(19) DANMARK

(10) **DK/EP 2930358 T3**

Patent- og Varemærkestyrelsen

(12) # Oversættelse af europæisk patentskrift

(51) Int.Cl.: ***F 03 D 80/30 (2016.01)*** ***F 03 D 1/06 (2006.01)*** ***F 03 D 80/40 (2016.01)***

(45) Oversættelsen bekendtgjort den: **2018-12-17**

(80) Dato for Den Europæiske Patentmyndigheds bekendtgørelse om meddelelse af patentet: **2018-08-29**

(86) Europæisk ansøgning nr.: **14164233.0**

(86) Europæisk indleveringsdag: **2014-04-10**

(87) Den europæiske ansøgnings publiceringsdag: **2015-10-14**

(84) Designerede stater: **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**

(73) Patenthaver: **Nordex Energy GmbH, Langenhorner Chaussee 600, 22419 Hamburg, Tyskland**

(72) Opfinder: **Ohlerich, Nick, Beim Hornschen Hof 6, 18055 Rostock, Tyskland**

(74) Fuldmægtig i Danmark: **Chas. Hude A/S, H.C. Andersens Boulevard 33, 1780 København V, Danmark**

(54) Benævnelse: **Rotorblad til et vindenergianlæg med et potentialudligningsorgan**

(56) Fremdragne publikationer:
JP-A- 2009 115 052
JP-A- 2010 059 813
JP-A- 2012 246 815
US-A1- 2009 246 025

The invention relates to a wind turbine rotor blade having a pressure side and a suction side lightning conductor that are electrically connected to each other by a potential equalization element.

It is known to protect wind turbine rotor blades from damage from lightning using a lightning protection device. For this, generally a lightning receptor is arranged in the region of the blade tip. The current from lightning striking the lightning receptor is then diverted via a lightning conductor toward the blade root and from there via the nacelle and the tower of the wind turbine into the ground. Particular difficulties arise when a plurality of electrically-conductive elements are arranged more or less in parallel within the wind turbine rotor blade. As a consequence of the high lightning currents, electromagnetic induction causes great differences in potential to arise between the different electrically-conductive elements which can lead to flashover and hence to damage or destruction of the wind turbine rotor blade. It is known to counteract such flashovers by means of potential equalization elements.

A wind turbine rotor blade with a centrally arranged lightning protector is known from the document WO 00/79128 Al. Two other electrical lines also run in the longitudinal direction of the rotor blade and serve to energize an electrical heating apparatus. In the region of the blade tip, they are connected by spark gaps to the central lightning conductor. No additional potential equalization elements are provided.

A wind turbine rotor blade is known from the document EP 1 692 752 B1 in which an interior, electrically-conductive spar is connected to an adjacently arranged lightning conductor. For this, potential equalization elements are provided in the interior of the rotor blade that connect the spar and the lightning conductor to each other via an electrical line. The contact to the spar is established by a conductive, flat strip.

A wind turbine rotor blade with electrically-conductive main belts consisting of a carbon fiber material and two lightning conductors arranged in the interior of the rotor blade is known from the document EP 1 664 528 B1. The main belts are connected by copper mesh to the lightning receptors. Between the lightning receptors and the interior lightning conductors, an electrical connection is established via the interior electrical conductors.

A wind turbine rotor blade is known from the document DE 10 2012 108 124 A1 in which a lightning conductor consists of a strip of electrically-conductive material that is arranged around the trailing edge on the outside of the rotor blade. On the trailing edge, there is also a noise reducing device with prongs of metal which are connected to the conductive strip and function as lightning receptors.

A wind turbine rotor blade with a plurality of electrically-conductive belts consisting of a carbon fiber material is known from the document EP 1 112 448 B2. To increase the electrical conductivity of the belts, metal-coated carbon fibers are used such that the current carrying capacity of the belts is sufficient for use as a lightning conductor. In addition, a centrally arranged metal lightning conductor can be used. The belts and possibly the additional metal lightning conductors are connected to each other at a plurality of longitudinal positions over the potential equalization elements in the form of interior, electrical conductors.

The document JP 2010059813A discloses a wind turbine rotor blade with a plurality of lightning receptors which are each connected to a pressure-side, or a suction-side, lightning conductor. On the outside of the rotor blade, there is an additional first and second discharging means that each has a first electrically conductive layer, such as a thin metal film, and an electrically insulating layer. The first discharging means are arranged along the leading edge and the trailing edge, and the second discharging means run away in the direction of the depth of the profile via a lightning receptor to which they are connected in an electrically conductive manner.

The document JP 2012246815 A describes a wind turbine rotor blade that has two lightning conductors in some exemplary embodiments which are arranged in the region of the leading edge, or respectively in the region of the trailing edge.

In the exemplary embodiment in Fig. 17, these lightning conductors are each connected to two lightning receptors, of which one is arranged on the suction side, and one is arranged on the pressure side. These lightning receptors are connected to each other by electrically conductive layers running around the leading edge, or respectively the trailing edge.

Against this background, it is the object of the invention to provide a wind turbine rotor blade with a pressure-side and a suction-side lightning conductor that are connected to each other by a potential equalization element that can be more easily produced and enables improved lightning protection, as well as a method to produce such a wind turbine rotor blade.

This object is achieved by the wind turbine rotor blade with the features of claim 1. Advantageous embodiments are disclosed in the accompanying dependent claims.

The wind turbine rotor blade has a blade root, a pressure side, a suction side, a trailing edge, a pressure-side lightning conductor and a suction-side lightening conductor, wherein the two lightning conductors extend from a connecting point in the region of the blade root into the region of a blade tip and are designed to conduct a lightning current toward the blade root, and a potential equalization element that electrically connects the two lightning conductors to each other, wherein the potential equalization element is arranged on an outer side of the wind turbine rotor blade and runs around the trailing edge.

The wind turbine rotor blade can be designated for a wind turbine with an essentially horizontal axis. It can also be produced from a fiber composite material, in particular from two half shells connected to each other. It can be an aerodynamic shell that for example is formed by the outer sides of the two half shells as well as one or more belts, for example consisting of fiber glass or carbon-fiber-reinforced plastic. The two half shells can be connected to each other by one or more webs that in particular can be arranged between two main belts that face each other.

The two lightning conductors can extend substantially over the entire length of the wind turbine rotor blade. They extend from a connecting point in the region of the blade root into the region of the blade tip. There, they can be connected to a lightning receptor arranged on the blade tip. They can also terminate at a distance from the lightning receptor. An electrical connection between the lightning receptor and at least one of the lightning conductors can be established by a connecting element.

The invention is based on the insight that the installation of potential equalization elements known from the prior art and arranged in the interior of the rotor blade between two lightning conductors associated with the pressure and suction side is fraught with significant difficulties. This holds true in particular at radial positions of the rotor blade lying relatively far to the outside, in particular for example in the outer third of the wind turbine rotor blade. There, the profile thickness of the wind turbine rotor blade is generally so small that the interior of the rotor blade is no longer readily accessible after joining the wind turbine rotor blade, for example consisting of two half shells. At the same time, reliable potential equalization, especially close to the blade tip, is particularly important because the two lightning conductors are arranged there at a relatively small distance from each other so that flashovers arise there very quickly.

The invention solves these difficulties in that the potential equalization element is arranged on an outer side of the wind turbine rotor blade and runs around the trailing edge. The potential equalization element can be mounted after the joining of the wind turbine rotor blade, for example consisting of two half shells. For this, the potential equalization element must be fastened to the wind turbine rotor blade, and an electrical connection must be established between the potential equalization element and the two lightning conductors, which is easily feasible from the outside by using suitable connecting means. The potential equalization element can be aligned in the direction of flow of the wind turbine rotor blade in order to impair the aerodynamic effect of the wind turbine rotor blade as little as possible.

Another advantage of the arrangement of the potential equalization element according to the invention is that the potential equalization element itself can serve as another lightning receptor. Running the potential equalization element around the trailing edge enhances this effect because particularly high field strengths associated with the geometry arise in the region of the trailing edge, which generally tapers sharply.

Of course, the wind turbine rotor blade according to the invention can have a plurality of potential equalization elements of the described type, in particular distributed over the longitudinal section in the outer third of the wind turbine rotor blade. For example, two or more potential equalization elements can be arranged at a distance from each other and from the blade tip in this region.

In one embodiment, the potential equalization element has a pressure-side metal rail and a suction-side metal rail that are electrically connected to each other or transition into each other in the region of the trailing edge. The metal rails can for example consist of copper, aluminum, iron or an alloy with sufficient electrical conductivity. The metal rails can consist of solid metal. The use of metal rails ensures sufficient current carrying capacity and promotes easy and secure attachment to the wind turbine rotor blade. The two metal rails can be connected to each other after their installation on the wind turbine rotor blade. Alternatively, they can form a prefabricated unit. A single-part design is also possible, for example in the form of a single metal rail which is bent around the trailing edge. In this case, the two metal rails transition into each other at the trailing edge.

In one embodiment, the pressure-side metal rail and/or the suction-side metal rail each have a cross-section of 25 mm^2 or more, and/or a width of 30 mm or more. The cross-section can also be more than 50 mm^2, or more than 100 mm^2, and the width can also be more than 50 mm, or more than 80 mm. Correspondingly large-format metal rails have a high current carrying capacity and form a particularly effective lightning receptor.

In one embodiment, the pressure-side metal rail and suction-side metal rail possess a height that decreases up to 1 mm or less on lateral edges and/or a front edge. For example, the height of the metal rails in the middle can be 3 mm or more, or 5 mm or more. In a cross-section, the metal rails can have a curved outer surface or for example can be designed trapezoidal. The advantage of the height decreasing at the edges is a particularly slight impairment of the aerodynamic and aeroacoustic conditions on the wind turbine rotor blade.

In one embodiment, the rear ends of the two metal rails project beyond the trailing edge and lie flat on each other. When directional information such as "rear" or "front" are used here and in the following, they refer to the direction of flow around the wind turbine rotor blade during operation. The leading edge is to the front, and the trailing edge is to the rear. In particular, a contact surface between the two rear ends of the metal rails can be greater than 10 mm^2, or greater than 30 mm^2. The two metal rails can in particular be welded to each other. Tests have shown that the projection of the metal rails beyond the trailing edge is acceptable in light of aerodynamic considerations. Accordingly, a large surface electrical contact can be established without weakening the trailing edge arranged below the metal rails. The edge formed at the connecting point at the rear end of the metal rails can run parallel to the trailing edge.

In one embodiment, the two metal rails are connected by a threaded joint in the region of the trailing edge. The contact surfaces of the two metal rails are pressed against each other by the threaded joint so that a connection capable of carrying lightning current results. In particular, a threaded bolt with an M6 thread or greater can be used in order to geometrically influence the trailing edge contour as little as possible. The threaded joint can in particular extend through a hole through the wind turbine rotor blade in the region of the trailing edge so that mechanical fixation of the metal rails in the region of the trailing edge is also achieved in addition to the electrical connection. Alternatively, the rails can also be riveted to each other.

In one embodiment, the rear ends of the two metal rails have a height of 5 mm or less. In particular, the height of the two metal rails can be selected such that they correspond to a thickness of the trailing edge, such as within a range of 2 mm to 4 mm. In this case, the air at the rear end of the potential equalization element flows off just as smoothly as in adjacent regions of the trailing edge.

In one embodiment, a front end of the pressure-side metal rail is arranged behind a pressure-side main belt in the direction of flow, and/or a front end of the suction-side metal rail is arranged behind a suction-side main belt in the direction of flow. In this case, the electrical connection between the front ends of the metal rails and the lightning conductors is established without endangering the integrity of the belts. In addition, an arrangement of the metal rails lying relatively far to the rear is aerodynamically advantageous.

In one embodiment, the pressure-side metal rails and/or the suction-side metal rails have a curvature that corresponds to a surface curvature of the pressure side, or respectively the suction side. In particular, substantially the entire face of the metal rails facing the wind turbine rotor blade can lie on the surface of the wind turbine rotor blade. The metal rails can be adhered to the surface of the wind turbine rotor blade.

In one embodiment, the suction side lightning conductor is arranged on an inner side of the suction side half shell, and/or the pressure-side lightning conductor is arranged on an inner side of the pressure-side half shell of the wind turbine rotor blade. In principle, the lightning conductors can also be arranged at a distance from the walls of the relevant half shells. An arrangement on the inner side, and/or integrated entirely or partially in the relevant half shells has the advantage that it is very easily feasible to establish an electrical connection to the lightning conductors from the outside of the wind turbine rotor blades.

In one embodiment, the suction side lightning conductor and/or the pressure-side lightning conductor each have a middle conductor with a cross-section of 25 mm² or more. In particular, the cross-section can also be 50 mm² or more. In principle, electrically conductive belts, in particular consisting of a carbon material, are possible as lightning conductors. The use of metal conductors with the aforementioned minimum cross-section represents a particularly simple and economical solution, however.

In one embodiment, the suction side lightning conductor runs along a suction-side belt, and/or the pressure-side lightning conductor runs along a pressure-side belt. In particular given a belt consisting of an electrically-conductive material, in particular with carbon fibers, an electrical contact can be established between the lightning conductor and the belt so that the potential equalization elements establish potential equalization between the electrically-conductive belts at the same time as between the two lightning conductors.

In one embodiment, the wind turbine rotor blade has a heating apparatus on an outer side in the region of a leading edge. In particular, it can be an electrical heating apparatus which for example has a flat electrical conductor. The arrangement of the potential equalization element according to the invention around the trailing edge can be easily combined with such a heating apparatus. In particular, an impairment of the heating effect by the potential equalization element does not occur, and neither does damage to the heating apparatus from a lightning strike of the potential equalization element.

The aforementioned object is also achieved by the method to produce a wind turbine rotor blade having the features of claim 14. An advantageous embodiment is set forth in the subsequent dependent claims.

The method for producing a wind turbine rotor blade has the following steps:

- produce a pressure-side half shell that has a pressure-side lightning conductor,
- produce a suction-side half shell that has a suction-side lightning conductor,

wherein the pressure-side lightning conductor and the suction-side lightning conductor extend from a connecting point in the region of the blade root up to the region of a blade tip,

- join the two half shells into the wind turbine rotor blade,
- arrange a potential equalization element on an outer side of the wind turbine rotor blade so that the potential equalization element runs around a trailing edge of the wind turbine rotor blade,
- produce an electrical connection between the potential equalization element and the pressure-side lightning conductor, as well as between the potential equalization element and the suction-side lightning conductor.

The method can in particular be used to produce a wind turbine rotor blade that corresponds to one or more of the embodiments explained above in detail. Of course, the method can be combined with each of the above-explained features of the wind turbine rotor blade.

A special feature of the method is that the potential equalization element is arranged on an outer side of the wind turbine rotor blade that was previously joined from two half shells. With regard to the advantages and features of the method, reference is made to the above explanations of the wind turbine rotor blade which correspondingly apply.

In one embodiment, the potential equalization element has a pressure-side metal rail and/or a suction-side metal rail that is provided with a curvature before arranging the potential equalization element on the wind turbine rotor blade, said curvature corresponding to a surface curvature of the pressure-side, or respectively the suction-side. In other words, one or both metal rails are prefabricated to precisely fit, which makes it even easier to mount the potential equalization element on the wind turbine rotor blade.

The invention is explained in greater detail below based on an exemplary embodiment shown in figures. In the figures:

Fig. 1 shows a simplified, perspective representation of a wind turbine rotor blade according to the invention,

Fig. 2 shows a cross-section of the wind turbine rotor blade from Fig. 1 along the plane designated A-A,

Fig. 3 shows a sectional enlargement of the region designated B in Fig. 2,

Fig. 4 shows a sectional enlargement of the reason designated C in Fig. 1.

The wind turbine rotor blade 10 from Fig. 1 has a blade root 12 and a blade tip 14. In the figure, the perspective is basically directed toward the pressure side 16; on the side facing away from the viewer, the wind turbine rotor blade 10 has a suction side 18.

The wind turbine rotor blade 10 has a trailing edge 20 and a leading edge 22. In the region of the blade tip 14, a lightning receptor 24 is arranged that is connected in an electrically conductive manner to a pressure-side lightning conductor 26 indicated in a dashed line. The current from lightning striking the lightning receptor 24 can be deflected toward the blade root 12 by the pressure-side lightning conductor 26.

A suction-side lightning conductor 28 that also extends from the blade root 12 to the region of the blade tip 14 is also only suggested in Fig. 1. Three potential equalization elements 30 establish an electrical connection between the suction-side lightning conductor 26 and the pressure-side lightning conductor 28. They are approximately arranged in the outer third of the wind turbine rotor blade 10, and each have a distance from each other as well as from the blade tip 14.

Details of the potential equalization elements 30 are more readily discernible in the additional figures. Fig. 2 shows a cross-section along the plane indicated by A-A in Fig. 1. A suction-side half shell 32 and a pressure-side half shell 34 are discernible which are connected to each other in the region of the leading-edge

22 and in the region of the trailing edge 20 and via a web 36. The height of the web 36 at the portrayed cross-sectional position lies for example within a range of 50 mm to 200 mm so that the interior of the wind turbine rotor blade is not readily accessible.

The suction-side half shell 32 has a suction-side main belt 38. The pressure-side half shell 34 has a pressure-side main belt 40. The two main belts 38, 40 consist of a carbon fiber material in the example. The other components of the two half shells 32, 34 consist of a fiber composite material with glass fibers in the example.

The suction-side lightning conductor 26 is arranged on the inside of the suction-side half shell 32 and is integrated therein. It runs adjacent to the suction-side main belt 38 and is electrically connected by means of a copper mesh 42 to the suction-side main belt 38. The pressure-side lightning conductor 28 is arranged on the inside of the pressure-side half shell 34 and is integrated therein. It runs along the pressure-side main belt 40 and is connected in an electrically conductive manner thereto by another copper mesh 42.

An electrical heating apparatus with a heating element 44 consisting of a carbon fiber material is arranged in the region of the leading edge 22 on the outside of the wind turbine rotor blade 10.

The potential compensation element 30 has a suction-side metal rail 46 and a pressure-side metal rail 48. The front end of the suction-side metal rail 46 is electrically connected by a connecting element 50 to the suction-side lightning conductor 26. The front end of the pressure-side metal rail 48 is electrically connected by a connecting element 52 to the pressure-side lightning conductor 28.

The rear ends of the two metal rails 46, 48 project beyond the trailing edge 20 and lie flat on each other after the trailing edge 20. They are connected to each other there by welding.

In the sectional enlargement in Fig. 3, the large contact surface 56 between the two metal rails 46, 48 is discernible. Also drawn is a height 54 of the two metal rails 46, 48 which substantially correspond to the thickness of the trailing edge 20.

Fig. 4 shows one of the potential equalization elements 30 in a perspective view. The convergence of the suction-side metal rail 46 and the pressure-side metal rail 48 in the region of the trailing edge 20 is discernible in this view as well. It is also discernible that the two metal rails 46, 48 taper toward their lateral and front edges down to a height of 1 mm or less. In a cross section, the two metal rails 46, 48 are trapezoidal. The connecting element 52 establishes the electrical connection between the pressure-side metal rail 48 and the pressure-side lightning conductor 28 not shown in Fig. 4.

<u>List of Reference Numbers Used:</u>

10	Wind turbine rotor blade
12	Blade root
14	Blade tip
16	Pressure side
18	Suction side
20	Trailing edge
22	Leading edge
24	Lightning receptor
26	Suction side lightning conductor
28	Pressure-side lightning conductor
30	Potential equalization element
32	Suction-side half shell
34	Pressure-side half shell
36	Web
38	Suction-side main belt
40	Pressure-side main belt
42	Copper mesh
44	Heating element
46	Suction-side metal rail
48	Pressure-side metal rail
50	Connecting element
52	Connecting element
54	Height
56	Contact surface

Patentkrav

1. Rotorblad (10) til et vindenergianlæg og med en bladrod (12), en trykside (16), en sugeside (18), en profilkant (20), en ved tryksiden anbragt lynafleder (28) og en ved sugesiden anbragt lynafleder (26), og hvor de to lynafledere (26, 28) strækker sig fra et tilslutningspunkt i bladrodens (12) område og ud til et bladspidsområde (14), og er således udformet, at de kan aflede en lyn-strøm i retning mod bladroden (12) og et potentialeudligningsområde (30), som forbinder de to lynafledere (26, 28) elektrisk med hinanden, **kendetegnet ved,** at potentialeudligningsorganet (20) er indrettet ved en yderside af vindenergianlægsrotorbladet (10) og er ført omkring en profilbagkant (20).

2. Rotorblad (10) til et vindenergianlæg ifølge krav 1, **kendetegnet ved,** at potentialeudligningsorganet (30) har en ved tryksiden anbragt metalskinne (48) og en ved sugesiden anbragt metalskinne (46), som i profilbagkantens (20) område er elektrisk forbundet med hinanden eller går over i hinanden.

3. Rotorblad (10) til et vindenergianlæg ifølge krav 2, **kendetegnet ved,** at den ved tryksiden anvendte metalskinne (48) og/eller den ved sugesiden anbragte metalskinne (46) har et tværsnit på 25 mm^2 eller mere og/eller en bredde på 30 mm eller mere og/eller en højde på 3 mm eller mere.

4. Rotorblad (10) til et vindenergianlæg ifølge krav 2 eller 3, **kendetegnet ved,** at den ved tryksiden anbragte metalskinne (48) og/eller den ved sugesiden anbragte metalskinne (46) har en højde, som ved sidekanterne og/eller ved en forkant aftager med op til 1 mm eller mindre.

5. Rotorblad (10) til et vindenergianlæg ifølge et af kravene 2 til 4, **kendetegnet ved,** at de to metalskinner (46, 48) med deres bageste ender rager ind over profilbagkanterne (20) og ligger an mod hinanden.

6. Rotorblad (10) til et vindenergianlæg ifølge et af kravene 2 til 5, **kendetegnet ved,** at de to metalskinner (46, 48) er forbundet med hinanden i et område, hvor profilbagkanten (20) findes, og dette ved hjælp af en skrueforbindelse.

7. Rotorblad (10) til et vindenergianlæg ifølge et af kravene 2 til 6, **kendetegnet ved,** at de to metalskinner (46, 48) ved deres bageste ender har en højde (54) på 5 mm eller mindre.

8. Rotorblad (10) til et vindenergianlæg ifølge et af kravene 2 til 7, **kendetegnet ved,** at en forreste ende af den ved tryksiden anbragte metalskinne (48) - set i strømningsretningen - bag ved en ved tryksiden anbragt hovedflange (40) og/eller ved den forreste ende af den ved sugesiden anbragte metalskinne (46) - set i strømningsretningen - er indrettet bag ved en ved sugesiden anbragt hovedflange (48).

9. Rotorblad (10) til et vindenergianlæg ifølge et af kravene 2 til 8, **kendetegnet ved,** at den ved tryksiden anbragte metalskinne (48) og/eller den ved sugesiden anbragte metalskinne (46) har en krumning, som svarer til en overfladekrumning af tryksiden (16) henholdsvis sugesiden (18).

10. Rotorblad (10) til et vindenergianlæg ifølge et af kravene 1 til 9, **kendetegnet ved,** at en ved sugesiden anbragt lynafleder (26) er indrettet på indersiden af den ved sugesiden anbragte halvskal (32), og/eller at den ved tryksiden anbragte lynafleder (28) er indrettet på indersiden af en på tryksiden anbragt halvskal (34) i vindenergianlægsrotorbladet (10).

11. Rotorblad (10) til et vindenergianlæg ifølge et af kravene 1 til 10, **kendetegnet ved,** at den ved sugesiden anbragte lynafleder (26) og/eller den ved tryksiden anbragte lynafleder (28) er en metallader med et tværsnit på 25 mm^2 eller mere.

12. Rotorblad (10) til et vindenergianlæg ifølge et af kravene 1 til 11, **kendetegnet ved,** at den ved sugesiden anbragte lynafleder (26) forløber langs en ved

sugesiden anbragt hovedflange (38), og/eller at den ved tryksiden anbragte lynafleder (28) forløber langs en ved tryksiden anbragt hovedflange (40).

13. Rotorblad (10) til et vindenergianlæg ifølge et af kravene 1 til 12, **kendetegnet ved,** at det har en opvarmningsindretning (44) ved en yderside i området af en profilnæse-kant (22).

14. Fremgangsmåde til fremstilling af et rotorblad (10) til et vindenergianlæg og med følgende trin:

- at man fremstiller en ved tryksiden anbragt halvskal (34), som har en ved tryksiden anbragt lynafleder (28),
- at man fremstiller en ved sugesiden anbragt halvskal (32), som har en ved sugesiden anbragt lynafleder (26), og at den ved tryksiden anbragte lynafleder (28) og den ved sugesiden anbragte lynafleder (26) strækker sig fra et tilslutningspunkt i området af en bladrod (12) til i området af bladspidsen (14),
- at man sammenføjer de to halvskaller (32, 34) til dannelse af vindenergianlægsrotorbladet (10),
- at man indretter et potentialudligningsorgan (30) ved en yderside af vindenergianlægsrotorbladet (10), så at potential-udligningsorganet (30) forløber omkring en profil-bagkant på vindenergianlægsrotorbladet (10),
- at man fremstiller en elektrisk forbindelse mellem potentialudligningsorganet (30) og den ved tryksiden anbragte lynafleder (28) samt mellem potentialudligningsorganet (30) og den ved sugesiden anbragte lynafleder (26).

15. Fremgangsmåde ifølge krav 14, **kendetegnet ved,** at potentialudligningsorganet (30) har en ved tryksiden anbragt metalskinne (48) og/eller en ved sugesiden anbragt metalskinne (48), som har en krumning inden man anbringer potentialudligningsorganet (30) på vindenergianlægsrotorbladet (10), hvilken krumning svarer til overfladekrumningen af tryksiden (16,) henholdsvis sugesiden (18).

Fig. 1

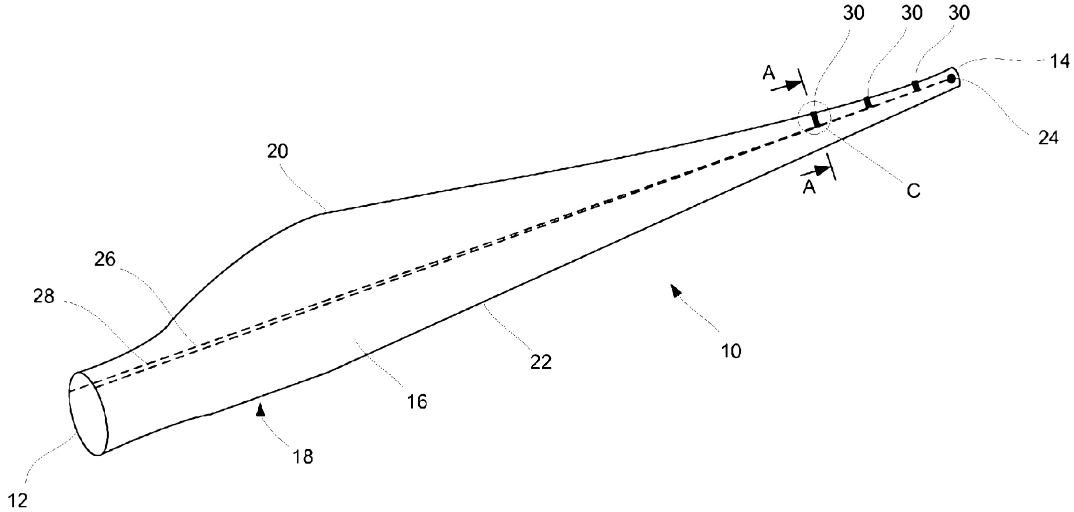
30
30
30
A
14
24
20
A
C
26
28
10
22
16
18
12

Fig. 2

A - A

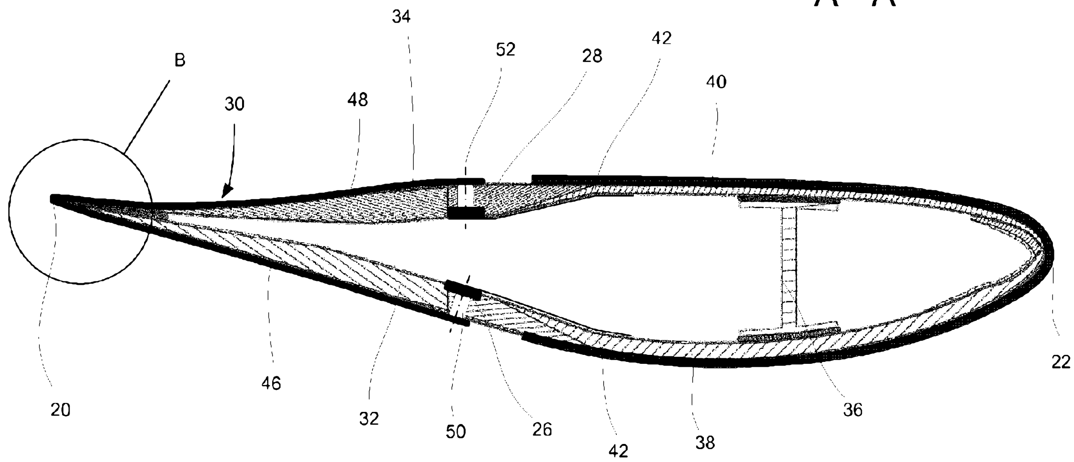
34
52
28
42
40
B
30
48
20
46
32
50
26
42
38
36
22

Fig. 3

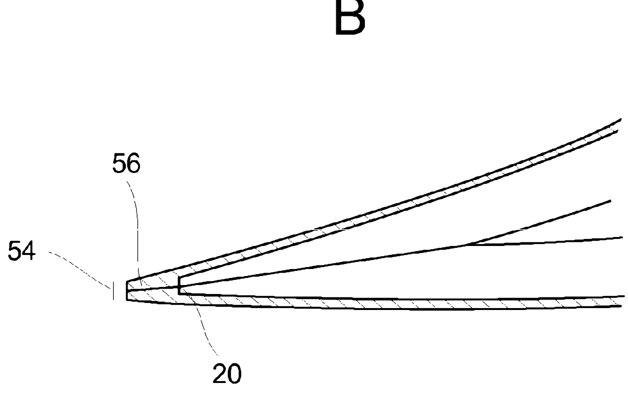

Fig. 4