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(54) **Title**: A WIND TURBINE BLADE

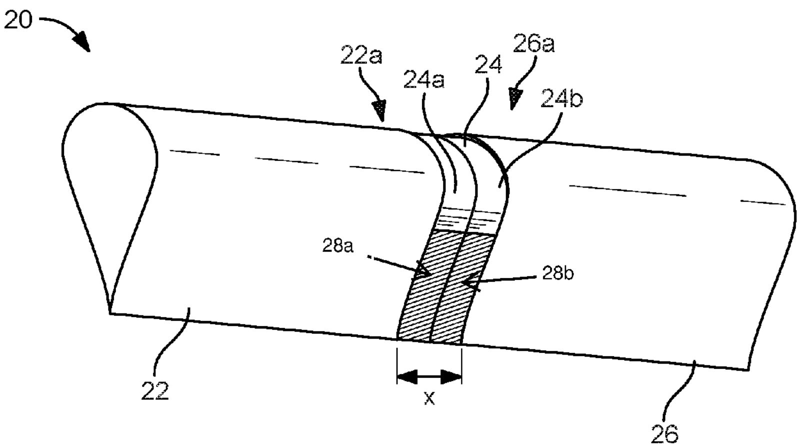

FIG. 2

(57) **Abstract**: A partial pitch wind turbine blade is described wherein an aerodynamic filler material is provided at the pitch system joint. The filler material acts to reduce tip losses at the joint, improving the efficiency of the wind turbine blade. The filler material may be a an inflatable or resilient material e.g. rubber, foam, or may be a shell applied at the joint.

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A Wind Turbine Blade

Field of the Invention

The present invention relates to a blade for a wind turbine, in particular a partial-pitch wind turbine blade.

Background of the Invention

One particular design of wind turbine blade is a partial pitch blade. A partial pitch blade generally comprises an inner and an outer blade section. A pitch system provided in the blade allows for the outer blade section to be pitched relative to the inner blade section, to control the wind turbine operation. Examples of partial pitch wind turbine blades can be seen in International Patent Application Publication No. WO 03/098034 and US Patent Application Publication No. 2009/0148285.

With reference to Fig. 1, an enlarged view of a section of a partial pitch wind turbine blade is shown. The partial pitch blade 10 comprises an inner blade extender (also called a hub extender) 16, which can be coupled to the rotor hub of a wind turbine (not shown). The blade 10 further comprises a pitch system 14, having first and second circular members 14a,14b coupled via a moveable bearing connection. The distal junction end 16a of the blade extender 16 is coupled to the first circular member 14a of the pitch system 14. The partial pitch blade 10 further comprises an outer blade section 12, a junction end 12a of the outer blade section 12 mounted to the second circular member 14b of the pitch system 14, such that the blade section 16 is pitchable relative to said blade extender 16.

Due to the difference in profile between the aerodynamic profile cross-section of both the blade extender 16 and the blade section 12, and the circular profile cross-section of the pitch system 14, a gap X is defined between the trailing edges of the respective junction ends 12a,16a of the blade section 12 and the blade extender 16. The presence of the gap X negatively impacts on the efficiency of the partial pitch blade 10, as it breaks up the aerodynamic profile of the blade and effectively introduces additional tip losses at the respective junction ends 12a,16a.

In general, partial pitch blades are configured such that the distance of the gap X is minimised. However, due to possible bending or flexion of different sections of the wind turbine blade during operation, it is necessary to maintain a gap so as not to damage the blades during operation and/or pitching. As the dimensions of the wind turbine blades increase, the distance of gap X also increases, unless additional strengthening or reinforcing is provided at the pitch system joint, thereby increasing the overall cost of blade design and manufacture. For standard partial pitch wind turbines, the gap X between the junction ends 12a,16a can normally be of the order of several centimetres in distance.

Another example is patent publication WO 2010 046760, which discloses a collar that to some extend bridges the two blade sections and which collar is provided to protect the wires between the two blade sections.

It is an object of the invention to provide a partial pitch blade for a wind turbine which combines improved efficiency at the pitch system joint with reduced blade design and manufacturing costs.

It is an object of the invention to provide a partial pitch blade for a wind turbine which improves the aerodynamic properties of a partial pitch blade.

Summary of the Invention

Accordingly, there is provided a partial pitch blade for a wind turbine, the blade comprising:

a first blade section;

a second blade section;

a pitch system coupling said first blade section to said second blade section, the pitch system operable to pitch said first blade section relative to said second blade section, wherein a gap is defined between said first blade section and said second blade section at the junction between said first and second blade sections; and

wherein the blade further comprises at least one bridging element provided at said junction, said at least one bridging element substantially covering said gap.

The bridging element acts to substantially fill or enclose the space between the blade sections at the pitch junction. As this gap between the different blade sections at the pitch system is at least substantially covered by the bridging element, the efficiency of the rotor blade is improved due to a reduction in the tip losses experienced by the rotor blade at the pitch junction.

Preferably, said gap is defined between the junction ends of said first and second blade sections. Additionally or alternatively, said gap is defined at least in part by the difference between the aerodynamic profiles of blade sections at said junction.

Preferably, said at least one bridging element is shaped to provide an aerodynamic profile at said junction.

According to a particular embodiment of the invention the least one bridging element is shaped such that the external surface of the bridging element is substantially flush with at least a porting of the external surface of at least one blade sections at the junction.

Thereby the bridging element improves the aerodynamic properties of the partial pitch blade.

As the bridging element presents an aerodynamic profile at the junction, this reduces the negative impact due to any turbulence, etc., normally experienced at the pitch junction of a partial pitch rotor blade.

Preferably, said at least one bridging element is shaped such that the external surface of said bridging element is substantially flush with at least a portion of the external surface of at least one of said blade sections at said junction.

As the bridging element is substantially in register with the surface of the adjacent blade section, this ensures that the aerodynamic flow over the rotor blade is not interrupted by the presence of the pitch junction. Preferably, said at least one bridging element is shaped such that the external surface of said bridging element is substantially flush with the external surface of both of said first and second blade sections at said junction when said first blade section is unpitched relative to said second blade section. Accordingly, the aerodynamic profiles seen at the respective junction ends of said blade sections substantially correspond to the aerodynamic profile seen at the pitch junction, which is provided by the bridging element (and possibly formed in part by the pitch system).

Preferably, said pitch system is provided towards the leading edge of said partial pitch rotor blade, wherein said at least one bridging element is provided at the trailing edge of said partial pitch rotor blade.

As the pitch system is normally circular in profile and provided at the leading edge of the blade, the bridging element is used to provide a trailing edge profile at the pitch junction. In one embodiment, the gap is defined between the respective trailing edges of said first and second blade sections wherein said at least one bridging element provides a trailing edge profile at said junction. In this case, the bridging element may be provided as a trailing edge add-on which forms an overall aerodynamic profile when combined with the circular face of the pitch system. This can reduce the materials required to construct the bridging element.

Preferably, said at least one bridging element is shaped such that said bridging element is aligned with the junction end of said first blade section and the junction end of said second blade section when said first blade section is unpitched relative to said second blade section.

Preferably, said at least one bridging element comprises a substantially V-shaped body. Alternatively, said at least one bridging element comprises a wedge-shaped body. It will be understood that said body may be hollow or may comprise a solid body.

The bridging element may be formed as a V-shaped aerodynamic partial shell piece which is used to enclose the gap, or the element may be formed as a solid body formed in or inserted into the gap.

Preferably, said at least one bridging element is configured to allow said pitch system to pitch said first blade section relative to said second blade section.

As the at least one bridging element is provided at the pitching junction of the partial pitch rotor blade, the element is configured such that the pitching action of the blade is largely unaffected by the use of the bridging element.

In one embodiment, said partial pitch blade comprises a first bridging element provided at the junction end of said first blade section and a second bridging element provided at the junction end of said second blade section, wherein said first bridging element abuts said second bridging element.

As the first and second bridging elements are not directly connected to each other, the bridging elements, and the respective blade sections, may be pitched relative to one another without damaging each other. In an alternate embodiment, it will be understood that the rotor blade may also comprise a single bridging element, the bridging element provided at either of the junction ends of the first and second blade sections and extending towards the opposed junction end.

It will be understood that the bridging elements may be arranged to be touching one another, the bridging elements adapted to slide past each other when the blade sections are pitched. Alternatively, the bridging elements may be provided closely adjacent one another, a small space defined between the elements. As the bridging elements can be provided very closely adjacent one another, such a small space between elements will have practically no impact on the greater efficiency of the rotor blade. With the system of the invention, it is possible to reduce the distance of this gap to a few millimetres in distance.

Preferably, said at least one bridging element extends about a portion of at least one of said first and second blade sections.

The bridging element may be further adapted to fit adjacent to or around a portion of at least one of the blade sections, to further improve the performance and efficiency of the partial pitch rotor blade, possibly by providing an improved aerodynamic profile at that portion of the blade.

In one embodiment, at least one of said first and second blade sections comprises an aerodynamically shaped body having a leading edge and a trailing edge, wherein said body tapers to a relatively narrow connecting section adjacent said junction for coupling to said pitch system, said connecting section provided at the leading edge of the body, wherein said at least one bridging element is shaped to provide a trailing edge at said connecting section.

Preferably, said first and second bridging elements are shaped such that the profile of said first bridging element is in register with the profile of said second bridging element when said first blade section has a pitch angle of approximately 0° relative to said second blade section.

When the first blade section has such a pitch angle, it can be regarded as unpitched relative to the second section, being substantially aligned with the second blade section. As the bridging elements are shaped so that the external surfaces of the elements are aligned with one another when the rotor blade is unpitched, this means that the aerodynamic profile of the entire partial pitch rotor blade is consistent for normal, unpitched, operation, and the partial pitch blade acts as a single, unbroken rotor blade, without any significant discontinuity in aerodynamic profile.

In one embodiment, the bridging element comprises an elastic material, the bridging element arranged to deform when said first blade section is pitched relative to said second blade section.

The use of an elastic bridging element provides for a deformable bridging element, which can adjust the shape of the bridging element as the blade is pitched.

Preferably, said elastic bridging element extends between said first and second blade sections. Preferably, said elastic bridging element is directly connected to the first and second blade sections.

As the bridging element is elastic, it can extend across the entire gap between the blade sections, and may be directly connected between the blade sections. The elasticity of the bridging element means that this direct connection between the blade sections does not adversely affect the pitching operation.

For the elastic bridging element embodiment, preferably at least a portion of the gap covered by the elastic bridging element is at least 20 centimetres in distance.

The elastic bridging element is particularly suitable in the case of partial pitch blades having larger gaps between the blade sections, as the elasticity of the bridging element can be maintained relatively low.

Preferably, said pitch system is provided at said junction, wherein said first bridging element abuts said second bridging element at the pitch plane of said pitch system.

The pitch plane is defined as the plane between the two relatively pitchable portions of a pitch system. This ensures that the boundary between the first and second bridging elements is in line with the boundary between the pitchable sections of the pitch system and the first and second blade sections.

In one embodiment, said first blade section comprises a first aerodynamic profile at the junction end of said first blade section, and said second blade section comprises a second aerodynamic profile at the junction end of said second blade section, wherein said first aerodynamic profile is different to said second aerodynamic profile, and wherein said at least one bridging element is shaped as a transition piece between said first and second aerodynamic profiles.

In some embodiments, it may be preferable that the first blade section has a different aerodynamic profile to the second section. In such cases, the bridging element may be shaped to correspond with the first aerodynamic profile at the side adjacent to the junction end of said first blade section, and is further shaped to correspond with the second aerodynamic profile at the side adjacent to the junction end of said second blade section. The body of the bridging element is then shaped to transition between the two profiles. When the first and second blade sections are aligned, this provides a smooth change in aerodynamic profile between the first and second blade sections.

Preferably, said first aerodynamic profile is a pitch-controlled blade profile and said second aerodynamic profile is a stall-controlled blade profile.

In embodiments wherein the first blade section is an inner blade extender mounted to the rotor hub, and the second blade section is a pitchable outer blade section, it is preferable that the aerodynamic profile of each section is configured for the particular operation of that section.

In one embodiment, said at least one bridging element comprises a shell provided over said pitch system. Preferably, said shell provides a seal about said pitch system.

The use of a shell which can be fitted over or around the pitch system allows for the pitch system to be protectively sealed within the shell, preventing the ingress of dirt and/or moisture into the pitch system components. The shell may be provided in the form of a steel or glass fibre case, or as an applied sealing covering, formed from rubber, foam, plastic, or any suitable insulating material.

Preferably, said shell has a substantially aerodynamic profile.

As the shell has an aerodynamic profile, any losses experienced at the pitch junction due to the non-aerodynamic shape of the pitch system can be reduced.

Preferably, said shell comprises two shell halves fitted around said pitch system.

The shell can be provided in two halves, to ease installation at the pitch junction, as the shell may be easily fitted about the pitch system after the partial pitch rotor blade has been assembled. This also allows for ease of maintenance of the pitch system, as the shell may be easily removed from its location about the pitch system.

In one embodiment, said shell halves are substantially identical.

The use of identical halves to form the shell results in an efficient manufacturing procedure, as a single mould may be used to form both halves.

Preferably, said shell halves are hingedly coupled together.

As the shell halves are hinged to one another, this further aids the ease of installation/removal.

Preferably, said second blade section comprises a blade extender for coupling to a wind turbine rotor hub.

Preferably, said at least one bridging element is mounted to at least one of said blade sections. Additionally or alternatively, said at least one bridging element is mounted to said pitch system.

The at least one bridging element may be mounted using any suitable coupling means, e.g. bolts, adhesives, etc.

Preferably, said at least one bridging element is formed from a flexible material. For example, the at least one bridging element may be selected from one or more of the following materials: flexible foam, rubber, plastics, etc.

The use of a flexible material means that any deflections or bending of the blade sections at the junction may be absorbed and/or cushioned by the flexible material.

Preferably, said at least one bridging element is formed from an expandable foam material applied in said gap at said junction.

The use of expandable foam provides for a relatively simple installation method for applying the bridging material.

Additionally or alternatively, said at least one bridging element is formed by an inflatable member.

Additionally or alternatively, said at least one bridging element may be formed by a resilient material, for example glass fibre, steel, etc.

Preferably, said partial pitch blade is at least 30 metres in length, preferably at least 60 metres.

Preferably, the ratio of the length of the first blade section to the second blade section is approximately 2:1.

Preferably, said first blade section comprises an outer blade section and said second blade section comprises an inner blade extender section, wherein said outer blade section is at least 40 metres in length and said inner blade extender section is at least 20 metres in length.

There is also provided a partial pitch wind turbine comprising at least two of said partial pitch blades.

Description of the Invention

An embodiment of the invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

Fig. 1 is a perspective view of an enlarged section of a first partial pitch blade;

Fig. 2 is a perspective view of an enlarged partial pitch blade according to a first embodiment of the invention;

Fig. 3 is a plan view of an enlarged section of a second partial pitch blade;

Fig. 4 is a plan view of an enlarged section of the second partial pitch blade according to a second embodiment of the invention; and

Fig. 5 is a plan view of an enlarged section of the second partial pitch blade according to a third embodiment of the invention.

An enlarged view of the pitch junction of a partial pitch blade according to the invention is provided in Fig. 2, the partial pitch blade indicated generally at 20.

The partial pitch blade 20 comprises a first blade section 22, and a pitch system 24, having first and second circular members 24a,24b coupled via a moveable bearing connection. The distal junction end 22a of the first blade section 22 is coupled to the first circular member 24a of the pitch system 24. The partial pitch blade 10 further comprises a second blade section 26, a junction end 26a of the second blade section 26 mounted to the second circular member 24b of the pitch system 24, such that the first blade section 22 is pitchable relative to said second blade section 24.

Preferably, said second blade section 24 is a blade extender (or hub extender) which can be rigidly coupled to a rotor hub of a wind turbine, and said first blade section 22 is the outer blade section for a partial pitch wind turbine blade, but it will be understood that said first and second blade sections 22,24 may be provided at any part of a partial pitch turbine blade.

The junction ends 22a,26a of the first and second blade sections 22,26 comprise airfoil-shaped profiles, to generate aerodynamic lift and reduce drag of the first and second blade sections 22,26. The pitch system 24 is circular in cross-sectional profile, and is located towards the leading edge of the partial pitch blade 20.

The partial pitch blade 20 further comprises a pair of bridging elements 28a,28b provided between the junction ends 22a,26a of the first and second blade sections 22,26, provided at the trailing edge of the rotor blade 20. A first bridging element 28a is coupled to the junction end 22a of the first blade section 22 and a second bridging element 28b is coupled to the junction end 26a of the second blade section 26. The bridging elements 28a,28b extend from the respective junction ends 22a,26a of the first and second blade sections 22,26, and abut one another approximately half way of the distance between the junction ends 22a,26a, preferably along the pitch plane of the pitch system 24. The bridging elements 28a,28b are arranged to bridge the gap between the trailing edges of the junction ends 22a,26a of the first and second blade sections 22,26. The bridging elements 28a,28b may touch one another, or may be arranged with a very small space between the elements 28a,28b. As the bridging elements 28a,28b are not connected, they may be moved relative to one another as the pitch system 24 pitches the first blade section 22 relative to the second blade section 26.

The bridging elements 28a,28b are shaped to correspond to the trailing edge of an aerodynamic profile, such that a suitable aerodynamic profile is provided at the pitch junction from a combination of the circular pitch system 24 at the leading edge of the blade 20 and the shaped bridging elements 28a,28b at the trailing edge of the blade 20.

The bridging elements 28a,28b are shaped to correspond to the airfoil profiles presented at the junction ends 22a,26a of the first and second blade sections 22,26, such that the exposed external surface of the bridging elements 28a,28b is in register or flush with the external surface of the adjacent blade sections 22,26.

The use of the bridging elements 28a,28b acts to eliminate or reduce to an insignificant amount the gap formed at the pitch junction between the trailing edges of the first and second blade sections 22,26. Accordingly, the negative impact of any tip losses at the pitch junction is practically eliminated, resulting in improved blade aerodynamic efficiency.

It will be understood that the bridging elements may be shaped as required to correspond with variations in the junction ends of the blade sections. With reference to Fig. 3, a plan view is shown of an example of a type of pitch junction for a partial pitch rotor blade, indicated at 30. In this system, the rotor blade 30 comprises an inner blade extender section 32 and an outer blade section 34, coupled together via pitch system 36.

In the example shown in Fig. 3, both the inner blade extender section 32 and the outer blade section 34 are profiled such that the bodies of both sections 32,34 have an aerodynamic airfoil-shaped profile along substantially the length of the respective sections 32,34, but that said sections 32,34 taper or narrow towards a relatively narrow connection section 33,35 having a substantially circular cross-section at the junction ends

32a,34a of the sections 32,34. Said pitch system 36 can then be connected to the circular cross-section of the connection sections 33,35 of the blade sections 32,34.

The relatively narrow connection sections 33,35 are provided towards the leading edge of the blade 30, and consequently the blade 30 has a circular, non-aerodynamic profile at this area. This lack of an aerodynamic profile can introduce losses and reduced efficiency into the performance of the overall partial pitch blade 30.

With reference to Fig. 4, a first bridging element 38 is provided at the junction end 32a of the inner blade extender section 32, and a second bridging element 40 is provided at the junction end 34a of the outer blade section 34, to cover the gap between the ends of the blade sections 32,34 at the pitch system 36, the bridging elements 38,40 either touching one another or defining a minimal space 41 between the bridging elements 38,40. However, in this embodiment, the bridging elements 38,40 also extend adjacent to the body of the blade sections 32,34 at the relatively narrow connection sections 33,35, such that the bridging elements 38,40 provide a trailing edge for the overall partial pitch blade 30 at the connection sections 33,35. The bridging elements 38,40 may be shaped to provide a smooth profile at these sections 33,35.

It will be understood that the bridging elements 28a,28b,38,40 are shaped such that the external surfaces of the elements are aligned with one another when the blade sections 22,26,32,34 are aligned together, e.g. when the first blade section 22 is unpitched relative to the second blade section 26. This provides that the aerodynamic profile of the entire partial pitch rotor blade 20,30 is consistent for normal, unpitched, operation, and the partial pitch blade acts as a single, unbroken rotor blade, without any significant discontinuity in aerodynamic profile.

It will be understood that the bridging elements may be formed from any suitable material. For example, a flexible material e.g. foam, rubber or plastics may be used. This can allow for any deflection or bending of the junction ends 22a,26a,32a,34a during use of the blade sections 22,26,32,34 to be absorbed and/or cushioned by the bridging elements 28a,28b,38,40. An expandable foam may be applied in the space between the junction ends 22a,26a,32a,34a to form the bridging elements 28a,28b,38,40. Furthermore, an inflatable article may be positioned in the space to form the bridging elements 28a,28b,38,40. It will also be understood that the bridging elements 28a,28b,38,40 may be formed using any suitable resilient materials, e.g. steel, fibre glass, etc.

The bridging elements 28a,28b,38,40 may be provided as a simple V-shaped element, adapted to form the trailing edge of an airfoil profile, or may be provided as a wedge-shaped member, possibly with a concave face adapted to fit about a portion of the circular cross-section pitch system 24,36. The bridging elements 28a,28b,38,40 may be solid bodies, or may be formed as hollow elements.

In another alternative embodiment, the bridging elements 28a,28b,38,40 may be formed as a shell having an aerodynamic airfoil profile which is adapted to fit around the pitch system 24,36, and possibly around portions of the adjacent blade sections 32,34. Such a shell may be configured to form a more efficient aerodynamic profile at the pitch junction, possibly corresponding to the aerodynamic profiles of the adjacent blade sections. The shell may also be used to form a seal about the pitch system 24,36, to prevent the ingress of dirt and/or moisture to the pitch system 24,36 interior. Such a shell may comprise two half shell members, which can be hinged at one end to provide for ease of mounting/removal from the pitch system.

With reference to Fig. 5, a further alternative embodiment is illustrated, using the basic partial pitch blade structure of Fig. 3. In Fig 5, a single bridging element 42 is provided in the gap between the blade sections 32. 34. Here, the bridging element 42 is formed from an elastic material, the elastic material suitable to stretch and deform in the gap between the blade sections 32,34, as the outer blade section 34 is pitched relative to inner blade extender section 32. In such an embodiment, the bridging element 42 may entirely cover the gap formed between the blade sections, and can be directly connected (e.g. clamping, bolting, adhesives, etc.) to the junction ends of both blade sections. This ensures that the gap at the pitch junction section is eliminated, and does not require the definition of any minor spaces between adjacent bridging elements (see 41 in Fig. 4).

Furthermore, as the pitch system is generally a steel construction, with the blade sections normally manufactured from glass fibre, and as glass fibre is approximately 4 times more elastic than steel, the use of a flexible bridging element can more easily accommodate any deformations or bending in the region of the pitch system junction, e.g. when the blade is exposed to operational forces and loading.

While the elastic bridging element may be used with any suitable pitch junction section, the elastic bridging element is particularly suitable for use with regard to the pitch junction illustrated in Fig. 3, as the large gap distance between the blade sections 32,34 means that an elastic material having a relatively low modulus of elasticity can be used, thereby minimising manufacturing costs.

It will be understood that various alternative embodiments may be used. For example, the rotor blade 20,30 may comprise a single bridging element, which extends from one of the junction ends 22a,26a,32a,34a across substantially the entire gap between the trailing edges of the first and second blade sections 22,26,32,34. Such an embodiment means only one mounting operation may be used to secure the bridging element.

It will be understood that the bridging element(s) may be shaped as required. For example, if the aerodynamic profile at the junction end 22a,32a of the first blade section 22,32 is different from the aerodynamic profile at the junction end 26a,34a of the second blade section 26,34, then the bridging element(s) may be shaped as a transition piece, such that the aerodynamic profile presented at the pitch junction gradually changes between the two blade sections 22,26,32,34, thereby preserving the continuity of the overall rotor blade 20,30.

Such a construction of partial pitch rotor blade provides for an increase in rotor blade efficiency for a relatively minor constructional alteration.

The invention is not limited to the embodiment described herein, and may be modified or adapted without departing from the scope of the present invention.

CLAIMS

1. A partial pitch blade for a wind turbine, the blade comprising:

a first blade section;

a second blade section;

a pitch system coupling said first blade section to said second blade section, the pitch system operable to pitch said first blade section relative to said second blade section, wherein a gap is defined between said first blade section and said second blade section at the junction between said first and second blade sections;

wherein the blade further comprises at least one bridging element provided at said junction, said at least one bridging element substantially covering said gap **characterised in that** said at least one bridging element is shaped such that the external surface of said bridging element is substantially flush with at least a portion of the external surface of at least one of said blade sections at said junction.

2. The partial pitch blade of claim 1, wherein said at least one bridging element is shaped to provide an aerodynamic profile at said junction.

3. The partial pitch blade of any preceding claim, wherein said pitch system is provided towards the leading edge of said partial pitch rotor blade, wherein said at least one bridging element is provided at the trailing edge of said partial pitch rotor blade.

4. The partial pitch blade of any preceding claim, wherein said at least one bridging element is shaped such that said bridging element is aligned with the junction end of said first blade section and the junction end of said second blade section when said first blade section is unpitched relative to said second blade section.

5. The partial pitch blade of any preceding claim, wherein said partial pitch blade comprises a first bridging element provided at the junction end of said first blade section and a second bridging element provided at the junction end of said second blade section, wherein said first bridging element abuts said second bridging element.

6. The partial pitch blade of any preceding claim, wherein at least one of said first and second blade sections comprises an aerodynamically shaped body having a leading edge and a trailing edge, wherein said body tapers to a relatively narrow connecting section adjacent said junction for coupling to said pitch system, said connecting section provided at the leading edge of the body, wherein said at least one bridging element is shaped to provide a trailing edge at said connecting section.

7. The partial pitch blade of any preceding claim, wherein said at least one bridging element comprises a shell provided over said pitch system.

8. The partial pitch blade of any preceding claim, wherein said at least one bridging element is formed from a substantially flexible material.

9. The partial pitch blade of any preceding claim, wherein said bridging element comprises an elastic material, the bridging element arranged to deform when said first blade section is pitched relative to said second blade section.

10. A partial pitch wind turbine comprising at least two partial pitch blades as claimed in any one of claims 1-10.

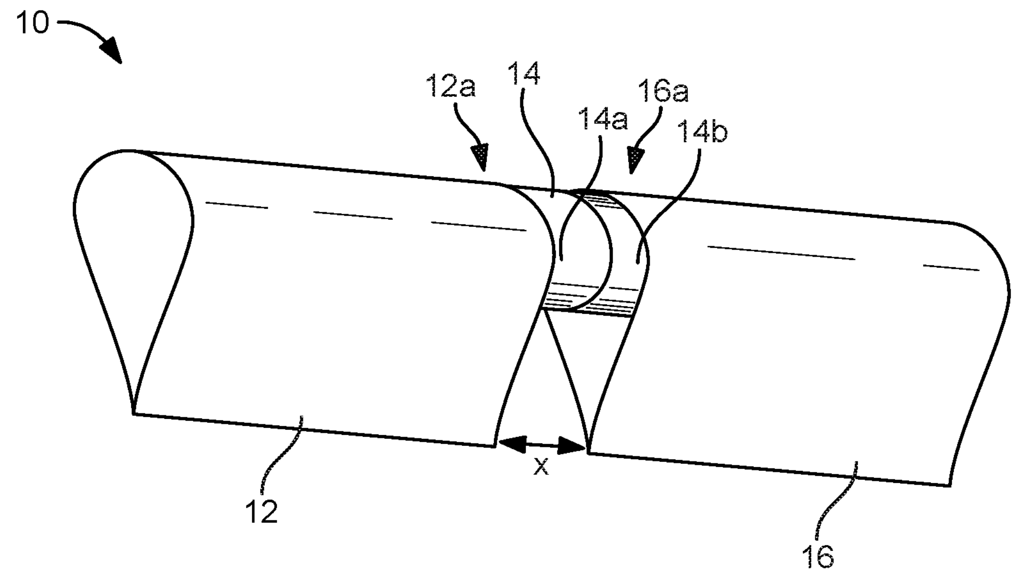

FIG. 1
(Prior Art)

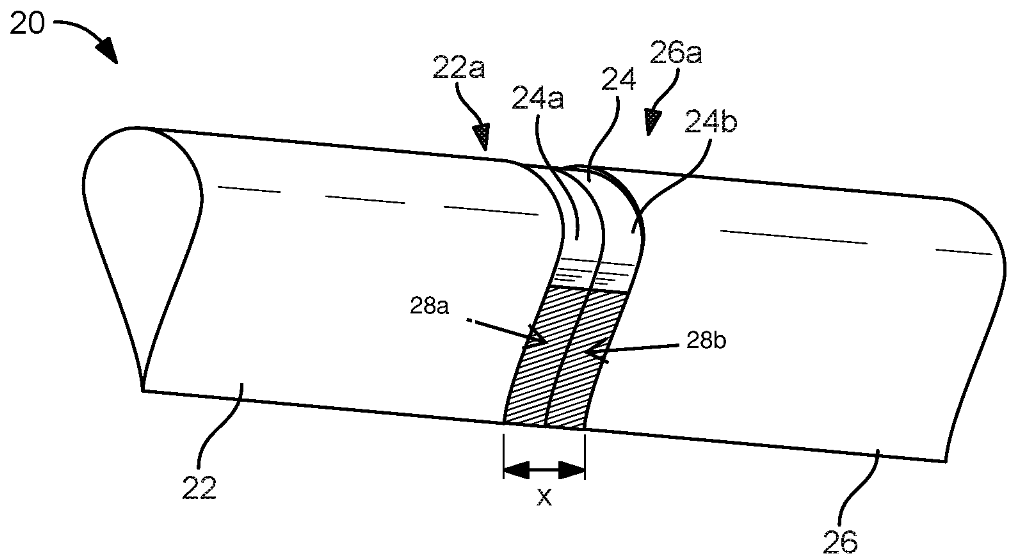

FIG. 2

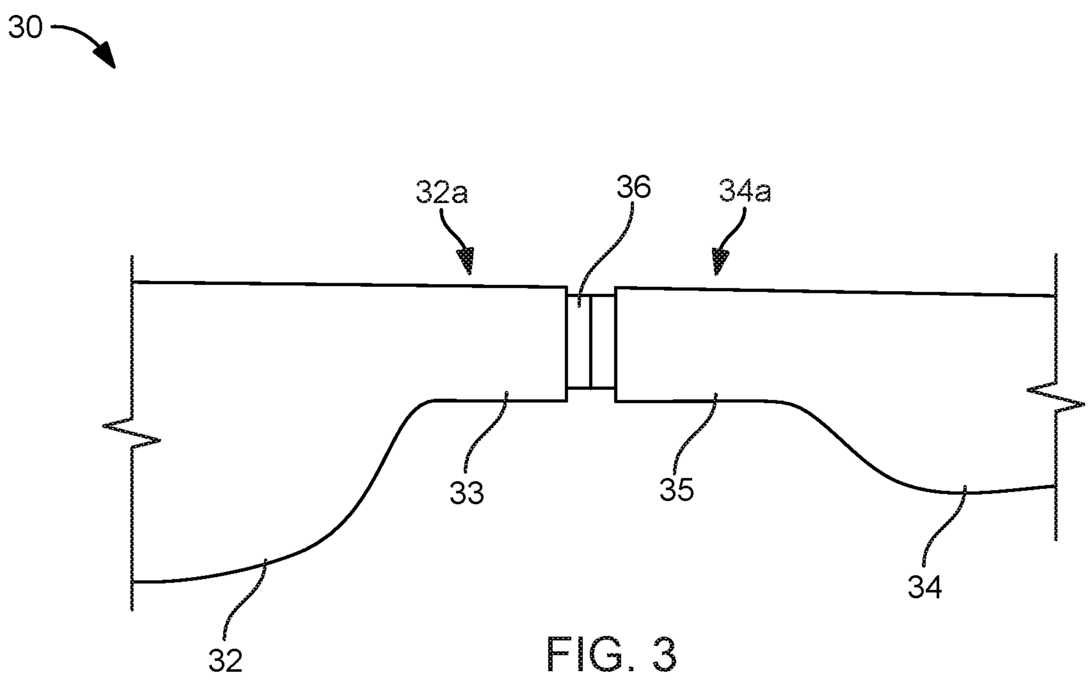

FIG. 3
(Prior Art)

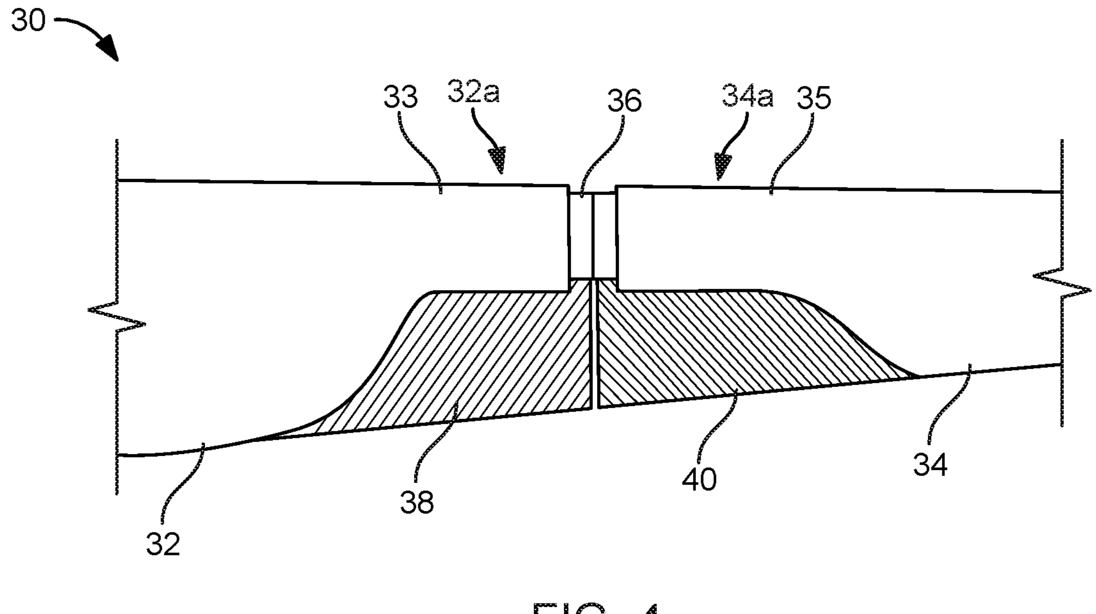

FIG. 4

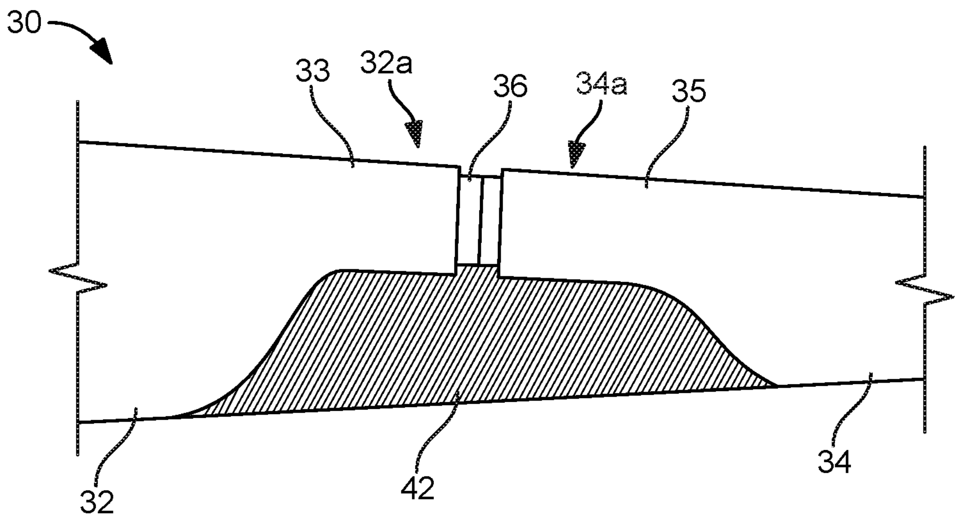

FIG. 5