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(54) PROCESSING AND MOUNTING METHOD FOR TWISTED ALUMINUM SHEET HAVING GRADIENT COLOR

VERFAHREN ZUR HERSTELLUNG UND MONTAGE EINES TORDIERTEN ALUMINIUMBLECHES MIT GRADIENTFARBE

PROCÉDÉ DE TRAITEMENT ET DE MONTAGE POUR FEUILLE D'ALUMINIUM TORSADÉE PRÉSENTANT UNE COULEUR DE GRADIENT

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Description

Technical Field

[0001] The present invention relates to the technical field of mounting and manufacturing of a twisted aluminium sheet for architectural decoration, in particular to a processing and mounting method for a twisted aluminium sheet having a gradient color.

Background of the Invention

[0002] The present invention is based on an engineering project of temporary venues of the 10th China Flower EXPO, the temporary venues of this project are divided into three "blade-shaped" single-body steel structure buildings, and twisted aluminium sheets having gradient colors are hung outside a curtain wall of the Huaqi Hall, which have high artistry and high ornamental value. In construction projects, aluminium sheets are widely used as a decorative material, and more aluminium sheets are processed and manufactured into decorative materials with high ornamental value.

[0003] In a traditional arc bending process of hollow ribbed aluminium sheets, a twisting radian and twisting deformation are the two most difficult variables to control, an excessively large twisting radian is prone to buckling deformation of the aluminium sheets, and an excessively small radian is prone to elastic deformation. When a traditional arc bending apparatus performs arc bending on the hollow ribbed aluminium sheets, the sheets are twisted by mechanical clamping at two ends, which will cause stress concentration near clamping ends at the moment, this position is uneven in deformation and not smooth, and when the two ends are clamped and twisted, they will extend along a longitudinal axis of the aluminium sheets, resulting in depression or diameter shrinkage in middle sections of the sheets. Limitation on the aluminium sheets lacks, the aluminium sheets are prone to tilting, after the bending is completed, the twisted aluminium sheets are difficult to take out, and at the same time, traditional one-time twisting forming has excessively large angle mutation, easily resulting in obvious rebound of the sheets and the irregular deformation amount, so that a traditional manufacturing process cannot be applied.

[0004] Patent document GB2594778A introduces an approach to forming twisted building façade elements, particularly louvres, by utilizing metal precursors. The process involves clamping an elongate metal precursor at two spaced-apart points, applying tension to the precursor, and then rotating one clamp relative to the other to induce a twist in the material. The tension prevents unwanted deformations like rippling or crimping, ensuring a uniform twist. The method can accommodate various degrees of twist, including at least 90 degrees and often 180 degrees or more, to account for the metal's elasticity and subsequent rebounding. The apparatus designed for this method includes a first clamp, a second clamp spaced apart and linearly aligned with the first, a linear displacement means to tension the precursor, and a rotation means to twist it. The invention aims to produce non-combustible, aesthetically pleasing, and structurally sound twisted metal façade elements suitable for building exteriors.

[0005] Patent document CN204343565U discloses a torsion equipment for bar-shaped aluminium sheet solar protection devices that enhances rigidity, reduces material consumption, and provides uniform light-blocking effects. The twisted sheet material ensures consistent light-blocking performance from various angles, enhancing the aesthetic appeal of the building. The equipment also includes a base with a first fixture, slide rails, a slide block with a turning cylinder driven by a motor, and a second fixture. This setup allows for the precise twisting of the aluminium sheets to the desired angle, accommodating different lengths to mitigate temperature-induced deformation.

[0006] Patent document WO2016148640 A1 discloses a system and method for twisting hollow metal bars used in the architectural industry, which alters the material's muscle memory without distorting its physical structure or cross-sectional shape. The system includes a supporting device to fix one end of the hollow bar, a connector to link the bar to a twisting device, and the twisting device itself, which applies a torque to alter the material's muscle memory. The method involves over twisting the bar in one direction and then twisting it back in the opposite direction to achieve the desired permanent twist without the need for additional supports.

[0007] Patent document US20110293959 A1 discloses a method for fabricating twisted hollow bars used in architectural elements like grilles or railings, which involves assembling separate longitudinal parts with joint means to allow for increased torsional stress without exceeding the material's fatigue limit.

[0008] Patent document EP2136015 A2 discloses a facade system with plastic slat elements and fixing elements designed for curved building facades, allowing for aesthetic flexibility and improved load distribution.

Summary of the Invention

[0009] The present invention provides a processing and mounting method for a twisted aluminium sheet having a gradient color, which is implemented by adjusting a clamping apparatus, changing an internal structure of an aluminium sheet, etc.

[0010] The invention is as defined in independent claim 1. Preferable features thereof are defined in the dependent claims.

[0011] In order to implement the above technical effects, the present invention is implemented through the technical solution as follows.

[0012] A processing and mounting method for a twisted aluminium sheet having a gradient color includes

the following steps:

twisting of aluminium sheet units: respectively twisting a plurality of hollow aluminium sheet units, specifically, clamping one end of each aluminium sheet unit by means of a telescopic sheet rolling machine, and twisting the other end by means of a twisting machine to twist the aluminium sheet unit towards the sheet rolling machine along the direction of the twisting machine until the aluminium sheet unit is twisted to a designed angle; and

filling the hollow aluminium sheet units with flexible fillers;

painting of the aluminium sheet units: respectively painting the aluminium sheet units according to a design requirement of a gradient color;

building of framework structures: providing the grille-shaped framework structures along the outside of a building according to design requirements, the framework structures being fastened on the building; and

assembly of aluminium sheet structures: providing at least one aluminium sheet structure on each grille-shaped framework structure from top to bottom, the aluminium sheet structures being formed by splicing at least two painted aluminium sheet units.

[0013] In the technical solution, first of all, the hollow aluminium sheet units are selected as a raw material, and meanwhile, the hollow aluminium sheet units are filled with the flexible fillers, so that stress on hollow aluminium sheets in a sheet twisting process is more uniform, and "the hollow sheets are filled with the flexible fillers, so that the stress in the sheet twisting process is more uniform", because a flexible material is at a ribbed sheet where the stress is easy to concentrate, concentrated stress can be dispersed and transferred very well.

[0014] In the technical solution, secondly, based on the framework structures, aluminium sheet curtain wall hanging pieces are connected with a square steel rigid framework through fasteners, and the square steel rigid framework is connected with the steel structure building through connecting parts, so as to form an aluminium sheet curtain wall of a stable structure.

[0015] In the technical solution, thirdly, each aluminium sheet is formed by splicing the plurality of aluminium sheet units along grilles of the framework, to make variability of the aluminium sheet structure greater, and compared with an integrally-formed aluminium sheet structure, the aluminium sheet structure has stronger plasticity, and then a structure with a variety of colors and shapes may be formed.

[0016] In the technical solution, for formation of the aluminium sheet structure, the plurality of aluminium sheet units and the connecting parts may be marked and colored successively according to design, and each aluminium sheet unit and each connecting part may be painted respectively according to marks and colors.

[0017] As a further improvement of the present invention, in the twisting step of the aluminium sheet units, the sheet rolling machine freely extends and retracts in a sheet length direction, so as to disperse stress in twisting.

[0018] In the technical scheme, an end of the sheet rolling machine may freely extend and retract in a sheet direction, so as to avoid longitudinal stress concentration. Further, the sheet rolling machine freely extends and retracts in a length direction. The sheet is clamped between roller shafts of the sheet rolling machine, which is equivalent to limiting an XY direction in three-dimensional coordinates, but because the sheet is not clamped at ends, a Z direction is a free end and may freely extend and retract, and the Z direction (that is, the sheet length direction) will not obstruct free extending or shortening of the sheet in the twisting process, so that the problem of stress concentration will not appear.

[0019] As a further improvement of the present invention, in the twisting step of the aluminium sheet units, when the designed angle is greater than 5°, the twisting machine performs twisting at least two times, and an angle of each time of twisting ranges from 1° to 5°.

[0020] In the technical solution, a multi-time small-angle twisting process is adopted for sheet twisting, after rebound occurs in the process, multiple times of small-amount twisting continues to be performed, and an angle of single-time twisting does not exceed 5°, so that the angle is gradually close to a design value, and uncontrollable yield deformation is effectively overcome.

[0021] As a further improvement of the present invention, the flexible fillers are specifically of a tubular structure, a sheet structure or a hollow structure formed by a flexible material.

[0022] In the technical solution, a plate, a pipeline or a hollow structure, etc. formed by a PVC material may be selected specifically, and is supported in each hollow aluminium sheet unit to form a supporting body, and at the same time, a concentrated stress condition may be uniformized. Further, a PVC pipe, which is easy to obtain at a construction site, is generally selected, and it belongs to flexible materials, may uniformize concentrated stress of the aluminium sheet, and is low in cost.

[0023] As a further improvement of the present invention, in the twisting step of the aluminium sheet units, when a length of the aluminium sheet units is smaller than 2 m, the method further includes pretreatment of the aluminium sheet units, and the pretreatment is increase of the length of the aluminium sheet units, so that the aluminium sheet units are twisted after the length is greater than 6 m.

[0024] In the technical solution, according to a design length of the twisted aluminium sheet, in an early stage of manufacturing of the project, an aluminium sheet with a design length (50 mm to 4000 mm) is adopted to be twisted, but because the shorter the sheet, the worse the uniformity of twisting deformation, especially when the length is less than 2 meters, an effective twisting length of the aluminium sheet is insufficient. In order to

solve the above problems, the present invention solves the problem of the effective length of the twisted aluminium sheet by increasing the length of the sheet to 6 m and then twisting, and then cutting two ends of a deformed aluminium sheet to the design length.

[0025] In the prior art, the 2 m sheet may be directly twisted, but a final effective length cannot reach 2 m, and because ends are prone to being damaged in the twisting process, herein, in order to ensure the effective length of the aluminium sheet, the 2 m sheet is lengthened and then twisted.

[0026] As a further improvement of the present invention, the painting of the aluminium sheet units is specifically as follows: the plurality of aluminium sheet units are divided into a plurality of aluminium sheet structures according to the design requirement of the gradient color, and the plurality of aluminium sheet units in each aluminium sheet structure are spliced successively to form the aluminium sheet structure having the gradient color.

[0027] In the technical solution, according to the height of the curtain wall, a single complete curtain wall is formed by splicing 1 to 3 aluminium sheets, and twisting angles of the spliced aluminium sheets are superimposed to achieve a gradient effect. A curtain wall at a northern end and a transition section of the building is a single-splicing curtain wall twisted by 90°, a curtain wall at a southern end is a double-splicing curtain formed by splicing two aluminium sheets twisted by 0° to 90°, and a main curtain wall in the middle is a three-splicing curtain wall formed by splicing two aluminium sheets twisted by 90° and a surface sheet.

[0028] Further, in the painting step of the aluminium sheet units, painting treatment is specifically as follows: operations of primer spraying, color paint spraying, varnish spraying and baking on two sides are carried out in sequence respectively on each aluminium sheet unit; and operations of primer, intermediate paint, finish paint and finish-coat paint are carried out in sequence for each connecting part, and a total thickness of a dry paint film of a coating is greater than or equal to 150 μm.

[0029] In the technical solution, since a gradient-color finished product needs to be achieved in the later stage, it is necessary to carefully paint each aluminium sheet unit at this time, and carry out further analysis according to a situation to ensure that the later stage has a good effect.

[0030] As a further improvement of the present invention, in the building step of the framework structures, a distance between frameworks ranges from 4 m to 4.5 m, and each framework structure is formed by a plurality of square steels, which are connected by butt welds in a transverse direction and/or a longitudinal direction.

[0031] In the technical solution, a large gap range is that a width is about 4 m to 4.5 m and a height is about 2.5 m to 5 m, a general steel structure connecting mode has welding and bolt connecting, welding is divided into butt welding, angle welding, lap welding, etc., the requirement for a butt welding process is higher, and adoption of this welding mode is also the design requirements.

[0032] As a further improvement of the present invention, the plurality of aluminium sheet structures are arranged between the frameworks and are matched with the framework structures to form a streamer-shaped louver structure, and a gradient curve formed by the aluminium sheet units is continuously connected along a streamer-shaped curve.

[0033] In the technical solution, the streamer-shaped louver structure is distinct in layer, and has both structures and gaps, so as to achieve a relatively good appearance, and then the twisted aluminium sheet having the gradient color has high artistry and high ornamental value.

[0034] As a further improvement of the present invention, the gradient curve formed by the aluminium sheet units is specifically as follows: each aluminium sheet structure is formed by splicing at least two twisted aluminium sheet units according to the design requirements, so as to form the gradient curve.

[0035] In the technical solution, a plurality of times of assembly and splicing, etc., are used to avoid the problem that an aluminium sheet unit is directly twisted many times to form a curve, or is spray-coated many times to form gradient colors and then form a gradient curve, construction is easier, and the structure is more proper.

[0036] Further, in the building step of the framework structures, the framework structures and the fasteners are fastened on the building, and an anti-slip coefficient of connecting surfaces of the fasteners near the building is 0.45.

[0037] In the technical solution, 1. Abrasive blasting is to improve fatigue resistance of a workpiece, and increase adhesion between the workpiece and the coating. 2. The higher the anti-slip coefficient, the higher the structural safety, the higher the design requirements, and the 0.45 anti-slip coefficient is adopted and is more suitable for the gradient colors and strength requirements of connecting positions.

[0038] Further, in the mounting step of the aluminium sheet structure, in the aluminium sheet structure on each framework structure, the adjacent aluminium sheet units are connected through connecting plates, the aluminium sheet units are respectively inserted into the connecting plates, no less than 4 anchor bolts are arranged on the connecting position of each aluminium sheet unit and the connecting plate, and a pulling resistant value of each anchor bolt is no less than 15 KN.

Brief Description of the Drawings

[0039]

Fig. 1 is a schematic structural diagram of a twisted aluminium sheet having a gradient color provided by the present invention;

Fig. 2 is a front view of a twisted aluminium sheet having a gradient color provided by the present invention;

Fig. 3 is a schematic structural diagram of an aluminium sheet structure provided by the present invention; and

Fig. 4 is a schematic structural diagram of a framework structure provided by the present invention.

[0040] In the figures:
100, aluminium sheet structure; 110, aluminium sheet unit; 200, framework structure.

Detailed Description of Embodiments

[0041] The present invention is illustrated in detail in combination with implementations shown by embodiments below, but it should be illustrated that these implementations are not limitations on the present invention, and equivalent transformations or substitutions on functions, methods, or structures made by those ordinarily skilled in the art ordinary according to these implementations fall within the scope of protection of the present invention which is defined by the appended claims.

[0042] In the description of the present embodiment, it needs to be understood that an orientation or position relationship indicated by terms "center", "longitudinal", "transverse", "up", "down", "front", "back", "left", "right", "vertical", "horizontal", "top", "bottom", "inside", "outside", etc., is based on an orientation or position relationship shown in the accompanying drawings, is only intended to facilitate the description of the present invention and simplify the description, but does not indicate or imply that an apparatus or element referred to must have a specific orientation, or is constructed and operated in a specific orientation, and therefore cannot be construed as a limitation on the present invention.

[0043] In addition, terms "first", "second", "third", etc., are used for describing purposes only and cannot be understood as indicating or implying relative importance or as implicitly indicating the quantity of technical features indicated. Thus, a feature defined as "first", "second", etc., may explicitly or implicitly include one or more such features. In the description of the present invention, "a plurality of" means two or more unless otherwise stated.

[0044] Terms "mounting", "link" and "connection" should be understood broadly, for example, may be fixed connection, may also be detachable connection, or may be integrated connection; may be mechanical connection, may also be electrical connection; and may be direct connection, may also be indirection connection through an intermediate medium, or may be connection inside two elements. For those ordinarily skilled in the art, the specific meaning of the above terms in the present invention may be understood through specific circumstances.

Embodiment 1

[0045] The present embodiment is introduced in combination with main steps.

[0046] Referring to Figs. 1-4, a processing and mounting method for a twisted aluminium sheet having a gradient color in the present embodiment includes the following steps:

twisting of aluminium sheet units 110: a plurality of hollow aluminium sheet units 110 are twisted respectively, specifically, one end of each aluminium sheet unit 110 is clamped by means of a telescopic sheet rolling machine, and the other end is twisted by means of a twisting machine to twist the aluminium sheet unit 110 towards the sheet rolling machine along the direction of the twisting machine until the aluminium sheet unit is twisted to a designed angle; and

the hollow aluminium sheet units 110 are filled with flexible fillers;

painting of the aluminium sheet units 110: the aluminium sheet units 110 are painted respectively according to a design requirement of a gradient color;

building of framework structures 200: the grille-shaped framework structure 200 is provided along the outside of a building according to design requirements, the framework structures 200 being fastened on the building; and

assembly of aluminium sheet structures 100: at least one aluminium sheet structure 100 is provided on each grille-shaped framework structure 200 from top to bottom, the aluminium sheet structures 100 being formed by splicing at least two painted aluminium sheet units 110.

[0047] In the present embodiment, first of all, the hollow aluminium sheet units are selected as a raw material, and meanwhile, the hollow aluminium sheet units are filled with the flexible fillers, so that stress on hollow aluminium sheets in a sheet twisting process is more uniform, and "the hollow sheets are filled with the flexible fillers, so that the stress in the sheet twisting process is more uniform", because a flexible material is at a ribbed sheet where the stress is easy to concentrate, concentrated stress can be dispersed and transferred very well.

[0048] In the present embodiment, secondly, based on the framework structures, aluminium sheet curtain wall hanging pieces are connected with a square steel rigid framework through fasteners, and the square steel rigid framework is connected with the steel structure building through connecting parts, so as to form an aluminium sheet curtain wall of a stable structure.

[0049] In the present embodiment, thirdly, each aluminium sheet is formed by splicing the plurality of aluminium sheet units along grilles of the framework, to make variability of the aluminium sheet structure greater, and compared with an integrally-formed aluminium sheet structure, the aluminium sheet structure has stronger plasticity, and then a structure with a variety of colors and shapes may be formed.

[0050] In the present embodiment, for formation of the aluminium sheet structure, the plurality of aluminium sheet units and connecting parts may be marked and colored successively according to design, and each aluminium sheet unit and each connecting part may be painted respectively according to marks and colors.

Embodiment 2

[0051] The present embodiment is introduced in combination with twisting of the aluminium sheet units.

[0052] In order to ensure a twisting effect, in the twisting step of the aluminium sheet units 110, the sheet rolling machine freely extends and retracts in a sheet length direction, so as to disperse stress in twisting.

[0053] In the present embodiment, an end of the sheet rolling machine may freely extend and retract in a sheet direction, so as to avoid longitudinal stress concentration. Further, the rolling sheet machine freely extends and retracts in a length direction. The sheet is clamped between roller shafts of the sheet rolling machine, which is equivalent to limiting an XY direction in three-dimensional coordinates, but because the sheet is not clamped at ends, a Z direction is a free end and may freely extend and retract, and the Z direction (that is, the sheet length direction) will not obstruct free extending or shortening of the sheet in the twisting process, so that the problem of stress concentration will not appear.

[0054] In order to ensure good twisting, in the twisting step of the aluminium sheet units 110, when the designed angle is greater than 5°, the twisting machine performs twisting at least two times, and an angle of each time of twisting ranges from 1° to 5°.

[0055] In the present embodiment, a multi-time small-angle twisting process is adopted for sheet twisting, after rebound occurs in the process, multiple times of small-amount twisting continues to be performed, and an angle of single-time twisting does not exceed 5°, so that the angle is gradually close to a design value, and uncontrollable yield deformation is effectively overcome.

[0056] In order to achieve low-cost construction, the flexible fillers are specifically of a tubular structure, a sheet structure or a hollow structure formed by the flexible material.

[0057] In the present embodiment, a plate, a pipeline or a hollow structure, etc. formed by a PVC material may be selected specifically, and is supported in each hollow aluminium sheet unit to form a supporting body, and at the same time, a concentrated stress condition may be uniformized. Further, a PVC pipe, which is easy to obtain at a construction site, is generally selected, and it belongs to flexible materials, may uniformize the concentrated stress of the aluminium sheet, and is low in cost.

[0058] When a length is too small, that is, when the length of the aluminium sheet units is smaller than 2 m, the method further includes pretreatment of the aluminium sheet units, and the pretreatment is increase of the length of the aluminium sheet units, so that the aluminium sheet units are twisted after the length is greater than 6 m.

[0059] In the present embodiment, according to a design length of the twisted aluminium sheet, in an early stage of manufacturing of the project, an aluminium sheet with a design length (50 mm to 4000 mm) is adopted to be twisted, but because the shorter the sheet, the worse the uniformity of twisting deformation, especially when the length is less than 2 meters, an effective twisting length of the aluminium sheet is insufficient. In order to solve the above problems, the present invention solves the problem of the effective length of the twisted aluminium sheet by increasing the length of the sheet to 6 m and then twisting, and then cutting two ends of a deformed aluminium sheet to the design length.

[0060] In the prior art, the 2 m sheet may be directly twisted, but a final effective length cannot reach 2 m, and because the ends are prone to being damaged in the twisting process, herein, in order to ensure the effective length of the aluminium sheet, the 2 m sheet is lengthened and then twisted.

Embodiment 3

[0061] In the present embodiment, other core steps are mainly introduced.

[0062] Specifically, the painting of the aluminium sheet units is specifically as follows: the plurality of aluminium sheet units are divided into a plurality of aluminium sheet structures according to a design requirement of a gradient color, and the plurality of aluminium sheet units in each aluminium sheet structure are spliced successively to form the aluminium sheet structure having the gradient color.

[0063] In the present embodiment, according to the height of the curtain wall, a single complete curtain wall is formed by splicing 1 to 3 aluminium sheets, twisting angles of the spliced aluminium sheets are superimposed to achieve a gradient effect, a curtain wall at a northern end and a transition section of the building is a single-splicing curtain wall twisted by 90°, a curtain wall at a southern end is double-splicing curtain wall formed by splicing two aluminium sheets twisted by 0° to 90°, and a main curtain wall in the middle is a three-splicing curtain wall formed by splicing two aluminium sheets twisted by 90° and a surface sheet.

[0064] Further, in the painting step of the aluminium sheet units 110, painting treatment is specifically as follows: operations of primer spraying, color paint spraying, varnish spraying and baking on two sides are carried out in sequence respectively on each aluminium sheet unit; and operations of primer, intermediate paint, finish paint and finish-coat paint are carried out in sequence for each connecting part, and a total thickness of a dry paint film of a coating is greater than or equal to 150 μm.

[0065] In the present embodiment, since a gradient-color finished product needs to be achieved in the later stage, it is necessary to carefully paint each aluminium sheet unit at this time, and carry out further analysis

according to a situation, so as to ensure that the later stage has a good effect.

[0066] In order to ensure good structural arrangement, in the building step of the framework structures, a distance between frameworks ranges from 4 m to 4.5 m, and each framework structure is formed by a plurality of square steels, which are connected by butt welds in a transverse direction and/or a longitudinal direction.

[0067] In the present embodiment, a large gap range of the frameworks is that a width is about 4 m to 4.5 m and a height is about 2.5 m to 5 m, a general steel structure connecting mode has welding and bolt connecting, welding is divided into butt welding, angle welding, lap welding, etc., the requirement for a butt welding process is higher, and adoption of this welding mode is also the design requirements.

[0068] Specifically, the plurality of aluminium sheet structures are arranged between gaps of the frameworks and are matched with the framework structures to form a streamer-shaped louver structure, and a gradient curve formed by the aluminium sheet units is continuously connected along a streamer-shaped curve.

[0069] In the present embodiment, the streamer-shaped louver structure is distinct in layer, and has both structure and gaps, so as to achieve a relatively good appearance, and then the twisted aluminium sheet having the gradient color has high artistry and high ornamental value.

[0070] More further, the gradient curve formed by the aluminium sheet units is specifically as follows: each aluminium sheet structure is formed by splicing at least two twisted aluminium sheet units according to the design requirements, so as to form the gradient curve.

[0071] In the present embodiment, a plurality of times of assembly and splicing, etc., are used to avoid the problem that an aluminium sheet unit is directly twisted many times to form a curve, or is spray-coated many times to form gradient colors and then form a gradient curve, construction is easier, and the structure is more proper.

[0072] Further, in the building step of the framework structures, the framework structures and the fasteners are fastened on the building, and an anti-slip coefficient of connecting surfaces of the fasteners near the building is 0.45.

[0073] In the present embodiment, 1. abrasive blasting is to improve fatigue resistance of a workpiece, and increase adhesion between the workpiece and a coating. 2. The higher the anti-slip coefficient, the higher the structural safety, the higher the design requirements, and the 0.45 anti-slip coefficient is adopted and is more suitable for the gradient colors and strength requirements of connecting positions.

[0074] Further, in the assembly step of the aluminium sheet structures, in the aluminium sheet structure on each framework structure, the adjacent aluminium sheet units are connected through connecting plates, the aluminium sheet units are respectively inserted into the connecting plates, no less than 4 anchor bolts are arranged on the connecting position of each aluminium sheet unit and the connecting plate, and a pulling resistant value of each anchor bolt is not less than 15 KN.

[0075] Further, the method also includes compensation for the aluminium sheet structure when the aluminium sheet structure is twisted by 180°, and the compensation is specifically as follows: an aluminium sheet structure after painting is formed by splicing the twisted aluminium sheet structure and the surface sheet.

[0076] In the present embodiment, when a whole structure is relatively large and a shape changes a lot, for example, 180° twisting is performed to show a gradient effect, but due to a limitation of performance of the aluminium sheet itself, the single aluminium sheet cannot be twisted to 180° at one time, therefore, in the present invention, the single complete curtain wall is formed by splicing 1 to 3 aluminium sheets according to the height of the curtain wall, and a twisting angle of the spliced aluminium sheet is superimposed to achieve a gradient effect.

[0077] Further, the curtain wall at the northern end and the transition section of the building is the single-splicing curtain wall twisted by 90°, the curtain wall at the southern end is a double-splicing curtain formed by splicing two aluminium sheets twisted by 0° to 90°, the main curtain wall in the middle is the three-splicing curtain wall formed by splicing two aluminium sheets twisted by 90° and the surface sheet, the two twisted aluminium sheets in the three-splicing curtain wall are gradient-color control sheets, the surface sheet is a gradient-color compensation sheet, the control sheets control a twisting gradient curved surface through continuous length changes and quantitative cutting, with a length ranging from 50 mm to 4000 mm, and the compensation sheet makes quantitative compensation according to a design length of the curtain wall, with a length ranging from 50 mm to 2200 mm.

Embodiment 4

[0078] The present embodiment is introduced in combination with specific construction.

[0079] The present invention is a manufacturing process of a twisted aluminium sheet of a building decoration material. Since a twisting radian of the aluminium sheet of a whole building curtain wall needs to be coordinated and coherent, and an outer hanging surface as a whole presents a streamer-shaped louver system, a length, a twisting angle and a splicing direction of each aluminium sheet need to be continuously changed, which puts forward extremely high requirements for fine processing and mounting of the aluminium sheet, and therefore, the present invention mainly solves the technical problems including continuous variable-radian twisting of the aluminium sheet and fine coordinated mounting of a gradient-color curved surface of the aluminium sheet. Referring to Figs. 1-4, in the twisted aluminium sheet

having the gradient color in the present embodiment, each aluminium sheet structure 100 includes a plurality of aluminium sheet units 110 having gradient colors from top to bottom, at the same time, the aluminium sheet structure is from wide to narrow, then a middle faces an upper side and a lower side which are both of a sharp-corner structure, and then the middle continues downwards to form a wider structure. Specifically, a sharp-corner length of the lower side is greater than that of the upper side. Further, through the width change, it reflects a plurality of times of twisting of the whole aluminium sheet structure, and then a multi-twisting curve structure is formed.

[0080] Referring to the twisted aluminium sheet having the gradient color, the whole aluminium sheet structure forms a multi-wave curve structure again, and not only has the plurality of times of twisting, but also has a plurality of times of gradual changes from top to bottom and from left and right, and the appearance is beautiful.

[0081] The present embodiment specifically includes contents as follows:

First part, brief introduction of twisted aluminium sheet and connecting parts

[0082] The twisted aluminium sheet of the present invention is a hollow rectangular aluminium sheet made of a single aluminium sheet with a thickness of 4 mm, the original sheet is an aluminium-magnesium alloy with a series of 5005 and a state of H_24, a cross section is 40 mm×350 mm, a length ranges from 50 mm to 4000 mm, and two longitudinal ribbed sheets are internally arranged, which may effectively reduce the dead weight of the sheet, reinforce a section feature thereof, improve whole rigidity, and facilitates prevention of deformation damage in the aluminium sheet twisting process. The twisting angle of the aluminium sheet is about 0° to 90°, in which a twisting angle at a gradient-color curve surface position is near 90°. A plurality of slots and holes are formed in the twisted aluminium sheet, and the twisted aluminium sheet is connected with vertical keels on a building external facade by galvanized connecting steel sheets and high-strength bolts. The aluminium sheet is painted with a gold violet blue/gold red violet two-color chameleon four-sided spraying technology, one adjacent surface is sprayed with gold violet blue, the other adjacent surface is sprayed with gold red violet, and a painting process adopts fluorocarbon spraying treatment.

[0083] Aluminium sheet curtain wall hanging pieces are connected with the square steel rigid framework through the fasteners, and the square steel rigid framework is connected with the steel structure building through the connecting parts, thus forming the aluminium sheet curtain wall of the stable structure. The square steel rigid framework is a large-gap grille structure, and adopts Q235 carbon structural steel, the square steels mainly have three models of 160*80*8 mm, 120*120*6 mm and 80*80*5 mm, the longitudinal and transverse square steels are connected through the butt welds, and fluorocarbon spraying anti-corrosion treatment is performed on surfaces. The fasteners mainly include connecting plates, bolts, screws, studs, nuts, etc. The high-strength bolts adopt 10.9-level friction type connecting high-strength bolts, a connecting surface is abrasively blasted, and an anti-slip coefficient is 0.45.

Second part, manufacturing process of twisted aluminium sheet

[0084] A twisted aluminium sheet processing apparatus adopts a fully hydraulic combination sheet rolling machine, front and rear ends are respectively a large-disc twisting machine and a three-roller sheet rolling machine, the large-disc twisting machine at the front end provides active twisting force, which may refine a twisting angle through an automatic numerical control system, and the three-roller sheet rolling machine at the rear end provides passive limiting force, which limits twisting displacement of the aluminium sheet, but releases longitudinal displacement of the sheet. In order to solve the problems that elastic deformation, yield deformation, etc. are prone to appearing in a traditional twisting process, the project improves the sheet twisting processing technology, mainly including three aspects: (1) the hollow sheet is filled with a PVC pipe, so that stress in the sheet twisting process is more uniform, and especially a position near the ribbed sheet is smoother, so as to resist harmful plastic deformation caused by stress concentration in the middle of the sheet; (2) sheet twisting adopts a multi-time small-angle twisting process, after rebound appears in the process, multiple times of small-amount twisting continues to be performed, and an angle of single-time twisting does not exceed 5°, so as to make the angle gradually approach to a design value, thereby effectively overcoming uncontrollable yield deformation; and (3) the end of the sheet rolling machine may freely extend and retract in the sheet direction, so as to avoid longitudinal stress concentration.

[0085] According to the design length of the twisted aluminium sheet, in the early stage of manufacturing of the project, the aluminium sheet with the design length (50 mm to 4000 mm) is adopted to be twisted, however, because the shorter the sheet, the worse the uniformity of twisting deformation, especially when the length is less than 2 m, the effective twisting length of the aluminium sheet is insufficient. In order to solve the above problems, the present invention solves the problem of the effective length of the twisted aluminium sheet by increasing the sheet length to 6 m and then twisting, and then cutting two ends of the deformed aluminium sheet to the design length.

Third part, painting process for twisted aluminium sheet and connecting parts

[0086] In the present invention, a formed aluminium

sheet twisting process is assisted by a gold violet blue/-gold red violet two-color chameleon spraying technology, and the process is three-spraying two-baking fluorocarbon spraying treatment. Three-spraying refers to that three groups of spray guns are started during spraying, the first group of spray guns sprays primer, the second group of spray guns sprays color paint (fluorocarbon or polyester paint), and the third group of spray guns sprays protective top paint (varnish). Two-baking refers to two times of baking of the aluminium sheet after three-spraying. A sprayed aluminium-magnesium alloy profile has the characteristics of being excellent in corrosion resistance and weather resistance, firm and durable, beautiful for decoration, simple in production process, environmentally friendly, etc. Through the gradient twisting of the aluminium sheet, an external hanging curtain wall of the Huaqi Hall finally achieves a desired effect of displaying gorgeous colors under different light source conditions.

[0087] The connecting parts also adopt fluorocarbon spraying treatment. A coating mainly includes primer, intermediate paint, finish paint and finish-coat paint. A total thickness of a dry paint film of the coating is no less than 150 μm.

Fourth part, aluminium sheet curtain wall mounting process

[0088] The aluminium sheet external hanging curtain wall adopts single splicing by a mobile crane, and splicing between aluminium sheets is through the connection of a plug-in galvanized steel connecting plate with upper and lower aluminium sheets by bolts, each connecting point has no less than 4 anchor bolts, a pulling resistant value of the anchor bolts is no less than 15 KN, and an anchoring safety level is 2.

Fifth part, twisted aluminium sheet gradient-color curve control

[0089] The design of the twisted aluminium sheet external hanging curtain wall of this project is presented as a streamer-shaped louver system, the aluminium sheet gradient curve is continuously connected along the streamer curve, and high consistency of the curve becomes another problem that needs to be solved in the present invention.

[0090] In order to present the gradient color effect, the curtain wall aluminium sheet needs to be twisted by 180°, however, due to the limitation of the performance of the aluminium sheet itself, a single piece of aluminium sheet cannot be twisted to 180° at one time, therefore, in the present invention, according to the height of the curtain wall, the single complete curtain wall is formed by splicing 1 to 3 aluminium sheets, and the twisting angles of the spliced aluminium sheets are superimposed to achieve the gradient effect. A curtain wall at a northern end and a transition section of the building is a single-splicing curtain wall twisted by 90°, a curtain wall at a southern end is a double-splicing curtain wall formed by splicing two aluminium sheets twisted by 0° to 90°, a main curtain wall in the middle is a three-splicing curtain wall formed by splicing two aluminium sheets twisted by 90° and a surface sheet, the two twisted aluminium sheets in the three-splicing curtain wall are gradient-color control sheets, the surface sheet is a gradient-color compensation sheet, the control sheets control a twisting gradient curved surface through continuous length changes and quantitative cutting, with a length ranging from 50 mm to 4000 mm, and the compensation sheet makes quantitative compensation according to a design length of the curtain wall, with a length ranging from 50 mm to 2200 mm.

[0091] The gradient curve control of the aluminium sheet curtain wall is a complex project with an extremely high precision requirement. In order to ensure a gradient-color streamer effect of the twisted aluminium sheet, the present invention studies a professional numbering system, which systematically numbers all the aluminium sheets, and a numbering logic is shown in appendix 1.

[0092] The present invention adopts a multi-time small-angle twisting superposition process for aluminium sheet processing, in the manufacturing process, the problem of aluminium sheet yield deformation or uneven rebound margin which is prone to appearing in one-time twisting forming in the traditional process is solved, the former problem causes direct deformation damage of the aluminium sheet, the later problem causes an uncontrollable aluminium sheet twisting angle, and multi-time small-angle twisting may effectively control the rebound of the aluminium sheet through the bit-by-bit deformation accumulation and may precisely control the designed angle of the aluminium sheet.

[0093] In the twisting process of the aluminium sheet, the problem that ends of the aluminium sheet sink and are damaged due to excessively large stress of clamp at two ends is prone to appearing, and the present invention effectively solves the problem of the deformation of the ends of the aluminium sheet by increasing an effective processing length of the aluminium sheet, and not arranging a stress end in a design length range of the aluminium sheet.

[0094] In the twisting process of the aluminium sheet, not only two ends are prone to generating concentrated stress, but also a central part is prone to generating stress concentration because of the increase of the twisting angle and the accumulation of the deformation amount, resulting in buckling deformation of the central part. According to the present invention, the flexible material makes stress in the sheet twisting process more uniform by filling the hollow sheet with the PVC pipe, and especially the position near the ribbed sheet is smoother, so as to resist the harmful plastic deformation caused by the stress concentration in the middle of the sheet.

[0095] Mounting of the aluminium sheet curtain wall of the present invention mainly solves two major problems, one is connection and fixation of the twisted sheet, and

the other is to cater to various connection angles. The aluminium sheet curtain wall is connected by bolts, long kidney-shaped holes are formed in the connecting parts, not only is mounting simple and fast, but also straightness of the sheet adjusting on the spot is achieved, and a shortcoming of aluminium sheet deformation caused by excessive hot welding is overcome. The aluminium sheet is mounted by adopting single-piece hoisting splicing, which has high operability and strong controllability, and is conducive to the control over the streamer-shaped gradient color effect of the aluminium sheet curtain wall.

[0096] In the present embodiment, the single aluminium sheets are not directly connected, but are connected with the rigid framework behind through high-strength bolts, and then the rigid framework is connected with the building. Forming of the high kidney-shaped holes of bolts of the aluminium sheet and the rigid framework and single mounting of the aluminium sheet are for catering to the connecting angle. The high kidney-shaped holes may adapt to an error of the length of the sheet by adjusting fixation positions of the bolts, and the single mounting may adjust the angle of the aluminium sheet on a plane.

[0097] There are lots of curtain wall aluminium sheets of many types in the present invention, the height sizes of the aluminium sheets change along the gradient-color curve of the building, the present invention studies the strict and complete numbering system, in the mounting process of the aluminium sheets, each aluminium sheet is mounted according to the numbering sequence of the aluminium sheets, and the mounting heights of the aluminium sheets are strictly controlled, providing a strong guarantee for the final effect of the streamer-shaped gradient color presented by the aluminium sheet curtain wall.

[0098] The invention is not limited to the embodiments described herein but can be amended or modified without departing from the scope of the present invention as defined by the appended claims. Any accompanying drawing marks in the claims shall not be deemed to limit the involved claims.

Claims

1. A processing and mounting method for a twisted aluminium sheet having a gradient color, comprising the following steps:

   twisting of aluminium sheet units (110): respectively twisting a plurality of hollow aluminium sheet units (110), by clamping one end of each aluminium sheet unit (110) by means of a telescopic sheet rolling machine, and twisting the other end by means of a twisting machine to twist the aluminium sheet unit (110) towards the sheet rolling machine along the direction of the twisting machine until the aluminium sheet unit (110) is twisted to a designed angle; **characterized in that** sheet twisting adopts a multi-time small-angle twisting process, after rebound appears in the process, multiple times of small-amount twisting continues to be performed, and an angle of single-time twisting does not exceed 5°, when the designed angle is greater than 5°, the twisting machine performs twisting at least two times, and an angle of each time of twisting ranges from 1° to 5°, and filling the hollow aluminium sheet units (110) with flexible fillers;
   painting of the aluminium sheet units (110): respectively painting the aluminium sheet units (110) according to a design requirement of a gradient color;
   building of framework structures (200): providing the grille-shaped framework structures (200) along the outside of a building according to design requirements, the framework structures (200) being fastened on the building; and
   assembly of aluminium sheet structures (100): providing at least one aluminium sheet structures (100) on each grille-shaped framework structure (200) from top to bottom, the aluminium sheet structures (100) being formed by splicing at least two painted aluminium sheet units (110).

2. The processing and mounting method according to claim 1, **characterized in that** in the twisting step of the aluminium sheet units (110), the sheet rolling machine freely extends and retracts in a sheet length direction, so as to disperse stress in twisting.

3. The processing and mounting method according to claim 1, **characterized in that** the flexible fillers are specifically of a tubular structure, a sheet structure or a hollow structure formed by flexible materials.

4. The processing and mounting method according to claim 1, **characterized in that** in the twisting step of the aluminium sheet units (110), when a length of the aluminium sheet units (110) is smaller than 2 m, the method further comprises pretreatment of the aluminium sheet units, and the pretreatment is increase of the length of the aluminium sheet units (110), so that the aluminium sheet units (110) are twisted after the length is greater than 6 m.

5. The processing and mounting method according to claim 1, **characterized in that** the painting of the aluminium sheet units (110) is specifically as follows: the plurality of aluminium sheet units (110) are divided into a plurality of aluminium sheet structures (100) according to the design requirement of the gradient color, and the plurality of aluminium sheet units (110) in each aluminium sheet structure (100) are spliced successively to form an aluminium sheet

structure (100) having a gradient color.

6. The processing and mounting method according to claim 1, **characterized in that** in the building step of the framework structures (200), a distance between frameworks ranges from 4 m to 4.5 m, and each framework structure (200) is formed by a plurality of square steels, which are connected by butt welds in a transverse direction and/or a longitudinal direction.

7. The processing and mounting method according to claim 6, **characterized in that** a plurality of aluminium sheet structures (100) are arranged between the frameworks and are matched with the framework structures (200) to form a streamer-shaped louver structure, and a gradient curve formed by the aluminium sheet units (110) is continuously connected along a streamer-shaped curve.

8. The processing and mounting method according to claim 7, **characterized in that** the gradient curve formed by the aluminium sheet units (110) is specifically as follows: each aluminium sheet structure (100) is formed by splicing at least two twisted aluminium sheet units (110) according to the design requirements, to form the gradient curve.

9. The processing and mounting method according to claim 1, **characterized in that** in the assembly step of the aluminium sheet structures (100), the aluminium sheet units (110) are moved to a design position in a hoisting mode, and are spliced in combination with connecting plates and anchor bolts.

Patentansprüche

1. Verarbeitungs- und Montageverfahren für ein verdrilltes Aluminiumblech mit einer Verlaufsfarbe, umfassend folgende Schritte:

   Verdrillen von Aluminiumblecheinheiten (110): jeweils Verdrillen einer Vielzahl von hohlen Aluminiumblecheinheiten (110), indem ein Ende jeder Aluminiumblecheinheit (110) mittels einer Teleskopblechwalzmaschine geklemmt und das andere Ende mittels einer Verdrillmaschine verdrillt wird, um die Aluminiumblecheinheit (110) entlang der Blechwalzmaschine in Richtung der Verdrillmaschine zu verdrillen, bis die Aluminiumblecheinheit (110) in einen vorgesehenen Winkel verdrillt ist; **dadurch gekennzeichnet, dass** das Blechverdrillen einen mehrfachen Kleinwinkelverdrillprozess annimmt, nachdem im Prozess eine Rückfederung auftritt, mehrfaches Kleinmengenverdrillen weiterhin durchgeführt wird, und ein Winkel des einmaligen Verdrillens 5° nicht überschreitet, wenn der vorgesehene Winkel größer als 5° ist, führt die Verdrillmaschine mindestens zweimal ein Verdrillen durch, und ein Winkel jedes Verdrillens liegt zwischen 1° und 5°, und füllt die hohlen Aluminiumblecheinheiten (110) mit flexiblen Füllstoffen;
   Lackieren der Aluminiumblecheinheiten (110): jeweils Lackieren der Aluminiumblecheinheiten (110) gemäß einer Gestaltungsanforderung einer Verlaufsfarbe;
   Errichten von Rahmenstrukturen (200): Bereitstellen der gitterförmigen Rahmenstrukturen (200) entlang der Außenseite eines Gebäudes gemäß den Gestaltungsanforderungen, wobei die Rahmenstrukturen (200) am Gebäude befestigt werden; und
   Zusammenbauen von Aluminiumblechstrukturen (100): Bereitstellen von mindestens einer Aluminiumblechstruktur (100) auf jeder gitterförmigen Rahmenstruktur (200) von oben nach unten, wobei die Aluminiumblechstrukturen (100) durch Spleißen von mindestens zwei lackierten Aluminiumblecheinheiten (110) gebildet werden.

2. Verarbeitungs- und Montageverfahren nach Anspruch 1, **dadurch gekennzeichnet, dass** in dem Verdrillschritt der Aluminiumblecheinheiten (110) die Blechwalzmaschine in einer Blechlängenrichtung frei aus- und einfährt, um Spannungen beim Verdrillen zu verteilen.

3. Verarbeitungs- und Montageverfahren nach Anspruch 1, **dadurch gekennzeichnet, dass** die flexiblen Füllstoffe insbesondere eine Rohrstruktur, eine Blechstruktur oder eine aus flexiblen Materialien gebildete Hohlstruktur aufweisen.

4. Verarbeitungs- und Montageverfahren nach Anspruch 1, **dadurch gekennzeichnet, dass** in dem Verdrillschritt der Aluminiumblecheinheiten (110), wenn eine Länge der Aluminiumblecheinheiten (110) kleiner als 2 m ist, das Verfahren ferner eine Vorbehandlung der Aluminiumblecheinheiten umfasst, und die Vorbehandlung eine Verlängerung der Länge der Aluminiumblecheinheiten (110) ist, so dass die Aluminiumblecheinheiten (110) nach der Länge größer als 6 m verdrillt werden.

5. Verarbeitungs- und Montageverfahren nach Anspruch 1, **dadurch gekennzeichnet, dass** das Lackieren der Aluminiumblecheinheiten (110) im Einzelnen wie folgt erfolgt: die Vielzahl von Aluminiumblecheinheiten (110) ist entsprechend der Gestaltungsanforderung der Verlaufsfarbe in eine Vielzahl von Aluminiumblechstrukturen (100) unterteilt, und die Vielzahl von Aluminiumblecheinheiten (110) in jeder Aluminiumblechstruktur (100) werden nach-

einander zu einer Aluminiumblechstruktur (100) mit einer Verlaufsfarbe gespleißt.

6. Verarbeitungs- und Montageverfahren nach Anspruch 1, **dadurch gekennzeichnet, dass** im Bauschritt der Rahmenstrukturen (200) ein Abstand zwischen den Rahmen von 4 m bis 4,5 m beträgt, und jede Rahmenstruktur (200) durch eine Vielzahl von Vierkantstählen gebildet ist, die durch Stumpfschweißnähte in Querrichtung und/oder in Längsrichtung verbunden sind.

7. Verarbeitungs- und Montageverfahren nach Anspruch 6, **dadurch gekennzeichnet, dass** eine Vielzahl von Aluminiumblechstrukturen (100) zwischen den Rahmen angeordnet ist und mit den Rahmenstrukturen (200) zu einer streifenförmigen Jalousiestruktur abgestimmt ist, und eine von den Aluminiumblecheinheiten (110) gebildete Gradientenkurve entlang einer streifenförmigen Kurve kontinuierlich verbunden ist.

8. Verarbeitungs- und Montageverfahren nach Anspruch 7, **dadurch gekennzeichnet, dass** die von den Aluminiumblecheinheiten (110) gebildete Gradientenkurve im Einzelnen wie folgt ist: jede Aluminiumblechstruktur (100) wird durch Spleißen von mindestens zwei verdrillten Aluminiumblecheinheiten (110) gemäß den Gestaltungsanforderungen gebildet, um die Gradientenkurve zu bilden.

9. Verarbeitungs- und Montageverfahren nach Anspruch 1, **dadurch gekennzeichnet, dass** im Montageschritt der Aluminiumblechstrukturen (100) die Aluminiumblecheinheiten (110) in einem Hebemodus in eine Gestaltungsanforderung bewegt und in Kombination mit Verbindungsplatten und Ankerbolzen gespleißt werden.

Revendications

1. Procédé de traitement et de montage pour une tôle d'aluminium déformée ayant un dégradé de couleur, comprenant les étapes suivantes :
la déformation d'unités de tôle d'aluminium (110) :

respectivement la déformation d'une pluralité d'unités de tôle d'aluminium (110) creuses, par le serrage d'une extrémité de chaque unité de tôle d'aluminium (110) au moyen d'une machine télescopique de laminage de tôle, et la déformation de l'autre extrémité au moyen d'une machine de déformation pour déformer l'unité de tôle d'aluminium (110) vers la machine de laminage de tôle le long de la direction de la machine de torsion jusqu'à ce que l'unité de tôle d'aluminium (110) soit déformée selon un angle conçu ; **caractérisé en ce que** la déformation de tôle adopte un processus de déformation à petit angle à multiples occurrences, après qu'un rebond apparaît dans le processus, de multiples occurrences de déformation de faible quantité continuent d'être réalisées, et un angle de la déformation en une occurrence ne dépasse pas 5°, lorsque l'angle conçu est supérieur à 5°, la machine de déformation réalise une déformation au moins à deux occurrences, et un angle de chaque occurrence de déformation varie de 1° à 5°, et le remplissage des unités de tôle d'aluminium (110) creuses avec des charges flexibles ;
la peinture des unités de tôle d'aluminium (110) :

respectivement la peinture des unités de tôle d'aluminium (110) selon une exigence de conception d'un dégradé de couleur ;
la construction de structures d'ossature (200) : la fourniture des structures d'ossature (200) en forme de grille le long de l'extérieur d'un bâtiment selon des exigences de conception, les structures d'ossature (200) étant fixées sur le bâtiment ; et
l'assemblage de structures de tôle d'aluminium (100) : la fourniture d'au moins une structure de tôle d'aluminium (100) sur chaque structure d'ossature (200) en forme de grille de haut en bas, les structures de tôle d'aluminium (100) étant formées par la jonction d'au moins deux unités de tôle d'aluminium (110) peintes.

2. Procédé de traitement et de montage selon la revendication 1,
caractérisé en ce que, à l'étape de déformation des unités de tôle d'aluminium (110), la machine de laminage de tôle s'étend et se rétracte librement dans une direction de longueur de tôle, de façon à disperser les contraintes lors de la déformation.

3. Procédé de traitement et de montage selon la revendication 1,
caractérisé en ce que les charges flexibles sont spécifiquement d'une structure tubulaire, d'une structure de tôle ou d'une structure creuse formée par des matériaux flexibles.

4. Procédé de traitement et de montage selon la revendication 1,
caractérisé en ce que, à l'étape de déformation des unités de tôle d'aluminium (110), lorsqu'une longueur des unités de tôle d'aluminium (110) est inférieure à 2 m, le procédé comprend en outre le prétraitement des unités de tôle d'aluminium, et le prétraitement est une augmentation de la longueur des unités de tôle d'aluminium (110), de sorte que les

unités de tôle d'aluminium (110) soient déformées après que la longueur est supérieure à 6 **m.**

5. Procédé de traitement et de montage selon la revendication 1,
caractérisé en ce que la peinture des unités de tôle d'aluminium (110) est spécifiquement comme suit : la pluralité d'unités de tôle d'aluminium (110) sont divisées en une pluralité de structures de tôle d'aluminium (100) selon l'exigence de conception du dégradé de couleur, et la pluralité d'unités de tôle d'aluminium (110) dans chaque structure de tôle d'aluminium (100) sont jointes successivement pour former une structure de tôle d'aluminium (100) ayant un dégradé de couleur.

6. Procédé de traitement et de montage selon la revendication 1,
caractérisé en ce que, à l'étape de construction des structures d'ossature (200), une distance entre ossatures varie de 4 m à 4,5 m, et chaque structure d'ossature (200) est formée par une pluralité d'aciers carrés, qui sont reliés par des soudures bout à bout dans une direction transversale et/ou une direction longitudinale.

7. Procédé de traitement et de montage selon la revendication 6,
caractérisé en ce qu'une pluralité de structures de tôle d'aluminium (100) sont agencées entre les ossatures et sont mise en concordance avec les structures d'ossature (200) pour former une structure de persienne en forme de banderole, et une courbe de dégradé formée par les unités de tôle d'aluminium (110) est reliée en continu le long d'une courbe en forme de banderole.

8. Procédé de traitement et de montage selon la revendication 7,
caractérisé en ce que la courbe de dégradé formée par les unités de tôle d'aluminium (110) est spécifiquement comme suit : chaque structure de tôle d'aluminium (100) est formée par la jonction d'au moins deux unités de tôle d'aluminium (110) déformées selon les exigences de conception, pour former la courbe de dégradé.

9. Procédé de traitement et de montage selon la revendication 1,
caractérisé en ce que, à l'étape d'assemblage des structures de tôle d'aluminium (100), les unités de tôle d'aluminium (110) sont déplacées jusqu'à une position de conception dans un mode de levage, et sont jointes en combinaison avec des plaques de liaison et des boulons d'ancrage.

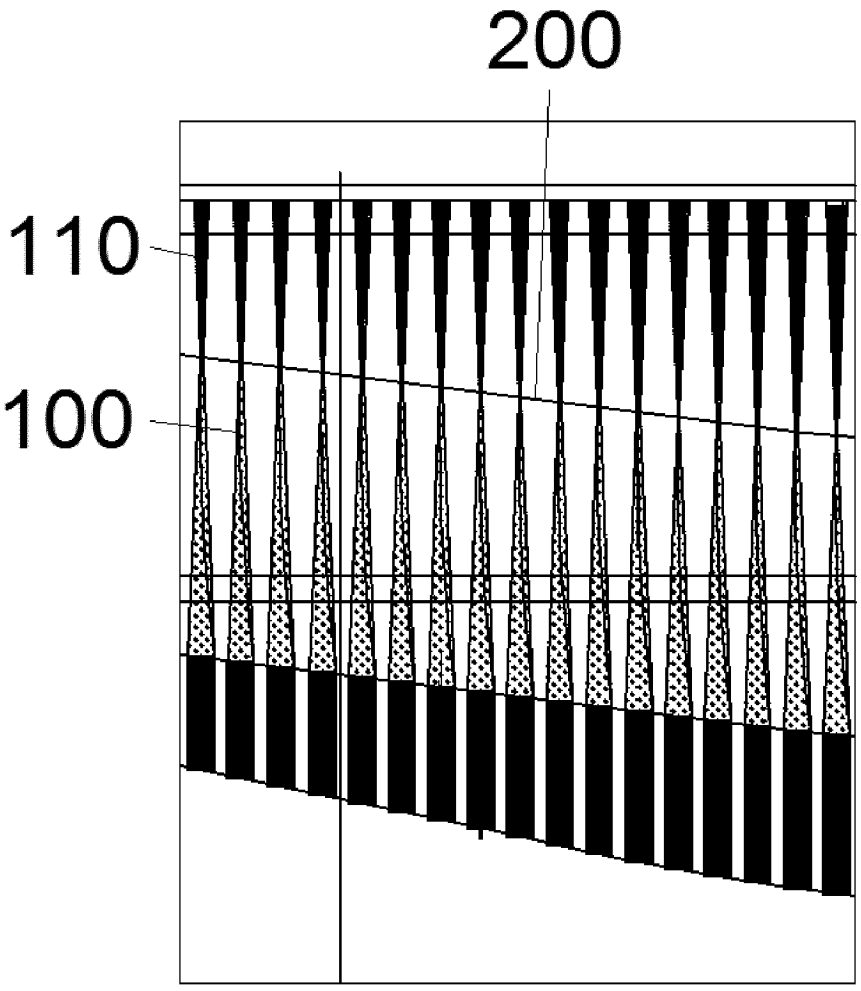

Fig. 1

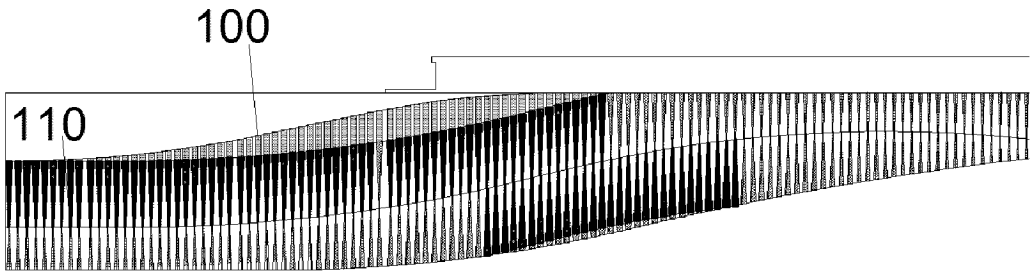

Fig. 2

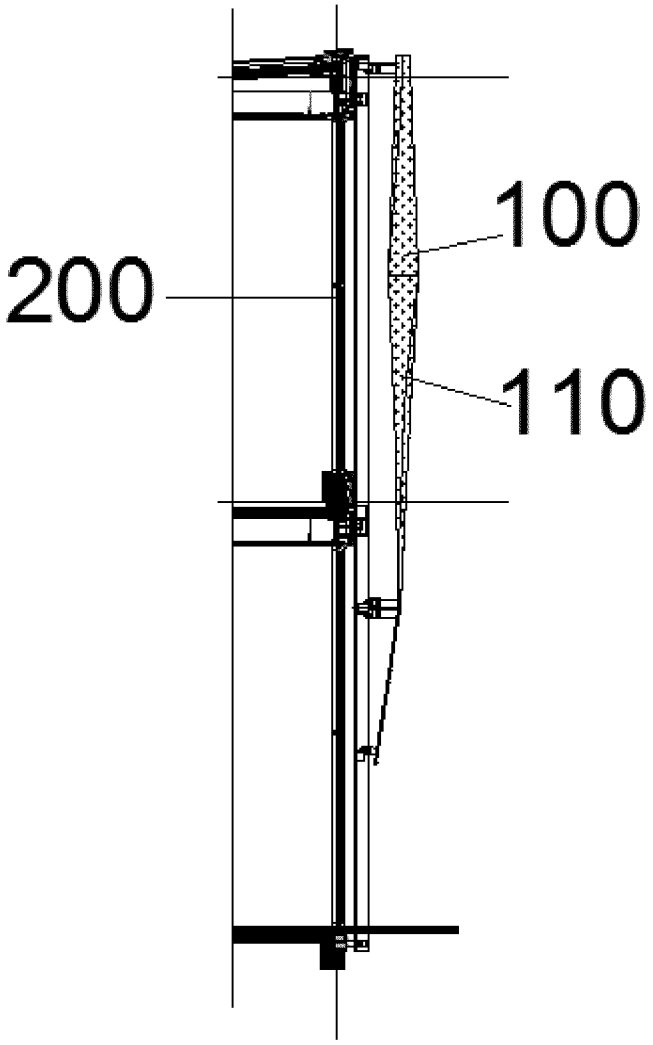

Fig. 3

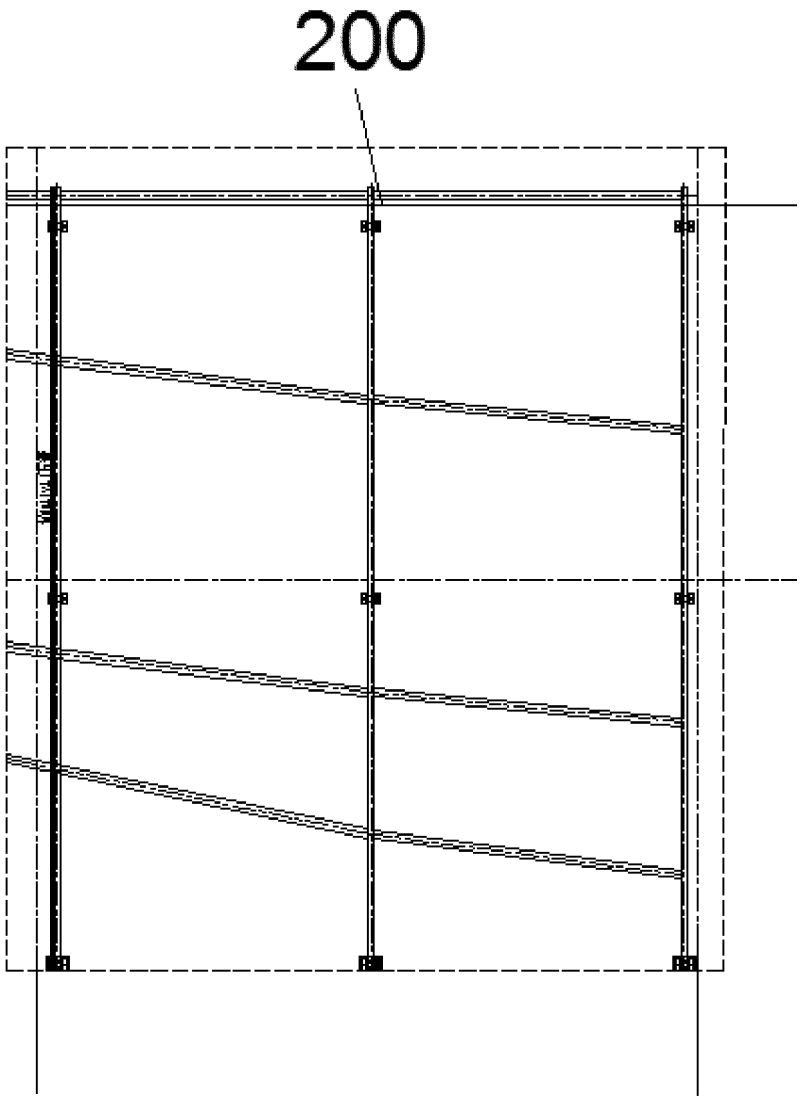

Fig. 4

REFERENCES CITED IN THE DESCRIPTION

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