

SACRIFICIAL ANODE ASSEMBLY AND METHOD FOR INSTALLING SACRIFICIAL ANODE

5 BACKGROUND OF THE INVENTION

1. Field of the invention

The present invention relates to improvement of a flush-mounted type of sacrificial anode assembly, which is one of sacrificial anodes, and more particularly,
10 to improvement of a sacrificial anode assembly that can be installed to metal structures, such as ballast tanks in ships, and appropriately used in preventing corrosion of metal structures and a method of installing the same.

2. Description of the Prior Art

15 In general, sacrificial anodes are often used to prevent corrosion of metals. In particular, since ballast tanks in ships are in contact with seawater and are easily corroded, sacrificial anodes are installed on the longitudinal girders or the bottom of the ballast tank to prevent corrosion thereof.

In particular, a sacrificial anode material or a sacrificial anode body is
20 installed on the surface of a structure in ships so as to be preferably in close contact therewith in order to reduce fluid resistance and influence of residual water, thereby protecting the structure from corrosion, and the surface of the sacrificial anode, which is in contact with the surface of the structure, is coated with paint to prevent corrosion thereof. The sacrificial anode having the shape and installed by the
25 method described above is commonly referred to as a "flush-mounted type of

sacrificial anode".

The sacrificial anode may be made of a material, such as zinc, magnesium, aluminum, or the like, which has a higher ionization tendency than iron constituting a longitudinal girder or a hull. When sacrificial anodes are installed in
5 corresponding components of the hull or offshore structures, the sacrificial anodes are corroded, instead of the iron structures constituting the hull or offshore structures.

As shown in FIGS. 1 to 3, the conventional flush-mounted type of sacrificial anode assembly 10 includes a sacrificial anode body 11 made of aluminum or the
10 like, a core 13 of which a part is inserted into the sacrificial anode body 11 and of which both ends protrude from the left and right sides and having a hole 12 formed therein, an anode pad 15 installed to the bottom 20 of a structure before it is painted and having a bolt 16, nuts 17, washers 18, and the like. Paint is applied to the lower surface of the sacrificial anode body 11. The nuts 17 may be installed respectively
15 in duplicate to prevent loosening.

If the conventional flush-mounted type of sacrificial anode assembly 10 described above is previously installed before a painting operation is performed in the case where there is no member to which the sacrificial anode assembly 10 can be installed in the structure, the bottom surface of the structure, which corresponds to
20 the lower surface of the sacrificial anode body 11, has no paint layer 30 because paint is not applied thereto. Therefore, the sacrificial anode body 11 must be installed after painting the structure.

Accordingly, in the case of using the conventional flush-mounted type of sacrificial anode assembly 10, an anode pad 15 provided with a bolt 16 is
25 preinstalled in the bottom 20 of a ballast tank structure in ships, and a cap 19 is put

on the bolt 16 to prevent the paint from being applied.

When the shipbuilding is almost finished, paint is applied to the bottom surface, the cap 19 is removed, and then the sacrificial anode body 11 having the core 13 is installed.

5 That is, in the shipbuilding procedure according to the prior art, the anode pad 15 is installed in advance, and then the sacrificial anode body 11 is transported in the hull after the paint is applied to the bottom surface at the stage in which shipbuilding is almost completed and installed.

Large structures, such as large ships or offshore structures, generally employ
10 a large and heavy sacrificial anode assembly of around 1 m in length. More than hundreds of heavy sacrificial anode bodies 11 having the core 13 installed therein must be moved by passing through complex structures inside the hull to then be installed therein at the stage in which building of a large ship or an offshore structure is almost completed, which causes many problems such as safety accidents, damage
15 to installed structures, an increase in costs due to additional manpower and equipment, reduction in productivity due to an increase in time required for building the ship, and the like.

In the related art of the present invention, there have been efforts to solve these problems, but there is no clear solution.

20 In addition, a conventional sacrificial anode is disclosed in Korean Patent Laid-Open Publication No. 10-2015-0083383 titled "Sacrificial anode assembly for floating offshore structure" invented by Myung-Geun Song, Min-Sung Jeon, and Yu-Jung Han.

SUMMARY OF THE INVENTION

25

An aspect of the present invention is to provide a sacrificial anode assembly that can be appropriately used as the flush-mounted type of sacrificial anode assembly by being preinstalled on the surface of a bottom of a structure before applying paint thereto when building general ships, or offshore plant structures or
5 offshore project structures, such as a floating production storage and offloading system (FPSO), a floating storage and offloading system (FSO), a floating storage re-gasification unit (FSRU), or the like, thereby eliminating the problems with the conventional flush-mounted type of sacrificial anode assembly.

Another aspect of the present invention is to provide a method of installing a
10 sacrificial anode in which the flush-mounted type of sacrificial anode assembly can be preinstalled before applying paint to the bottom surface of a structure when building general ships or offshore structures, such as a floating production storage and offloading system (FPSO), a floating storage and offloading system (FSO), a floating storage re-gasification unit (FSRU), or the like.

15 A sacrificial anode assembly according to the present invention may include: a sacrificial anode body having an installation reference surface for installation toward a bottom of a structure; a core having an insertion portion inserted into the sacrificial anode body in the longitudinal direction thereof and a pair of laterally-bent portions that extend from the insertion portion so as to be exposed outside both sides
20 of the sacrificial anode body or so as not to be exposed outside both sides thereof and are bent forwards or backwards in the same lateral direction, and made of a conductor; and a pair of supports configured to be connected to respective ones of the pair of laterally-bent portions so as to support the pair of laterally-bent portions and the installation reference surface in a state of standing up and then fix the same
25 in a state of lying on its side, and to be installed to the structure.

Preferably, the sacrificial anode assembly may further include a fixing means for fixing the laterally-bent portions to the supports in a state in which the pair of laterally-bent portions stands up and in a state in which the pair of laterally-bent portions lies on its side.

5 The pair of supports may include a bottom portion attached in parallel to the bottom and a protrusion installed to extend upwards from an upper surface of the bottom portion and connected to the laterally-bent portion. Slots may be formed respectively in any one of the protrusions of the supports and the pair of laterally-bent portions in the vertical direction so as to fix the sacrificial anode body by adjusting the
10 height thereof and holes may be formed respectively in the remaining one of the protrusions of the supports and the pair of laterally-bent portions. The fixing means may include a bolt inserted into the slot and the hole and a nut coupled to the bolt.

 The hole may be a slot formed in the longitudinal direction of the laterally-bent portion in a state in which the laterally-bent portion is fixed to the support while
15 standing up, and a groove into which an end of the laterally-bent portion is inserted may be formed in the bottom portion.

 Slots may be formed in the pair of laterally-bent portions in the longitudinal direction thereof, respectively, holes may be formed in the pair of supports, respectively, and the fixing means may include a bolt inserted into the slot and the
20 hole and a nut coupled to the bolt.

 The core may have a band shape and may be disposed in a direction perpendicular to the installation reference surface, and the support may be configured to have a bottom portion attached in parallel to the bottom of the structure and a protrusion installed to extend upwards from an upper surface of the
25 bottom portion and connected to the laterally-bent portion.

Preferably, the sacrificial anode body may have a trapezoidal traverse cross-section in which the cross-sectional area thereof decreases as going upwards in a state in which the installation reference surface is disposed to face the bottom. A paint layer is preferably formed on the installation reference surface.

5 A method of installing a sacrificial anode according to the present invention may include: a sacrificial anode body preparation step of preparing a sacrificial anode body provided with a core having an insertion portion inserted into the sacrificial anode body in the longitudinal direction thereof and a pair of laterally-bent portions that extend from the insertion portion so as to be exposed outside both sides
10 of the sacrificial anode body or so as not to be exposed outside both sides thereof and are bent forwards or backwards in the same lateral direction and made of a conductor, and having an installation reference surface for installation toward a bottom of a structure; a support fixing step of fixing a pair of supports to the bottom of the structure so as to be spaced apart from each other; a first laterally-bent portion
15 fixing step of fixing the pair of laterally-bent portions to the pair of supports in a state in which the installation reference surface is directed laterally by standing up the pair of laterally-bent portions; a step of applying paint to the surface of the bottom of the structure; a laterally-bent portion rotation step of rotating the pair of laterally-bent portions so as to lie on its side such that the installation reference surface faces the
20 bottom to which the paint is applied; and a second laterally-bent portion fixing step of fixing the pair of laterally-bent portions to the pair of the supports.

 The first laterally-bent portion fixing step may include a step of fixing the laterally-bent portion to the support using a fixing means in a state in which a lower end of the laterally-bent portion is in close contact with the bottom portion of the
25 support or is inserted into a groove formed in the bottom portion of the support to

prevent the laterally-bent portion from rotating left and right while standing up the laterally-bent portion and the installation reference surface, and the first laterally-bent portion fixing step or the second laterally-bent portion fixing step may be performed by means of bolts and nuts. The method of installing a sacrificial anode
5 according to the present invention may further include a height adjustment step of adjusting the height of the laterally-bent portion so that a paint layer is in close contact with the bottom between the first laterally-bent portion fixing step and the second laterally-bent portion fixing step.

In the case of using the sacrificial anode assembly according to the present
10 invention, the sacrificial anode can be preinstalled to the bottom of a ship, an offshore plant, or the like without being limited by a painting operation, thereby drastically reducing safety accidents occurring in the process of installing the sacrificial anode, and manpower and time required for the same.

In addition, in the case of using the sacrificial anode assembly according to
15 the present invention, since a heavy sacrificial anode body can be relatively safely rotated using a bolt or a hinge installed on a support, it is possible to minimize the impact or damage to the paint coated on the bottom surface.

According to the present invention, the sacrificial anode body can be installed while adjusting the height thereof, and the height of the sacrificial anode
20 body can be easily adjusted as necessary after the installation.

BRIEF DESCRIPTION OF THE DRAWINGS

The above and other aspects, features, and advantages of the present
25 disclosure will be more apparent from the following detailed description taken in

conjunction with the accompanying drawings, in which:

FIG. 1 is a perspective view of a conventional flush-mounted type of sacrificial anode assembly;

FIG. 2 is an enlarged cross-sectional view illustrating the state in which a conventional anode pad is installed to fix the flush-mounted type of sacrificial anode assembly;

FIG. 3 is a front view illustrating the state in which the conventional flush-mounted type of sacrificial anode assembly is installed;

FIG. 4 is an exploded perspective view illustrating an embodiment of a flush-mounted type of sacrificial anode assembly according to the present invention;

FIGS. 5A to 5E are views illustrating a process of installing the sacrificial anode assembly shown in FIG. 4;

FIG. 6 is a plan view illustrating the final state in which the sacrificial anode assembly shown in FIG. 4 is installed;

FIG. 7 is a flowchart illustrating a process of installing a sacrificial anode assembly according to the present invention;

FIGS. 8 and 9 are exploded perspective views illustrating modified embodiments of the sacrificial anode assembly, respectively; and

FIGS. 10A to 10D are views illustrating other embodiments of a sacrificial anode assembly.

DETAILED DESCRIPTION OF THE EXEMPLARY EMBODIMENTS

Hereinafter, a preferred embodiment of the present invention will be described in detail with reference to the accompanying drawings. As shown in

FIGS. 4 to 7, a sacrificial anode assembly 100 according to the present invention has a sacrificial anode body 110. The sacrificial anode body 110 is primarily made of zinc, magnesium, aluminum, or the like. The sacrificial anode body 110 has an installation reference surface 112 disposed toward the bottom of a structure in the final installation state. The installation reference surface 112 is preferably coated with paint to form a paint layer 113. The cross-sectional shape of the sacrificial anode body 100 may be variously modified. As shown in the present embodiment, the width of the installation reference surface 112 of the sacrificial anode body 100 is preferably greater than the width of an upper surface thereof.

10 The embodiment shown in FIGS. 4 to 7 illustrates a sacrificial anode body 110 having a length in the left and right directions, which is greater than a width in the forward and backward directions, and a trapezoidal traverse cross-section. In the present invention, on the basis that the length in the left and right directions is larger than the width in the forward and backward directions, the front direction may also be referred to as a "forward lateral direction" and the backward direction can be referred to as a "backward lateral direction".

 The sacrificial anode body 110 of the present embodiment has a trapezoidal traverse cross-section in which the cross-sectional area thereof decreases as going upwards from the installation reference surface 112.

20 The sacrificial anode body 110 is provided with a core 120 made of a conductor such as iron. The core 120 has a band shape and is disposed in a direction perpendicular to the installation reference surface 112. The core 120 has an insertion portion 122 inserted into the sacrificial anode body 110 and laterally-bent portions 124 that protrude outwards from both sides of the sacrificial anode body 110 and is bent forwards, whereby the thickness surfaces of the insertion portion 122

25

and the laterally-bent portions 124 face the installation reference surface 112. This is one of the features of the present invention, which is different from the conventional core of which the wide surface is parallel to the installation reference surface. The laterally-bent portion 124 may be formed so as to be bent backwards.

5 Although it is illustrated that the core 120 has a band shape in the present embodiment, the core 120 may be formed to have any of various cross-sectional shapes such as a circle, a polygon, or the like.

 In the sacrificial anode assembly 100 of the present embodiment, the core 120 includes an insertion portion 122 inserted into the sacrificial anode body 110
10 and a pair of laterally-bent portions 124 that extend from the insertion portion 122 so as to be exposed outside both sides of the sacrificial anode body 110 and are bent toward the "forward lateral direction" or the "backward lateral direction". The laterally-bent portion 124 is also one of the features of the present invention, which is not provided in the prior art. Preferably, the laterally-bent portion 124 is formed
15 with a hole 126 into which the bolt 142 may be inserted.

 The sacrificial anode assembly 100 according to the present invention has a pair of supports 130. The pair of supports 130 is installed to the bottom 20 of a structure by means of welding or the like and is connected to the pair of laterally-bent portions 124. The pair of supports 130 is intended to support the pair of
20 laterally-bent portions 124 and the installation reference surface 112 in the state of standing up and switch the same to the state of lying on its side after coating paint on the surface of the bottom of the structure to then be fixed.

 The support 130 is configured to include a bottom portion 132 attached in parallel to the bottom 20 of the structure and a protrusion 134 installed to extend
25 upwards from the upper surface of the bottom portion 132 and connected to the

laterally-bent portion 124. Preferably, the protrusion 134 has a slot 136 or an elongated hole (hereinafter, referred to as "slot") formed therein to be long in the vertical direction other than the width direction in order to adjust the height of the laterally-bent portion 124 and the sacrificial anode body 110.

5 The sacrificial anode assembly 100 according to the present invention has a fixing means 140. The fixing means 140 is intended to fix the laterally-bent portion 124 to the support 130 in the state in which the pair of laterally-bent portions 124 stands up or lies on its side.

 The fixing means 140 is preferably configured to include a bolt 142 inserted
10 into the slot 136 and the hole 126 and a nut 144 coupled to the bolt 142. Washers 146 may be further provided.

 The final state in which the sacrificial anode assembly 100 is installed is shown in FIGS. 5E and 6. The laterally-bent portion 124 has an inverted "L" shape when viewed from above.

15 A method of installing the sacrificial anode assembly according to the present invention will be described with reference to FIGS. 4 to 7. A sacrificial anode body 110 is prepared when building general ships or offshore plants, such as FPSO, FSO, FSRU, or the like, the sacrificial anode body 110 having a core 120 that includes an insertion portion 122 inserted into the sacrificial anode body 110
20 and a pair of laterally-bent portions 124 that extend from the insertion portion 122 so as to be exposed outside both sides of the sacrificial anode body 110 or so as not to be exposed outside both sides thereof, as will be described later, and are bent forwards or backwards in the same lateral direction and is made of a conductor such as iron, copper, or the like (S1).

25 The sacrificial anode body 110 has an installation reference surface 112 to be

installed toward the bottom 20 of a structure. Preferably, the installation reference surface 112 is painted.

Then, as shown in FIG. 5A, supports 130 are installed to the bottom 20 of a ballast tank so as to be spaced apart from each other by welding or the like in the
5 early stage or in the middle of building a ship before installing various structures inside a ship or an offshore plant, or the like, that is, before painting the surface of the bottom 20 of the offshore structure such as a ship, an offshore plant, or the like (S2).

Next, a first laterally-bent portion fixing step of fixing the pair of laterally-
10 bent portions 124 to the pair of supports by means of a fixing means, preferably, bolts 142 and nuts 144 while standing up the pair of laterally-bent portions 124 such that the installation reference surface 112 is directed to the "front side" or the "rear side", as shown in FIG. 5B, and is performed (S3).

At this time, it is preferable to arrange the laterally-bent portion 124 such that
15 the lower end thereof is in close contact with the upper surface of the bottom portion 132 as shown by the dotted line in FIG. 5B to prevent the laterally-bent portion 124 from rotating left and right, thereby maintaining a more stable fixed state. In some cases, a groove into which the end of the laterally-bent portion 124 is inserted may be formed in the bottom portion 132, and the laterally-bent portion 124 may be fixed
20 by the fixing means 140 in the state in which the end of the laterally-bent portion 124 is inserted into the groove, thereby preventing the laterally-bent portion 124 from rotating.

A procedure of building a ship, an offshore plant, or the like is performed in the state shown in FIG. 5B, and at a stage in which shipbuilding is almost
25 completed, paint is applied to the surface of the bottom 20 of the structure such as a

ballast tank, thereby forming a paint layer 30 as shown in FIG. 5C (S4). Since the installation reference surface 112 and the laterally-bent portions 124 of the sacrificial anode body 110 stand up above the supports 130 as shown in FIG. 5B, it is possible to apply paint to the surface of the bottom 20 of the structure without interference
5 with the sacrificial anode body 110 and the laterally-bent portions 124.

After the paint applied to the surface of the bottom 20 is dried, the fixed state of the laterally-bent portions 124 is released by loosening the nuts 144, and the laterally-bent portions 124 and the sacrificial anode body 110 are lifted upwards as shown in FIG. 5C and are rotated so as to lie on their sides as shown in FIG. 5D, so
10 that the installation reference surface 112 faces the surface of the bottom 20 of the structure on which the paint is coated (S5).

Next, as shown in FIG. 5E, a second laterally-bent portion fixing step of fixing the pair of laterally-bent portions 124 to the pair of supports 130 using the bolts 142 and the nuts 144 in the state in which, preferably, the installation reference
15 surface 112 is in close contact with the surface of the bottom 20 of the structure by adjusting the height of the core 120 and the sacrificial anode body 110 through the slots 136 is performed. In some cases, the second fixing step may be performed by welding (S6).

When the sacrificial anode assembly 100 is installed to the bottom 20 of a
20 ship or an offshore structure, such as an offshore plant, as described above, it is possible to eliminate all the problems caused by the operation of moving and installing a heavy sacrificial anode after the painting operation performed at the time at which shipbuilding is completed.

The sacrificial anode assembly according to the present invention described
25 above does not necessarily have to be installed such that the installation reference

surface is in close contact with the bottom of the structure. The sacrificial anode assembly may be installed such that the installation reference surface is spaced apart from the bottom as necessary.

In addition, in the sacrificial anode assembly according to the present invention, the distance between the installation reference surface of the sacrificial anode body and the bottom can be easily adjusted as needed.

That is, although the sacrificial anode assembly according to the present invention can be most preferably utilized in the case where the installation reference surface must be installed at the same height as the surface of the bottom, the installation reference surface is not necessarily installed on the same plane as the bottom. The sacrificial anode assembly according to the present invention can also be utilized in the case where the installation reference surface is installed at any of various heights.

In some cases, as shown in FIG. 8, a slot 126a or an elongated hole may be formed in the laterally-bent portion 124 in the longitudinal direction thereof, in addition to the support 130. In this case, the height of the sacrificial anode body 110 may be adjusted in a broader range. In addition, a groove 132a into which the laterally-bent portion 124 is inserted may be formed in the bottom portion 132 constituting the support 130, so that the lower end of the laterally-bent portion 124 may be inserted into the groove 132a in the state in which the laterally-bent portion 124 stands up as shown in FIG. 5B to then be fixed. This configuration may reliably prevent the laterally-bent portion 124 from rotating. A description of the remaining elements is the same as that made with reference to FIGS. 4 to 7.

In some cases, as shown in FIG. 9, a circular hole 136a through which the bolt 142 passes may be formed in the support 130, and a slot 126a or an elongated

hole may be formed in the laterally-bent portion 124 in the longitudinal direction thereof. A description of the remaining elements is the same as that made with reference to FIGS. 4 to 7.

Referring to FIGS. 10A to 10C, the core 120 may have an insertion portion 122 inserted in the sacrificial anode body 110 along the longitudinal direction thereof and a pair of laterally-bent portions 124 that are bent forwards or backwards in the same lateral direction from the insertion portion 122, which is not exposed through both sides 114, so as to be exposed to the outside through the front surface 115 or the rear surface. In addition, the insertion portion 122 may have a cross-sectional shape different from that of the laterally-bent portion 124 as shown in FIGS. 10B and 10C, and may protrude from both sides in order to support four points during manufacture. Alternatively, the insertion portion 122 may not protrude from both sides 114. In addition, referring to FIG. 10D, the laterally-bent portion 124 may be installed to be inclined with respect to the reference surface 112.

A description of the remaining elements is the same as that made with reference to FIGS. 4 to 7, and the hole 126, the slot 136, and the bottom portion 132 may be modified as described above with reference to FIGS. 8 and 9.

The present invention may be appropriately utilized to install a sacrificial anode in the bottom of a general ship or a large offshore structure such as a floating production storage and offloading system (FPSO), a floating storage and offloading system (FSO), a floating storage re-gasification unit (FSRU), or the like.

WHAT IS CLAIMED IS:

1. A sacrificial anode assembly comprising:
 - a sacrificial anode body having an installation reference surface
 - 5 for installation toward a bottom of a structure;
 - a core having an insertion portion inserted into the sacrificial anode body in the longitudinal direction thereof and a pair of laterally-bent portions that extends from the insertion portion so as to be exposed outside both sides of the sacrificial anode body or so as not to be
 - 10 exposed outside both sides thereof and is bent forwards or backwards in the same lateral direction, and made of a conductor;
 - a pair of supports configured to be connected to respective ones of the pair of laterally-bent portions so as to support the pair of laterally-bent portions and the installation reference surface in a state of standing
 - 15 up and then fix the same in a state of lying on its side, and to be installed to the structure; and
 - a fixing means for fixing the pair of laterally-bent portions to the pair of supports in a state in which the pair of laterally-bent portions stands up and in a state in which the pair of laterally-bent portions lies on
 - 20 its side,
 - wherein the pair of supports is comprised of a bottom portion attached in parallel to the bottom of the structure and a protrusion installed to extend upwards from an upper surface of the bottom portion and connected to the laterally-bent portion,
 - 25 slots are formed respectively in any one of the protrusions of the supports and the pair of laterally-bent portions in the vertical direction so as to fix the sacrificial anode body by adjusting the height thereof and holes are formed respectively in the remaining one of the protrusions of the supports and the pair of laterally-bent portions,
 - 30 the fixing means comprises a bolt inserted into the slot and the hole and a nut coupled to the bolt, and

wherein a groove into which an end of the laterally-bent portion is inserted is formed in the bottom portion.

2. The sacrificial anode assembly of claim 1, wherein the
5 hole is a slot formed in the longitudinal direction of the laterally-bent portion in a state in which the laterally-bent portion is fixed to the support while standing up.

3. The sacrificial anode assembly of claim 1, wherein the
10 slots are formed in the pair of laterally-bent portions in the longitudinal direction thereof, respectively,

wherein the holes are formed in the protrusions of the supports, respectively.

15 4. The sacrificial anode assembly of claim 1, wherein the core has a band shape and is disposed in a direction perpendicular to the installation reference surface.

5. The sacrificial anode assembly of claim 1, wherein the
20 sacrificial anode body has a trapezoidal traverse cross-section in which the cross-sectional area decreases as going upwards in a state in which the installation reference surface is disposed to face the bottom of the structure.

25 6. The sacrificial anode assembly of claim 1, wherein a paint layer is formed on the installation reference surface.

7. A method of installing a sacrificial anode, the method comprising:

30 a sacrificial anode body preparation step of preparing a sacrificial anode body provided with a core having an insertion portion inserted

into the sacrificial anode body in the longitudinal direction thereof and a pair of laterally-bent portions that extend from the insertion portion so as to be exposed outside both sides of the sacrificial anode body or so as not to be exposed outside both sides thereof and are bent forwards or backwards in the same lateral direction and made of a conductor, and
5 having an installation reference surface for installation toward a bottom of a structure;

a support fixing step of fixing a pair of supports to the bottom of the structure so as to be spaced apart from each other;

10 a first laterally-bent portion fixing step of fixing the pair of laterally-bent portions to the pair of supports in a state in which the installation reference surface is directed laterally by standing up the pair of laterally-bent portions;

a step of applying paint to the surface of the bottom of the
15 structure;

a laterally-bent portion rotation step of rotating the pair of laterally-bent portions so that the laterally-bent portions are laid on their sides such that the installation reference surface faces the bottom to which the paint is applied; and

20 a second laterally-bent portion fixing step of fixing the pair of laterally-bent portions to the pair of the supports,

wherein the first laterally-bent portion fixing step comprises a step of fixing the laterally-bent portion to the support using a fixing means in a state in which a lower end of the laterally-bent portion is inserted into a
25 groove formed in the bottom portion of the support to prevent the laterally-bent portion from rotating left and right while standing up the laterally-bent portion and the installation reference surface,

wherein the first laterally-bent portion fixing step or the second laterally-bent portion fixing step is performed by means of bolts and
30 nuts, and

further comprising a height adjustment step of adjusting the height

of the laterally-bent portion so that a paint layer is in close contact with the bottom between the first laterally-bent portion fixing step and the second laterally-bent portion fixing step.