

CABLE CLEAT

CROSS-REFERENCE TO RELATED APPLICATION

This application claims priority to and the benefit of Korean Patent Application No. 2017-0177602, filed on December 21, 2017, the disclosure of which is incorporated herein by reference in its entirety.

BACKGROUND

1. Field of the Invention

The present invention relates to a cable cleat, and more particularly, to a cable cleat that adjusts a buffering force by using a plurality of impact absorbing members.

2. Discussion of Related Art

Generally, when cables are installed on a transmission line, the cables should be secured using cable cleats.

A cleat for an ultra-high voltage cable is coupled by an upper cable cleat and a lower cable cleat, which have an inner diameter of a semicircle, being bolted in a state in which the upper cable cleat and the lower cable cleat are attached to each other, and restrains cables by pressing cables passing through holes of a body of the cleat at a constant pressure.

In an ultra-high voltage cable installed in a transmission line, an axial force may be generated by heat generated during actual operation, and thus the ultra-high voltage cable may thermally expand in an outer diameter direction.

An outer diameter of the ultra-high voltage cable installed in the

transmission line may also expand due to heat generated by a current applied to the transmission line. Accordingly, the cleat for an ultra-high voltage cable is required to have a buffering means capable of absorbing expansion of the cable.

When a buffering means is not provided, the cables may be distorted or cleats may fail due to fatigue or be plastically deformed by creep

[Prior-Art Documents]

[Patent Documents]

(Patent Literature 01) Korea Registered Patent No. 10-1101842 (Announced on January 05, 2012)

SUMMARY OF THE INVENTION

The present invention has been made to solve the above problems of the related art, and it is an object of the present invention to provide a cable cleat capable of maintaining a force for restraining cables even under severe conditions such as a thermal expansion or contraction due to a climate change.

According to an aspect of the present invention, there is provided a cable cleat including a base, a center support fixedly coupled to the base and configured to support three cables so that respective three cross-sectional centers of the three cables are formed in a triangular shape, a first cover member coupled to surround an outer circumferential surface of one side of a first cable and a part of an outer circumferential surface of a second cable among the three cables, wherein the first cable is located in the middle among the three cables, a second cover member coupled to surround an outer circumferential surface of the other side of the first cable and a part of an outer circumferential surface of a third cable, a first elastic

adjusting member passing through the first cover member and coupled to the center support, and a second elastic adjusting member passing through the second cover member and coupled to the center support.

In one embodiment, a first elastic member surrounding an outer circumferential surface of the first elastic adjusting member may be formed on the first elastic adjusting member, one end of the first elastic member along a longitudinal direction may be supported by a head of the first elastic adjusting member, and the other end of the first elastic member may be supported by a first seating groove formed in the first cover member such that the first elastic adjusting member may be elastically supported by the first elastic member, and a second elastic member surrounding an outer circumferential surface of the second elastic adjusting member may be formed on the second elastic adjusting member, one end of the second elastic member may be supported by a head of the second elastic adjusting member, and the other end of the second elastic member may supported by a second seating groove formed in the second cover member such that the second elastic adjusting member may be elastically supported by the second elastic member.

In one embodiment, a part of an end portion of the first elastic adjusting member along the longitudinal direction may be screwed to the center support, and a part of an end portion of the second elastic adjusting member along the longitudinal direction may be screwed the center support.

In one embodiment, each of the first elastic adjusting member and the second elastic adjusting member may be formed as a pair of parallel elastic adjusting members.

In one embodiment, the first and second elastic members may have the same elastic modulus.

In one embodiment, the center support may include a lower portion support formed to support a part of a lower portion of each quadrant of the second and third cables and bolted to the base, and an upper portion support formed to support a part of an upper portion of each of the quadrants of the second and third cables and configured to support a lower portion of the first cable, wherein the upper portion support and the lower portion support are coupled by a vertical bolt passing therethrough.

In one embodiment, gaps which are spaced a predetermined distance apart may be formed between adjacent end portions of the first cover member, the second cover member, and the lower portion support.

BRIEF DESCRIPTION OF THE DRAWINGS

FIGS. 1 and 2 are perspective views of a cable cleat according to an embodiment of the present invention.

FIG. 3 is a longitudinal cross-sectional view of the cable cleat according to an embodiment of the present invention.

FIG. 4 is a front view of the cable cleat according to an embodiment of the present invention.

DETAILED DESCRIPTION OF EXEMPLARY EMBODIMENTS

Hereinafter, the present invention will be described with reference to the accompanying drawings. However, embodiments of the present invention may be implemented in several different forms, and are not limited to embodiments described herein. In addition, parts irrelevant to the description will be omitted in the drawings in order to clearly explain embodiments of the present invention. Similar

parts are denoted by similar reference numerals throughout this specification.

In addition, throughout this specification, when a part is referred to as being “connected” to another part, the reference includes the part being “directly connected” to the other part and the part being “indirectly connected” to the other part via an intervening member. Also, when a certain part “includes” a certain component, this description does not exclude the inclusion of other components unless described otherwise, and other components may in fact be included.

Hereinafter, embodiments of the present invention will be described in detail with reference to the accompanying drawings.

FIGS. 1 and 2 are perspective views of a cable cleat according to an embodiment of the present invention, FIG. 3 is a longitudinal cross-sectional view of the cable cleat according to an embodiment of the present invention, and FIG. 4 is a front view of the cable cleat according to an embodiment of the present invention.

As illustrated in FIGS. 1 to 4, a cable cleat according to an embodiment of the present invention may include a base 110, a center support 120, first and second cover members 130 and 140, and first and second elastic adjusting members 131 and 141.

The base 110 may be formed in a plate shape having a flat surface or a bar shape having a predetermined length to be fixed to the ground.

In addition, an upper surface of the base 110 may be formed to have a flat surface to firmly support a bottom of the center support 120.

The center support 120 may have a bottom surface formed to be flat so that the center support 120 is in surface-contact with and coupled to the base 110.

The center support 120 may be formed to have three surfaces, and each of the surfaces of the three surfaces may be formed to be curved so that a part of an

outer circumferential surface of each of three cables c1, c2, and c3 may be seated thereon. That is, the three surfaces of the center support 120 may be formed concave with a curvature corresponding to a curvature of the outer circumferential surface of each of the three cables c1, c2, and c3.

Here, although respective shapes of the cables c1, c2, and c3 are illustrated in the form of a cylinder, both ends of the cable in a longitudinal direction are illustrated in a state of being cut for convenience of explanation, and the cables c1, c2, and c3 may each refer to a covering of a cable including a plurality of wirings therein.

The cable may be a single-phase cable or a three-phase cable, but may also be various other cables.

Referring again to the center support 120, the center support 120 is formed to have three surfaces so that respective three cross-sectional centers of the three cables c1, c2, and c3 are formed in a triangular shape, and thus the three cables are seated on the center support 120.

The first cover member 130 may be coupled to surround the outer circumferential surface of one side of the first cable c1 and a part of the outer circumferential surface of the second cable c2 among the three cables c1, c2, and c3, and the first cable c1 is located in the middle among the three cables.

Likewise, the second cover member 140 may be coupled to surround the outer circumferential surface of the other side of the first cable c1 and a part of the outer circumferential surface of the third cable c3.

In other words, an overall shape of the first and second cover members 130 and 140 may be formed in a triangular shape surrounding the outer circumferential surfaces of the three cables c1, c2, and c3.

The center support 120 may have a lower portion support 121 formed to support a part of a lower portion of each quadrant of the second and third cables c2, and c3 and bolted to the base 110, and an upper portion support 122 formed to support a part of an upper portion of each of the quadrants of the second and third cables c2, and c3 and support a lower portion of the first cable c1.

The upper portion support 122 and the lower portion support 121 may be coupled by a vertical bolt 111 passing therethrough.

The first elastic adjusting member 131 may be coupled to the center support 120 in a state in which it passes through the first cover member 130. A first elastic member 133 surrounding an outer circumferential surface of the first elastic adjusting member 131 may be formed on the first elastic adjusting member 131.

One end of the first elastic member 133 is supported by a head 132 of the first elastic adjusting member 131, and the other end of the first elastic member 133 is supported by a first seating groove 134 formed in the first cover member 130 to be elastically supported thereby.

Likewise, the second elastic adjusting member 141 may be coupled to the center support 120 in a state in which it passes through the second cover member 140. A second elastic member 143 surrounding an outer circumferential surface of the second elastic adjusting member 141 may be formed on the second elastic adjusting member 141.

One end of the second elastic member 143 is supported by a head 142 of the second elastic adjusting member 141, and the other end of the second elastic member 143 is supported by a second seating groove 144 formed in the second cover member 140 to be elastically supported thereby.

A part of an end portion of the first elastic adjusting member 131 along the

longitudinal direction is screwed to a screw thread 122a of the center support 120, and a part of an end portion of the second elastic adjusting member 141 along the longitudinal direction is screwed to a screw thread 122b of the center support 120. As a result, the first elastic adjusting member 131 may elastically support the first cover member 130 by an elastic force of the first elastic member 133, and the second elastic adjusting member 141 may elastically support the second cover member 140 by an elastic force of the second elastic member 143.

That is, when the outer diameter of each of the three cables c1, c2, and c3 expands or contracts due to a temperature change of an external environment, the first and second elastic members 133 and 143 may be compressed or elongated, and thus the first and second cover members 130 and 140 may be elastically supported by the first and second elastic members 133 and 143 and may be moved.

The first and second elastic members 133 and 143 are compressed or elongated in accordance with a change of the outer diameter of the cables c1, c2, and c3 as described above so that a surface pressure of a certain level or more is continuously applied to grasp and fix the cables c1, c2, and c3.

In this case, it is preferable for gaps d1, d2, and d3 which are spaced a predetermined distance apart are provided between adjacent end portions of the first cover member 130, the second cover member 140, and the lower portion support 121.

The gaps d1, d2, and d3 are formed to provide an allowance margin for preventing interference between the first cover member 130, the second cover member 140, and the lower portion support 121 when the first cover member 130 and the second cover member 140 are elastically deformed by the first and second elastic members 133 and 143 and reciprocated.

Each of the first elastic adjusting member 131 and the second elastic

adjusting member 141 may be provided as a single piece and respectively coupled to the first cover member 130 and the second cover member 140. However, when each of the first elastic adjusting member 131 and the second elastic adjusting member 141 is provided as pair of elastic adjusting members in accordance with a diameter of the cable or a degree of environmental change, an elastic restoration force of the elastic adjusting members 131 and 141 may be adjusted.

Alternatively, the first elastic member 133 may be formed with the same elastic modulus as that of the second elastic member 143, but the elastic modulus of the first and second elastic members 133 and 143 may be set to be different when there is a temperature differences between the cables c1, c2, and c3.

Accordingly, the first and second elastic members are compressed or elongated due to thermal expansion and contraction of the cables c1, c2, and c3, and thus the first and second cover members 130 and 140 may be arranged in a flexible manner. Therefore, surface pressures are constantly applied to the outer circumferential surfaces of the cables c1, c2, and c3, and a gripping force is maintained at a constant surface pressure to reduce stress inside the cable.

According to one aspect of the present invention, even when cables are cooled due to a climate change or expanded by heat, a gripping force of the cables can be maintained at an appropriate surface pressure so that stress inside the cables can be reduced.

In addition, since the cables are installed with a simple configuration, cable installation work can be performed easily.

Effects of the present invention are not limited to the above-mentioned effects, and it should be understood that the present invention includes all effects inferable from the detailed description of the present invention or the constitution of

the invention described in the claims.

The above description is only exemplary, and it should be understood by those skilled in the art that the invention may be performed in other concrete forms without changing the technological scope and essential features. Therefore, the above-described embodiments should be considered only as examples in all aspects and not for purposes of limitation. For example, each component described as a single component may be realized in a distributed manner, and similarly, components that are described as being distributed may be realized in a coupled manner.

The scope of the present invention is defined not by the detailed description but by the appended claims, and encompasses all modifications or alterations derived from meanings, the scope, and equivalents of the appended claims.

WHAT IS CLAIMED IS:

1. A cable cleat comprising:

a base;

a center support fixedly coupled to the base and configured to support three cables so that respective three cross-sectional centers of the three cables are formed in a triangular shape;

a first cover member coupled to surround an outer circumferential surface of one side of a first cable and a part of an outer circumferential surface of a second cable among the three cables, wherein the first cable is located in the middle among the three cables;

a second cover member coupled to surround an outer circumferential surface of the other side of the first cable and a part of an outer circumferential surface of a third cable;

a first elastic adjusting member passing through the first cover member and coupled to the center support; and

a second elastic adjusting member passing through the second cover member and coupled to the center support.

2. The cable cleat of claim 1,

wherein a first elastic member surrounding an outer circumferential surface of the first elastic adjusting member is formed on the first elastic adjusting member, wherein one end of the first elastic member along a longitudinal direction is supported by a head of the first elastic adjusting member, and the other end of the

first elastic member is supported by a first seating groove formed in the first cover member, and

a second elastic member surrounding an outer circumferential surface of the second elastic adjusting member is formed on the second elastic adjusting member, wherein one end of the second elastic member is supported by a head of the second elastic adjusting member, and the other end of the second elastic member is supported by a second seating groove formed in the second cover member.

3. The cable cleat of claim 2, wherein a part of an end portion of the first elastic adjusting member along the longitudinal direction is screwed to the center support, and a part of an end portion of the second elastic adjusting member along the longitudinal direction is screwed to the center support.

4. The cable cleat of claim 3, wherein each of the first elastic adjusting member and the second elastic adjusting member is formed as a pair of parallel elastic adjusting members.

5. The cable cleat of claim 2, wherein the first and second elastic members have the same elastic modulus.

6. The cable cleat of claim 1, wherein the center support comprises:

a lower portion support formed to support a part of a lower portion of each quadrant of the second and third cables and bolted to the base; and

an upper portion support formed to support a part of an upper portion of each of the quadrants of the second and third cables and configured to support a lower

portion of the first cable,

wherein the upper portion support and the lower portion support are coupled by a vertical bolt passing therethrough.

7. The cable cleat of claim 6, wherein gaps which are spaced a predetermined distance apart are formed between adjacent end portions of the first cover member, the second cover member, and the lower portion support.