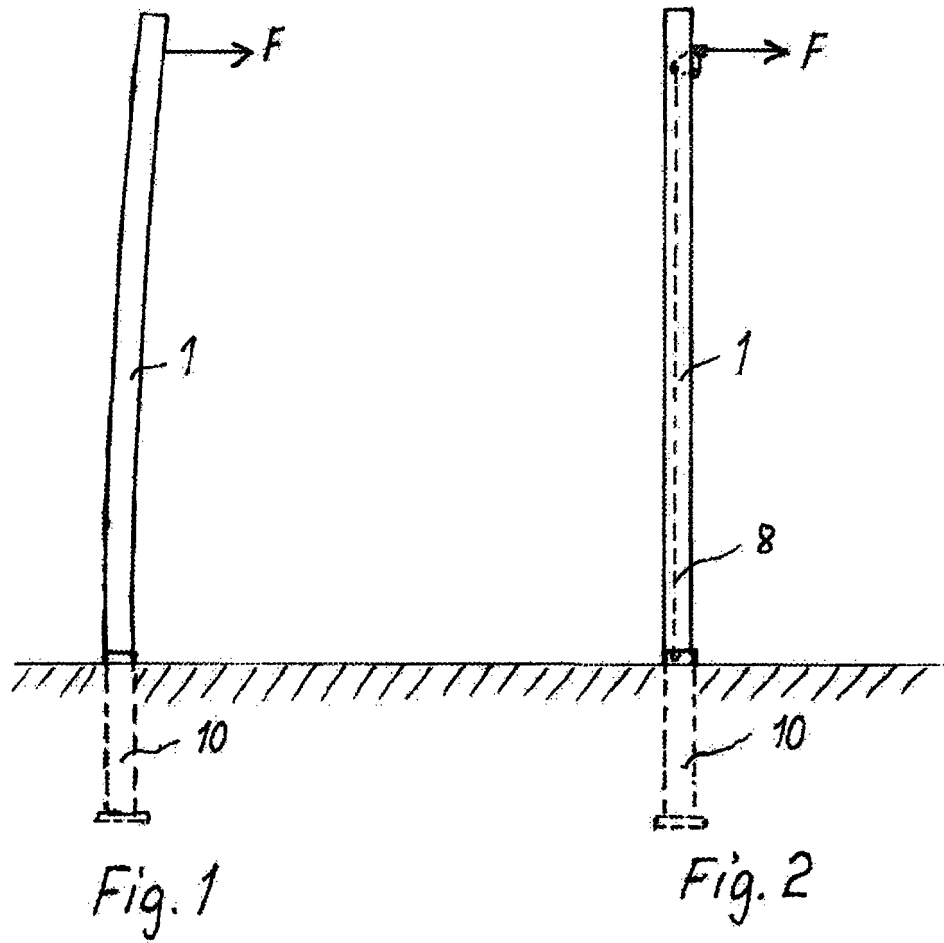
[0014] It is advantageous for the prevention of the deflection of a wooden pole that the first arm portion 3 in the mechanism is longer than the second arm portion 5. It is advantageously at least twofold in relation to the second arm portion 5.

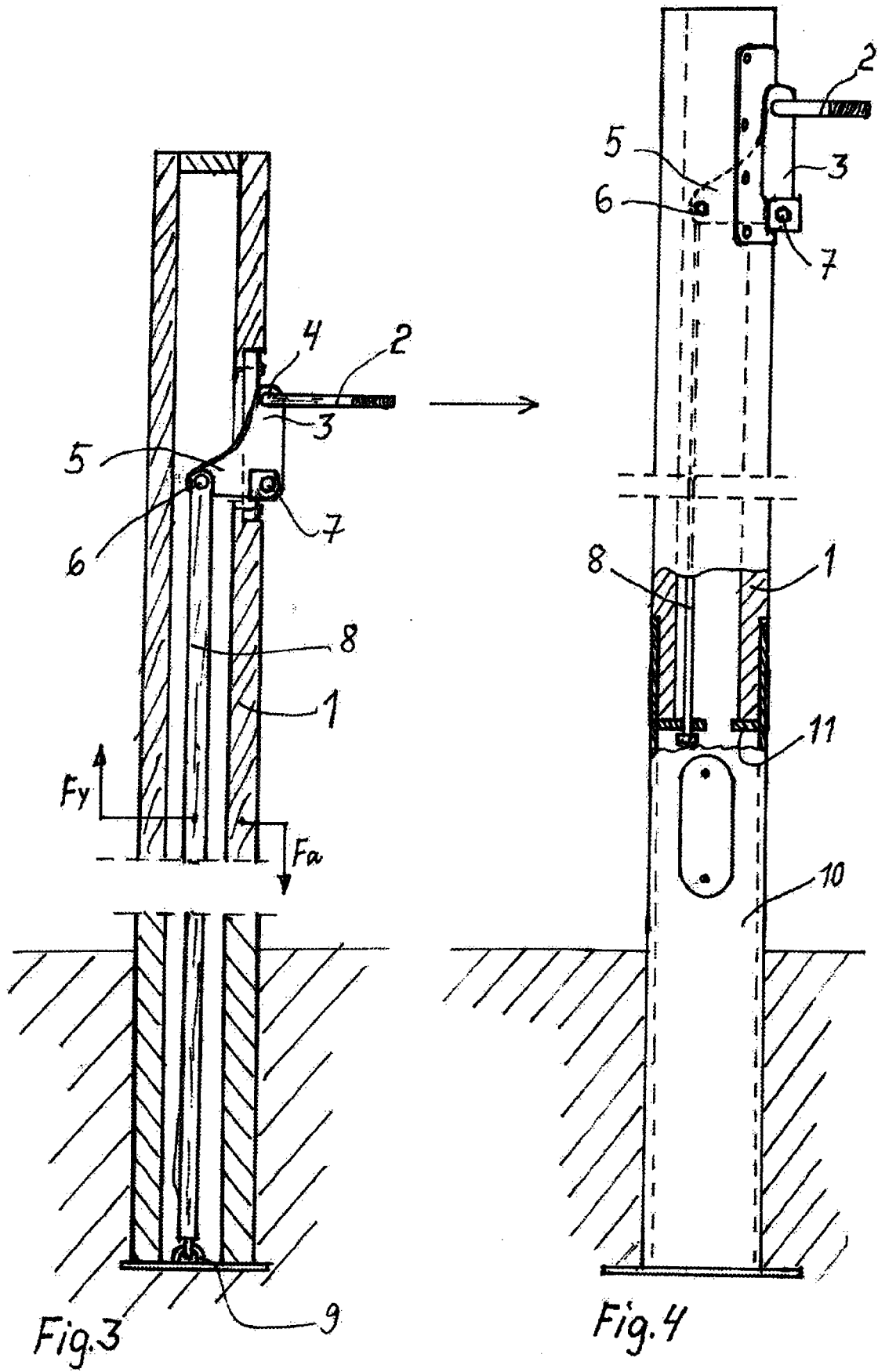
Claims

1. An apparatus arranged in a wooden pole (1) for reducing the deflection of said wooden pole (1) when

said wooden pole (1) is subjected to a lateral tensile load affecting at a particular height, **characterised in that** the apparatus includes a coupling element (2) receiving said lateral tensile load, a mechanism which is connected to said coupling element (2) and which, on its first arm portion (3), has a fixing point (4) arranged with the chance to move in the direction of the tensile load, and a fixing point (6) on a second arm portion (5) is arranged with the chance to move in the vertical direction, whereby said arm portions (3) and (5) are interconnected to move by turning around a common axle (7), and **in that** the second arm portion (5) is coupled by its fixing point (6) to a counterpart (9) in a base part of said wooden pole (1) by means of a tensile member (8) running within said wooden pole (1).

2. An apparatus as claimed in claim 1, **characterised in that** the fixing points (4); (6) of the first (3) and second arm portion (5) are substantially at a 90° angle with respect to each other in relation to the common axle (7).
3. An apparatus as claimed in claim 1, **characterised in that** the common axle (7) included in the mechanism is arranged outside of the wooden pole (1) or substantially on the edge part of the wooden pole (1).
4. An apparatus as claimed in claim 2, **characterised in that** the fixing point (4) belonging to the first arm portion (3) is located at least as far from the common axle (7) as the fixing point (6) of the second arm portion (5).
5. An apparatus as claimed in claim 2, **characterised in that** the distance of the fixing point (4) belonging to the first arm portion (3) from the common axle (7) is at least twice the distance of the fixing point (6) of the second arm portion (5).
6. An apparatus as claimed in claim 1, **characterised in that** the first (3) and the second arm portion (5) are of the same structure.







EUROPEAN SEARCH REPORT

Application Number
EP 16 16 5480

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			TECHNICAL FIELDS SEARCHED (IPC)
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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 24 August 2016	Examiner Decker, Robert
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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EPO FORM 1503 03/02 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 16 16 5480

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82