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(54) **HEAT INSULATION CONTROL MATERIAL**

(57)Abstract:

PROBLEM TO BE SOLVED: To provide heat insulating performance of high efficiency and earthing of high reliability while reducing bending torque by spirally winding a heat insulating member in which a terminal for earth is provided on one end of a belt-like winding part laminated with a plurality layers of resin film through fiber nets, on the movable part of loaded equipment for space.
SOLUTION: This heat insulating member 10 is formed by laminating a plurality of layers of resin film in which one side face is formed with a memetal vapor deposition layer, through fiber nets. Belt-like winding parts 10a are formed corresponding to a movable part 11, the one side face of the one side part and the other side face of the other side part are provided with a detachable pair of fixtures 12, 12 at fixed intervals corresponding to the winding angle. A terminal for earth 13 is provided on one side end of the heat insulating member 10, and connected to the gland of a space navigation body. Interlocking with motion of the movable part 11, the spirally wound winding parts 10a can be nearly independently moved, and hence low bending moment almost not influencing on the motion of the movable part 11 and earth of high efficiency can be provided.

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CLAIMS

[Claim(s)]

[Claim 1] The heat insulation control material possessing the heat insulation member in which band-like [which comes to twist around the moving part of a space loading device spirally and carried out two or more layers laminating of the resin film through the fiber network] twists around, and the section was prepared, and the terminal for a grounding of this heat insulation member prepared in an end at least.

[Claim 2] The aforementioned heat insulation member is a heat insulation control material according to claim 1 characterized by twisting, and branching and forming the section in a plurality.

[Claim 3] The aforementioned heat insulation member is a heat insulation control material according to claim 1 or 2 characterized by twisting and on the other hand forming a pair of fastener of one flank of the section in a field and the another side side of the flank of another side at predetermined interval.

[Claim 4] For the aforementioned heat insulation member, 3 is [the claim 1 characterized by forming a metal vacuum evaporatio layer in a field while a resin film is the much more at least, or] the heat insulation control material of a publication either.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] This invention relates to the heat insulation control material used for protecting the moving part prepared in the shape of [of the harness of the space loading devices carried in the space-navigation fields, such as a satellite, such as a solar paddle, etc.] free from the heat environment of space.

[0002]

[Description of the Prior Art] The technique of generally, twisting and protecting the heat insulation control material called MLI (Multiple Layer Insulation) to moving part, such as a harness of a space loading device, as a means to carry the space loading device exposed to space in the space-navigation field in the field of a space exploration, while the heat insulation control means for protecting from the heat environment of space to the loading device is given is taken.

[0003] The laminating of the resin film 1a which has the flexibility which deposited the metal as such moving part was shown in drawing 5 as a heat insulation control material protected from a heat environment is carried out to two or more layers through fiber network 1b, and the heat insulation member 1 is formed. And this heat insulation member 1 is put as shown in drawing 6 after forming in the shape of a rectangle, for example, so that it may twist around the periphery of moving part 2 using holddown members, such as yarn and a bell cross fastener. And the terminal for a grounding 3 is attached in the end of this heat insulation member 1.

[0004] The above-mentioned heat insulation control material is connected to the gland where the part is put in piles (refer to the drawing 6), and each terminal for a grounding 3 does not illustrate the heat insulation member 1 cut to two or more sheets around moving part 2. Thereby, by operation of resin film 1a to which the vacuum evaporatio of the metals, such as aluminum, was carried out, the heat insulation member 1 prevents irruption of external heat, and protects moving part 2 from the heat environment of space. In this case, if

static electricity is charged, as for the heat insulation member 1, this static electricity will discharge in the grounding part of the space-navigation field through the terminal for a grounding 3.

[0005] However, in the above-mentioned heat insulation control material, if enhancement in the heat insulation controllability ability is aimed at, since the bending torque which the heat insulation member 1 exerts on moving part 2 will become comparatively large, a movable operation of moving part 2 is affected and it has the problem reduce the function of the loading device connected with this moving part 2. And when the bending torque of the heat insulation member 1 is too large, moving part 2 interlocks movable, this heat insulation member 1 is damaged, and it has the problem affect the life of a space loading device as a result.

[0006] Moreover, in the above-mentioned heat insulation control material, when covering the large-sized-like moving part 2, it has the problem that it becomes difficult to secure a wrap, and the heat insulation member 1 and the efficient flow property between one, and a grounding reliability falls the moving-part 2 whole, using two or more heat insulation members 1.

[0007]

[Problem(s) to be Solved by the Invention] Like, by the conventional heat insulation control material, bending torque is large, and while a movable operation of moving part is affected and the function of a loading device is reduced, a reliable highly precise grounding has the problem described above are difficult.

[0008] This invention aims at offering the heat insulation control material which can realize efficient adiathermancy ability and enabled it to realize a reliable highly precise grounding after are made in view of the above-mentioned situation, aiming at the fall of bending torque and realizing a highly precise movable operation of moving part.

[0009]

[Means for Solving the Problem] This invention was equipped with the heat insulation member in which band-like [which comes to twist around the moving part of a space loading device spirally, and carried out two or more layers laminating of the resin film through the fiber network] twists around, and the section was prepared, and the terminal for a grounding of this heat insulation member prepared in an end at least, and constituted the heat insulation control material.

[0010] According to the above-mentioned configuration, a heat insulation member is in the status which twisted and twisted the section around the periphery of moving part spirally, this moving part is covered, a heat insulation control of this moving part is performed, and it interlocks movable [the moving part], and it was twisted spirally, and twists, the section carries out abbreviation independence, movable is carried out, and low bending torque is realized. And a heat insulation member is in the status put on moving part, and is grounded by connecting the terminal for a grounding to a gland. An efficient grounding is attained, while low bending torque which hardly does influence movable [moving part] is realized, after this realizes a highly precise heat insulation control.

[0011]

[Embodiments of the Invention] Hereafter, the gestalt of implementation of this invention is explained in detail with reference to a drawing. Drawing 1 shows the heat insulation control material concerning the gestalt of 1 implementation of this invention, on the other hand, metal vacuum evaporatio layers, such as aluminum, are formed in a field, for example, resin films, such as a fluororesin, intervene fiber networks, such as polyester Telnet, two or more layers laminating is carried out, and the heat insulation member 10 is formed (refer to [aforementioned] the view 5).

[0012] That is, corresponding to moving part 11, band-like twists the above-mentioned heat insulation member 10, and section 10a is formed. As band-like [this] twists and it is shown in drawing 2 at section 10a, a pair

of fasteners 12 and 12 in which the attachment and detachment of the flank of one of these called for example, a ** potter's wheel to a field and the another side side of the flank of another side on the other hand are free are formed in a predetermined spacing corresponding to a contact angle. These fasteners 12 and 12 are suitably arranged according to the configuration of moving part 11. It twists, for example, using yarn as these fasteners 12 and 12, and may be made to fix a part of flank of section 10a.

[0013] Moreover, it connects with the gland of the space-navigation field of the heat insulation member 10 which the terminal for a grounding 13 is formed in an edge on the other hand, and does not illustrate this terminal for a grounding 13. the above-mentioned configuration -- setting -- the heat insulation member 10 -- the -- it twists, section 10a is spirally twisted around the periphery of moving part 11 in order, and it is equipped with the fasteners 12 and 12 of a pair of here -- the heat insulation member 10 -- the -- it twists and the side attachment wall of section 10a is positioned by the predetermined spacing And in this status that twist and section 10a was spirally twisted around the periphery of moving part 11, the terminal for a grounding 13 of the one side edge of the heat insulation member 10 is connected to the gland of the above-mentioned space-navigation field. Thereby, band-like [the] twists, moving part 11 interlocks [section 10a] movable, and the heat insulation member 10 hardly affects a movable operation of moving part 11.

[0014] And the heat insulation member 10 will discharge the static electricity to the gland of the space-navigation field through the terminal for a grounding 13, if static electricity is charged in case it is launched by space with the space-navigation field.

[0015] Thus, band-like [which carried out two or more layers laminating of the resin film to the heat insulation member 10 through the fiber network] twisted the above-mentioned heat insulation control material, it formed section 10a, this heat insulation member 10 twisted it, and it is in the status which twisted section 10a around the periphery of moving part 11 spirally, and put it, and it was constituted so that a part of the flank might be positioned through fasteners 12 and 12.

[0016] According to this, it twists, moving part 11 interlocks movable, section 10a carries out abbreviation independence, after realizing a highly precise heat insulation control by [around which it was twisted spirally] carrying out movable, low bending torque without the thing of moving part 11 for which influence is almost done movable is realized, and, moreover, an efficient grounding is realized.

[0017] in addition, the two forks which are shown in drawing 3 , without restricting to this although the gestalt of the above-mentioned implementation explained by the case where it applies to a heat insulation control of the abbreviation straight-line-like moving part 11 -- it is also possible to apply to moving-part 11a of a configuration As a heat insulation member 10 put on moving-part 11a of this branching configuration, as shown in drawing 4 , band-like twists, section 10a is formed in the shape of Y character, and these fasteners 12 and 12 that twist and constitute a pair in section 10a are formed respectively like the aforementioned view 2 and abbreviation. thereby -- the heat insulation member 10 -- the -- it twists and section 10a shows in drawing 3 -- as -- two forks -- it is spirally twisted around the periphery of moving-part 11a of a configuration, respectively, and is covered

[0018] moreover -- the configuration of the moving part 11 (11a) which twists the above-mentioned heat insulation member 10 spirally ***** -- the shape of linear, and two forks -- without it restricts to a configuration -- two forks -- the thing of the branching configuration beyond a configuration -- or it is possible to constitute so that the edge of moving part may be covered also around splicers, such as a connector by which connection arrangement is carried out

[0019] Furthermore, although explained by the case where it constitutes from the gestalt of the above-mentioned implementation so that two or more laminatings of

the resin film which formed the metal vacuum evaporatio layer for the heat insulation member 10 may be carried out through a fiber network, without restricting to this, it may constitute so that a metal vacuum evaporatio layer may be prepared in both sides of a resin film, or you may constitute so that a metal vacuum evaporatio layer may be formed in much more resin film at least. And you may constitute so that two or more layers laminating of the resin film which a metal vacuum evaporatio layer does not form may be further carried out through a fiber network as a heat insulation member 10. Therefore, this invention of the ability of various deformation in the domain which does not deviate from the summary of this invention to be carried out is natural, without restricting to the gestalt of the above-mentioned implementation.

[0020]

[Effect of the Invention] The heat insulation control material which can realize efficient adiathermancy ability and enabled it to realize a reliable highly precise grounding after according to this invention aiming at the fall of bending torque and realizing the highly precise movable operation of moving part, as explained in full detail above can be offered.

Field

[The technical field to which invention belongs] This invention relates to the heat insulation control material used for protecting the moving part prepared in the shape of [of the harness of the space loading devices carried in the space-navigation fields, such as a satellite, such as a solar paddle, etc.] free from the heat environment of space.

Technique

[Description of the Prior Art] The technique of generally, twisting and protecting the heat insulation control material called MLI (Multiple Layer Insulation) to moving part, such as a harness of a space loading device, as a means to carry the space loading device exposed to space in the space-navigation field in the field of a space exploration, while the heat insulation control means for protecting from the heat environment of space to the loading device is given is taken.

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[0004] The above-mentioned heat insulation control material is connected to the gland where the part is put in piles (refer to the drawing 6), and each terminal for a grounding 3 does not illustrate the heat insulation member 1 cut to two or more sheets around moving part 2. Thereby, by operation of resin film 1a to which the vacuum evaporatio of the metals, such as aluminum, was carried out, the heat insulation member 1 prevents irruption of external heat, and protects moving part 2 from the heat environment of space. In this case, if static electricity is charged, as for the heat insulation member 1, this static electricity will discharge in the grounding part of the space-navigation field through the terminal for a grounding 3.

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[0006] Moreover, in the above-mentioned heat insulation control material, when covering the large-sized-like moving part 2, it has the problem that it becomes difficult to secure a wrap, and the heat insulation member 1 and the efficient flow property between one, and a grounding reliability falls the moving-part 2 whole, using two or more heat insulation members
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Effect

[Effect of the Invention] The heat insulation control material which can realize efficient adiathermancy ability and enabled it to realize a reliable highly precise grounding after according to this invention aiming at the fall of bending torque and realizing the highly precise movable operation of moving part, as explained in full detail above can be offered.

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] Like, by the conventional heat insulation control material, bending torque is large, and while a movable operation of moving part is affected and the function of a loading device is reduced, a reliable highly precise grounding has the problem described above are difficult.

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MEANS

[Means for Solving the Problem] This invention was equipped with the heat insulation member in which band-like [which comes to twist around the moving part of a space loading device spirally, and carried out two or more layers laminating of the resin film through the fiber network] twists around, and the section was prepared, and the terminal for a grounding of this heat insulation member prepared in an end at least, and constituted the heat insulation control material.

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[0019] Furthermore, although explained by the case where it constitutes from the gestalt of the above-mentioned implementation so that two or more laminatings of the resin film which formed the metal vacuum evaporatio layer for the heat insulation member 10 may be carried out through a fiber network, without restricting to this, it may constitute so that a metal vacuum evaporatio layer may be prepared in both sides of a resin film, or you may constitute so that a metal vacuum evaporatio layer may be formed in much more resin film at least. And you may constitute so that two or more layers laminating of the resin film which a metal vacuum evaporatio layer does not form may be further carried out through a fiber network as a heat insulation member 10. Therefore, this invention of the ability of various deformation in the domain which does not deviate from the summary of this invention to be carried out is natural, without restricting to the gestalt of the above-mentioned implementation.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] Drawing having shown the heat insulation control material concerning the gestalt of 1 implementation of this invention.

[Drawing 2] Drawing having taken out and shown the heat insulation member of drawing 1 .

[Drawing 3] Drawing having shown the gestalt of other operations of this invention.

[Drawing 4] Drawing having taken out and shown the heat insulation member of drawing 3 .

[Drawing 5] Drawing having shown the example of a configuration of a heat insulator.

[Drawing 6] Drawing having shown the conventional heat insulation control material.

[Drawing 7] Drawing having shown the conventional heat insulation control material.

[Description of Notations]

10 -- Heat insulation member.

10a -- It twists and is the section.

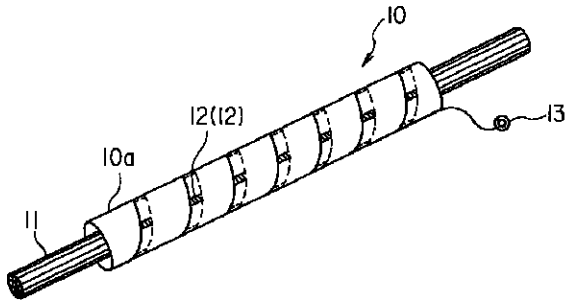
11, 11a -- Moving part.

12 -- Fastener.

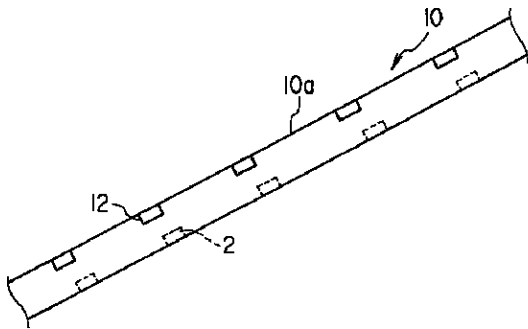
13 -- Terminal for a grounding.

DRAWINGS

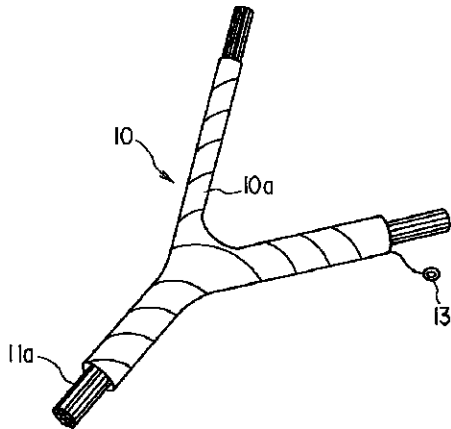
[Drawing 1]



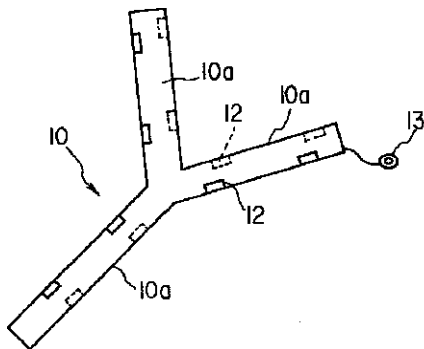
[Drawing 2]



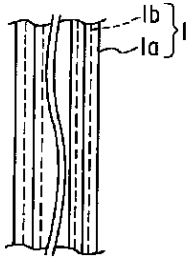
[Drawing 3]



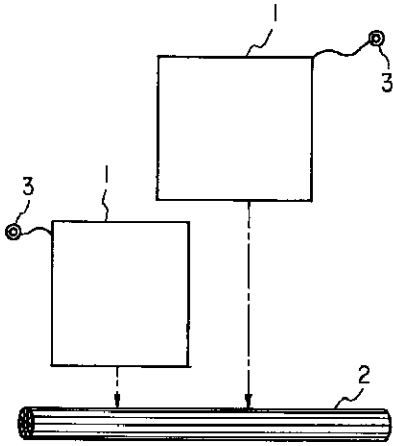
[Drawing 4]



[Drawing 5]



[Drawing 6]



[Drawing 7]

