(19) LE GOUVERNEMENT
DU GRAND-DUCHÉ DE LUXEMBOURG
Ministère de l'Économie

(11) N° de publication : **LU503852**

(12) **BREVET D'INVENTION** **B1**

(21) N° de dépôt: LU503852

(22) Date de dépôt: 02/11/2022

(51) Int. Cl.:
E02D 29/16, E01F 5/00, E02D 29/045

(30) Priorité:
16/08/2022 CN 202210980264.2

(43) Date de mise à disposition du public: 04/12/2023

(47) Date de délivrance: 04/12/2023

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(54) **ASSEMBLY TYPE CULVERT.**

(57) The present invention belongs to the technical field of culverts. Disclosed is an assembly type culvert, comprising a plurality of culvert sections. The plurality of culvert sections are sequentially arranged in a front-back direction. The ends of every two adjacent culvert sections close to each other are attached and aligned, and the ends of every two adjacent culvert sections close to each other are connected by means of a connecting piece, such that the culvert can be assembled from a plurality of culvert sections. Thus, the construction length of the assembly type culvert is not limited. Every two adjacent culvert sections are connected by means of the connecting piece, such that the stability of the whole assembly type culvert is improved. Further, the culvert sections can be prefabricated, and then transported to a site for assembly construction. Therefore, the construction efficiency is high.

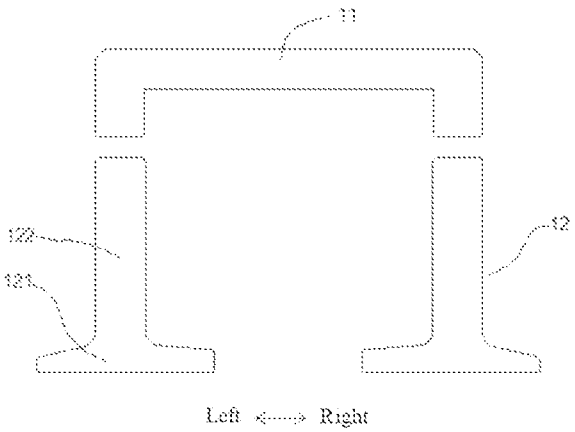


FIG. 1

DESCRIPTION

ASSEMBLY TYPE CULVERT

TECHNICAL FIELD

[0001] The present invention belongs to the technical field of culverts, and in particular relates to an assembly type culvert.

BACKGROUND ART

[0002] At present, culvert construction is usually completed by molding and casting in situ after excavation of a foundation pit. A cast-in-place culvert needs to be constructed in sequence from a cushion layer to a side wall to a top cover, and each step involves steel bar binding and formwork supporting, which lead to a complicated construction process, a long construction period and a high cost. There have been related reports on assembly type culverts, for example, from the document No. CN111926725A entitled "Culvert Structure and Culvert Construction Process", however, the disclosed culvert structure is only suitable for assembly of a short culvert.

SUMMARY OF THE INVENTION

[0003] In order to solve the above-mentioned technical problems, an object of the present invention is to provide an assembly type culvert which is easy and convenient to assemble and can be flexibly constructed according to the length of the culvert.

[0004] To fulfill the object described above, the present invention adopts the following technical solution: an assembly type culvert, including a plurality of culvert sections, wherein the plurality of culvert sections are sequentially arranged in a front-back direction; ends of every two adjacent culvert sections close to each other are attached and aligned; and the ends of every two adjacent culvert sections close to each other are connected by means of a connecting piece.

[0005] The technical solution described above has the following beneficial effects: in this way, the culvert can be assembled from a plurality of culvert sections, such that the construction length of the assembly type culvert is not limited; every two adjacent culvert sections are connected by means of the connecting piece, such that the stability

of the whole assembly type culvert is improved; and further, the culvert sections can be prefabricated, and then transported to a site for assembly construction, such that the construction efficiency is high.

[0006] In the technical solution described above, the culvert section includes a top cover and two side walls; the two side walls are vertically arranged in the front-back direction and distributed at intervals in a left-right direction; the top cover is horizontally arranged in the front-back direction, and a left side and a right side of the top cover are supported at upper ends of the two side walls respectively; an upper end of each of the side walls is connected to a corresponding side of the top cover; and every two adjacent top covers, as well as every two adjacent side walls on a same side, are respectively connected by means of the connecting piece.

[0007] The technical solution described above has the following beneficial effect: in this way, each culvert section is assembled from the top cover and the two side walls, such that the whole culvert section can be transported more conveniently.

[0008] In the technical solution described above, the side wall includes a bottom bracket and a vertical wall; the bottom bracket is a strip plate horizontally arranged in the front-back direction; the vertical wall is vertically arranged on the bottom bracket in the front-back direction; a front end and a rear end of the vertical wall are flush with a front end and a rear end of the bottom bracket respectively; and an upper end of the vertical wall constitutes the upper end of the side wall.

[0009] The technical solution described above has the following beneficial effect: in this way, the bottom bracket is arranged at the lower end of the vertical wall, such that the stability of the side wall in a foundation pit is better, and collapse of the side wall caused by uneven stress at the upper end of the culvert section is thus avoided.

[0010] In the technical solution described above, a left side and a right side of the bottom bracket protrude from a left side and a right side of the corresponding vertical wall.

[0011] The technical solution described above has the following beneficial effect: in this way, the stability of the side wall in the foundation pit is further improved.

[0012] In the technical solution described above, the upper end of the vertical wall is dented downwards to form an assembly groove; lower ends on two sides of the top cover protrude downwards to form bosses that match the assembly groove; and the bosses on the two sides of the top cover respectively extend into the assembly grooves at the upper ends of the vertical walls on the corresponding sides.

[0013] The technical solution described above has the following beneficial effect: in this way, the top cover can be embedded into the upper ends of the corresponding two side walls, such that the top cover can be limited in the left-right direction to avoid displacement in the left-right direction.

[0014] In the technical solution described above, first curved holes are formed in ends of every two adjacent vertical walls close to each other on a same side; one end of the first curved hole is located at an end portion of the vertical wall, and the other end of the first curved hole is located on a side of the vertical wall corresponding to an outside of the culvert section; the first curved holes at the ends of every two vertical walls close to each other are aligned with each other and together form one arc-shaped hole; and one of the connecting pieces is inserted into the arc-shaped hole to connect the two adjacent vertical walls.

[0015] The technical solution described above has the following beneficial effect: in this way, the two adjacent vertical walls in the two adjacent culvert sections are connected to each other by means of the connecting piece, such that any two adjacent vertical walls can be prevented from moving forward and backward.

[0016] In the technical solution described above, a plurality of the first curved holes are vertically formed at intervals in the ends of every two adjacent vertical walls close to each other on the same side in one-to-one correspondence; the corresponding two first curved holes are aligned with each other and together form one arc-shaped hole; and one of the connecting pieces is inserted into each of the arc-shaped holes.

[0017] The technical solution described above has the following beneficial effect: in this way, the two adjacent side walls are in better connection.

[0018] In the technical solution described above, second curved holes are formed in ends of every two adjacent top covers close to each other; one end of the second curved hole is located at an end portion of the top cover, and the other end of the second curved hole is located at an upper end of the top cover; the second curved holes at the ends of every two adjacent top covers close to each other are aligned with each other and together form one arc-shaped hole; and one of the connecting pieces is inserted into the arc-shaped hole to connect the two adjacent top covers.

[0019] The technical solution described above has the following beneficial effect: in this way, the two adjacent top covers can be prevented from moving forward and backward.

[0020] In the technical solution described above, a plurality of the second curved holes are formed at intervals in a left-right direction in the ends of every two adjacent top covers close to each other in one-to-one correspondence; the corresponding two

second curved holes are aligned with each other and together form one arc-shaped hole; and one of the connecting pieces is inserted into each of the arc-shaped holes.

[0021] The technical solution described above has the following beneficial effect: in this way, the two adjacent top covers are in better connection.

[0022] In the technical solution described above, the connecting piece includes an arc-shaped sleeve, an arc-shaped screw and at least two nuts; the arc-shaped sleeve is inserted into the arc-shaped hole, and two ends of the arc-shaped sleeve are located in the arc-shaped hole; the arc-shaped screw passes through the arc-shaped sleeve, and two ends of the arc-shaped screw extend out of the arc-shaped hole; and each of the two ends of the arc-shaped screw is in threaded connection with at least one of the nuts.

[0023] The technical solution described above has the following beneficial effects: the installation is convenient and the effect of connection is excellent.

BRIEF DESCRIPTION OF THE DRAWINGS

[0024] FIG. 1 is an exploded diagram of a culvert section according to Embodiment 1 of the present invention;

[0025] FIG. 2 is an exploded diagram of a culvert section according to Embodiment 2 of the present invention;

[0026] FIG. 3 is an end view of a side wall according to Embodiment 3 of the present invention;

[0027] FIG. 4 is a side view of a side wall according to Embodiment 3 of the present invention;

[0028] FIG. 5 is a top view of a vertical wall according to Embodiment 3 of the present invention;

[0029] FIG. 6 is a schematic diagram of two adjacent vertical walls connected by means of a connecting piece according to Embodiment 3 of the present invention;

[0030] FIG. 7 is an end view of a top cover according to Embodiment 3 of the present invention;

[0031] FIG. 8 is a top view of a top cover according to Embodiment 3 of the present invention;

[0032] FIG. 9 is a side view of a top cover according to Embodiment 3 of the present invention;

[0033] FIG. 10 is a schematic diagram of two adjacent top covers connected by means of a connecting piece according to Embodiment 3 of the present invention;

[0034] FIG. 11 is a schematic diagram of connection between culvert sections according to Embodiment 2 or Embodiment 3 of the present invention;

[0035] FIG. 12 is a side view of connection between two adjacent culvert sections according to Embodiment 3 of the present invention;

[0036] FIG. 13 is an exploded diagram of a connecting piece according to Embodiment 3 of the present invention;

[0037] FIG. 14 is an end view of construction of an assembly type culvert according to Embodiment 4 of the present invention; and

[0038] FIG. 15 is a side view of construction of an assembly type culvert according to Embodiment 4 of the present invention.

[0039] In the drawings: 1-culvert section; 11-top cover; 111-boss; 112-second curved hole; 12-side wall; 121-bottom bracket; 122-vertical wall; 1221-assembly groove; 1222-first curved hole; 2-connecting piece; 21-arc-shaped sleeve; 22-arc-shaped screw; 23-nut; 3-concrete filling layer; 4-gravel layer; 5-crushed stone layer; 6-concrete layer; 7-settlement joint; and 8-connection joint.

DETAILED DESCRIPTION

[0040] The principles and features of the present invention will be further described hereinafter with reference to the accompanying drawings, and the embodiments listed herein are only intended to explain the present invention, rather than limiting the scope of the present invention.

[0041] Embodiment 1:

[0042] As shown in FIG. 1, the present embodiment provides a culvert section, including a top cover 11 and two side walls 12. The two side walls 12 are vertically arranged in a front-back direction and distributed at intervals in a left-right direction. The top cover 11 is horizontally arranged in the front-back direction, and a left side and a right side of the top cover are supported at upper ends of the two side walls 12 respectively. An upper end of each of the side walls 12 is connected to a corresponding side of the top cover 11. In this way, each culvert section is assembled from the top cover and the two side walls, such that the whole culvert section can be transported more conveniently (that is, each culvert section may be divided into the top cover and the two side walls for transport).

[0043] At this time, the top cover and the two side walls are combined into an n-shaped structure. The lower ends on the two sides of the top cover and the upper ends of the

two side walls may be bonded by cement slurry (the upper ends of the side walls are connected to the lower ends on the corresponding sides of the top cover after solidification of the cement slurry).

[0044] Preferably, in the technical solution described above, the side wall 12 includes a bottom bracket 121 and a vertical wall 122. The bottom bracket 121 is a strip plate horizontally arranged in the front-back direction. The vertical wall 122 is vertically arranged on the bottom bracket 121 in the front-back direction. A front end and a rear end of the vertical wall 122 are flush with a front end and a rear end of the bottom bracket 121 respectively. An upper end of the vertical wall 122 constitutes the upper end of the side wall 12. The bottom bracket is arranged at the lower end of the vertical wall, such that the stability of the side wall in a foundation pit is improved, and collapse of the side wall caused by uneven stress at the upper end of the culvert section is thus avoided. Further preferably, a left side and a right side of the bottom bracket 121 protrude from a left side and a right side of the corresponding vertical wall 122 (i.e., the cross section of the side wall is inverted T-shaped), which further improves the stability of the side wall in the foundation pit. In addition, the bottom bracket may further increase the area of contact between the lower end of the side wall and the bottom of the foundation pit, thus reducing the pressure of the side wall on the bottom of the foundation pit and avoiding or reducing the risk of downward settlement of the side wall in the later period.

[0045] In the technical solution described above, the length of the top cover 11 and the length of the side wall 12 are the same, and thus, after the top cover and the two side walls are assembled, their front and rear ends are aligned.

[0046] In the technical solution described above, the side wall 12 and the top cover 11 are both reinforced concrete prefabricated members (in which the bottom bracket and the vertical wall are integrally cast with reinforced concrete), which are high in strength and low in cost.

[0047] The top cover may be slab-shaped, or has an n-shaped cross section (i.e., the top cover has downward bends on both sides).

[0048] Embodiment 2:

[0049] As shown in FIG. 2, on the basis of Embodiment 1, in this embodiment, in order to improve the stability of connection between the top cover and the upper ends of the two side walls, the upper end of the vertical wall 122 is dented downwards to form an assembly groove 1221, lower ends on two sides of the top cover 11 protrude downwards to form bosses 111 that match the assembly groove 1221, and the bosses

111 on the two sides of the top cover 11 respectively extend into the assembly grooves 1221 at the upper ends of the vertical walls 122 on the corresponding sides. In this way, the top cover may be embedded into the upper ends of the corresponding two side walls, such that the top cover may be limited in the left-right direction to avoid displacement in the left-right direction.

[0050] The assembly groove 1221 may be a U-shaped groove, which is formed by recessing the middle of the vertical wall and runs through the front end and the rear end of the vertical wall. At this point, the boss is a strip-shaped protrusion arranged in the front to rear direction and may exactly extend into the assembly groove. At this point, during assembly of the side wall and the top cover, a groove wall of the assembly groove and an edge of the boss may be roughened in advance, then the assembly groove is uniformly filled with cement slurry, and the top cover is assembled in place at the upper end of the side wall (the bonding effect of the cement slurry may be obviously improved by roughening treatment).

[0051] Embodiment 3:

[0052] As shown in FIGS. 3-12, this embodiment provides an assembly type culvert, including a plurality of culvert sections 1 as described in Embodiment 1 or Embodiment 2. The plurality of culvert sections 1 is sequentially arranged in a front-back direction. Ends of every two adjacent culvert sections 1 close to each other are attached and aligned, and the ends of every two adjacent culvert sections 1 close to each other are connected by means of a connecting piece 2 (at this time, every two adjacent side walls on the same side are connected by means of a connecting piece, and every two adjacent top covers are also connected by means of a connecting piece), such that the culvert can be assembled from a plurality of culvert sections. Thus, the construction length of the assembly type culvert is not limited. In addition, every two adjacent culvert sections are connected by means of the connecting piece, such that the stability of the whole assembly type culvert is improved. Further, the culvert sections can be prefabricated, and then transported to a site for assembly construction. Therefore, the construction efficiency is high.

[0053] In the technical solution described above, first curved holes 1222 are formed in ends of every two adjacent vertical walls 122 close to each other on the same side. One end of the first curved hole 1222 is located at an end portion of the vertical wall 122, and the other end of the first curved hole 1222 is located on a side of the vertical wall 122 corresponding to an outside of the culvert section 1. The first curved holes 1222 at the ends of every two vertical walls 122 close to each other are aligned with each other and

together form one arc-shaped hole. One of the connecting pieces 2 is inserted into the arc-shaped hole to connect the two adjacent vertical walls 122. In this way, the two adjacent vertical walls in the two adjacent culvert sections are connected to each other by means of the connecting piece, such that any two adjacent vertical walls can be prevented from moving forward and backward.

[0054] In the technical solution described above, a plurality of first curved holes 1222 are vertically formed at intervals in the ends of every two adjacent vertical walls 122 close to each other on the same side in one-to-one correspondence. The corresponding two first curved holes 1222 are aligned with each other and together form one arc-shaped hole. One of the connecting pieces 2 is inserted into each of the arc-shaped holes. In this way, the two adjacent side walls are in better connection.

[0055] The first curved hole 1222 needs to be reserved during prefabrication of the side wall, and a centering angle of the first curved hole needs to be less than 90°. For example, the two first curved holes are also aligned with each other to form one arc-shaped hole with a centering angle of less than 180° after the two adjacent side walls are aligned front and back.

[0056] In the technical solution described above, second curved holes 112 are formed in ends of every two adjacent top covers 11 close to each other. One end of the second curved hole 112 is located at an end portion of the top cover 11, and the other end of the second curved hole 112 is located at an upper end of the top cover 11. The second curved holes 112 at the ends of every two adjacent top covers 11 close to each other are aligned with each other and together form one arc-shaped hole. One of the connecting pieces 2 is inserted into the arc-shaped hole to connect the two adjacent top covers 11. In this way, no forward or backward displacement occurs between the two adjacent top covers.

[0057] In the technical solution described above, a plurality of second curved holes 112 are formed at intervals in a left-right direction in ends of every two adjacent top covers 11 close to each other in one-to-one correspondence. The corresponding two second curved holes 112 are aligned with each other and together form one arc-shaped hole. One of the connecting pieces 2 is inserted into each of the arc-shaped holes. In this way, the two adjacent top covers are in better connection.

[0058] A centering angle of the second curved hole is also less than 90°. When the two adjacent top covers are aligned with each other, the two second curved holes are aligned to form one arc-shaped hole with a centering angle of less than 180°.

[0059] As shown in FIG. 13, in the technical solution described above, the connecting piece 2 includes an arc-shaped sleeve 21, an arc-shaped screw 22 and at least two nuts 23. The arc-shaped sleeve 21 is inserted into the arc-shaped hole, and two ends of the arc-shaped sleeve are located in the arc-shaped hole. The arc-shaped screw 22 passes through the arc-shaped sleeve 21, and two ends of the arc-shaped screw extend out of the arc-shaped hole. Each of the two ends of the arc-shaped screw 22 is in threaded connection with at least one of the nuts 23. Therefore, the installation is convenient, and the effect of connection is excellent.

[0060] The surfaces of the arc-shaped sleeve, the arc-shaped screw and the nut are all steel or iron members, and all need to be galvanized for preservative treatment, and of course they may also be aluminum alloy members.

[0061] Threads (their function is similar to that of a conventional arc-shaped bolt) are formed in both ends of the arc-shaped screw. Centering angles of both the arc-shaped screw and the arc-shaped sleeve are less than 180°.

[0062] Further preferably, the connecting piece further includes a gasket. The gaskets are arranged at both ends of the arc-shaped screw, and clamped on the top cover or the vertical wall by the nuts at the same end.

[0063] When each culvert section is assembled in place, there is still a gap at the side where the two bottom brackets are close to each other (concrete may be poured into the gap in the later period to form a concrete filling layer 3).

[0064] Embodiment 4:

[0065] As shown in FIGS. 14 and 15, this embodiment provides a method for constructing the assembly type culvert described in Embodiment 3. The method includes the following steps.

[0066] In step 1, directions of two side edges of the culvert are marked on the ground (may be marked with lime lines), and a foundation pit is excavated according to a designed depth of the foundation pit in the directions.

[0067] In step 2, an inner bottom of the foundation pit is compacted (until it is flat, and no obvious footprints may appear when adults step on it); the bottom of the foundation pit is filled with a crushed stone layer 5 with a depth of 0.5m to 1.5m (preferably 1m to 1.3m); then a gravel layer 4 with a depth of 0.3m to 0.6m (preferably 0.4m to 0.5m) is filled at an upper end of the crushed stone layer 5; the gravel layer 4 is leveled and compacted; and a concrete layer 6 (C30 concrete) with a thickness of 0.15m to 0.3m (preferably 0.2m) is poured at the upper end of the gravel layer 4. The concrete layer 6

needs to be leveled manually, and a vibrating pump may be used for tamping if necessary.

[0068] In step 3, settlement joints 7 are transversely arranged on the concrete layer 6 (i.e., joints that cut off the concrete layer in a left-right direction are arranged, such that the concrete layer is divided into multiple sections in a front and back direction); and the settlement joints 7 are filled with bitumastic oakum. One settlement joint 7 is arranged every two culvert sections 1, and the settlement joints 7 need to be aligned with preset connection joints 8 of the two adjacent culvert sections 1;

[0069] In step 4, the side wall is hoisted and placed in place at the upper end of the concrete layer 6 according to a preset line; a concrete filling layer 3 is filled between the bottom brackets on two sides; the upper end of the concrete filling layer 3 is leveled to be flush with the upper ends of the sides of the bottom brackets on two sides close to each other (preferably, at this time, steel bars are exposed on the sides of the two bottom brackets close to each other in the same culvert section, the exposed steel bars on the sides of the two bottom brackets close to each other in the same culvert section may be bound together, and then, concrete is poured to form a concrete filling layer, such that the concrete filling layer may connect the two bottom brackets of the same culvert section together and form them integrally; and it should be noted that a gap aligned with the connection joint is formed at an end portion of the concrete filling layer 3 in each culvert section, i.e., the concrete filling layer in each culvert section is arranged independently, and the gap between every two adjacent concrete filling layers constitutes a part of the connection joint); the assembly groove at the upper end of the side wall is filled with cement slurry; the top cover is mounted in place; and then the two adjacent side walls and the two adjacent top covers are respectively connected by means of the connecting pieces. The gap between every two adjacent culvert sections constitutes the connection joint 8. Each of the settlement joints 7 is aligned with one of the connection joints 8 (only one of the connection joints at both ends of the same culvert section is aligned with the settlement joint). The connection joint is filled with cement slurry (M10 cement mortar). The cement slurry is leveled after joint filling. Water is regularly sprayed for curing. After seven days of curing, an inner side and an outer side of the culvert corresponding to the connection joint are coated with a layer of 911 polyurethane waterproof coating. After that, a back-attached rubber water stop (its width may be 25cm, and it may be pasted with special glue) is pasted.

[0070] In step 5, splayed walls (reinforced concrete structures) are poured at two ends of the culvert (i.e., the ends where the culvert sections at two ends face away from each

other), and the foundation pit is back-filled and compacted after the splayed walls are solidified, i.e., the construction of the assembly type culvert (the structures and the pouring methods of the splayed walls belong to the prior art, and thus will not be repeated herein) is completed.

[0071] The above descriptions are only preferred embodiments of the present invention, and are not intended to limit the present invention. Any modifications, equivalent substitutions, improvements and the like made within the spirit and principles of the present invention should be included within the scope of protection of the present invention.

CLAIMS

1. An assembly type culvert, comprising a plurality of culvert sections (1), wherein the plurality of culvert sections (1) are sequentially arranged in a front-back direction; ends of every two adjacent culvert sections (1) close to each other are attached and aligned; and the ends of every two adjacent culvert sections (1) close to each other are connected by means of a connecting piece (2).

2. The assembly type culvert according to claim 1, wherein the culvert section (1) comprises a top cover (11) and two side walls (12); the two side walls (12) are vertically arranged in the front-back direction and distributed at intervals in a left-right direction; the top cover (11) is horizontally arranged in the front-back direction, and a left side and a right side of the top cover are supported at upper ends of the two side walls (12) respectively; an upper end of each of the side walls (12) is connected to a corresponding side of the top cover (11); and every two adjacent top covers (11), as well as every two adjacent side walls (12) on a same side, are respectively connected by means of the connecting piece (2).

3. The assembly type culvert according to claim 2, wherein the side wall (12) comprises a bottom bracket (121) and a vertical wall (122); the bottom bracket (121) is a strip plate horizontally arranged in the front-back direction; the vertical wall (122) is vertically arranged on the bottom bracket (121) in the front-back direction; a front end and a rear end of the vertical wall (122) are flush with a front end and a rear end of the bottom bracket (121) respectively; and an upper end of the vertical wall (122) constitutes the upper end of the side wall (12).

4. The assembly type culvert according to claim 3, wherein a left side and a right side of the bottom bracket (121) protrude from a left side and a right side of the corresponding vertical wall (122).

5. The assembly type culvert according to claim 3, wherein the upper end of the vertical wall (122) is dented downwards to form an assembly groove (1221), lower ends on two sides of the top cover (11) protrude downwards to form bosses (111) that match the assembly groove (1221), and the bosses (111) on the two sides of the top cover (11) respectively extend into the assembly grooves (1221) at the upper ends of the vertical walls (122) on the corresponding sides.

6. The assembly type culvert according to claim 3, wherein first curved holes (1222) are formed in ends of every two adjacent vertical walls (122) close to each other on a same side; one end of the first curved hole (1222) is located at an end portion of the vertical wall (122), and the other end of the first curved hole (1222) is located on a side of the vertical wall (122) corresponding to an outside of the culvert section (1); the first curved holes (1222) at the ends of every two vertical walls (122) close to each other are aligned with each other and together form one arc-shaped hole; and one of the connecting pieces (2) is inserted into the arc-shaped hole to connect the two adjacent vertical walls (122).

7. The assembly type culvert according to claim 6, wherein a plurality of the first curved holes (1222) are vertically formed at intervals in the ends of every two adjacent vertical walls (122) close to each other on the same side in one-to-one correspondence; the corresponding two first curved holes (1222) are aligned with each other and together form one arc-shaped hole; and one of the connecting pieces (2) is inserted into each of the arc-shaped holes.

8. The assembly type culvert according to claim 3, wherein second curved holes (112) are formed in ends of every two adjacent top covers (11) close to each other; one end of the second curved hole (112) is located at an end portion of the top cover (11), and the other end of the second curved hole (112) is located at an upper end of the top cover (11); the second curved holes (112) at the ends of every two adjacent top covers (11) close to each other are aligned with each other and together form one arc-shaped hole; and one of the connecting pieces (2) is inserted into the arc-shaped hole to connect the two adjacent top covers (11).

9. The assembly type culvert according to claim 8, wherein a plurality of the second curved holes (112) are formed at intervals in the ends of every two adjacent top covers (11) in a left-right direction in one-to-one correspondence; the corresponding two second curved holes (112) are aligned with each other and together form one arc-shaped hole; and one of the connecting pieces (2) is inserted into each of the arc-shaped holes.

10. The assembly type culvert according to any one of claims 6-9, wherein the connecting piece (2) comprises an arc-shaped sleeve (21), an arc-shaped screw (22) and at least two nuts (23); the arc-shaped sleeve (21) is inserted into the arc-shaped hole, and two ends of the arc-shaped sleeve are located in the arc-shaped hole; the arc-shaped screw (22) passes through the arc-shaped sleeve (21), and two ends of the arc-shaped screw extend out of the arc-shaped hole; and each of the two ends of the arc-shaped screw (22) is in threaded connection with at least one of the nuts (23).

PATENTANSPRÜCHE

1. Zusammengebauter Durchlass, dadurch gekennzeichnet, dass er eine Vielzahl von Durchlassabschnitten (1) umfasst, wobei die Vielzahl von Durchlassabschnitten (1) aufeinanderfolgend in einer Richtung von vorne nach hinten angeordnet sind; wobei Enden von jeweils zwei benachbarten Durchlassabschnitten (1), die sich nahe beieinander befinden, befestigt und ausgerichtet sind; und wobei die Enden von jeweils zwei benachbarten Durchlassabschnitten (1), die sich nahe beieinander befinden, mittels eines Verbindungsstücks (2) verbunden sind.

2. Zusammengesetzter Durchlass nach Anspruch 1, dadurch gekennzeichnet, dass der Durchlassabschnitt (1) eine obere Abdeckung (11) und zwei Seitenwände (12) umfasst; wobei die beiden Seitenwände (12) vertikal in der Richtung von vorne nach hinten angeordnet sind und in Abständen in einer Richtung von links nach rechts verteilt sind; wobei die obere Abdeckung (11) horizontal in der Richtung von vorne nach hinten angeordnet ist und eine linke Seite und eine rechte Seite der oberen Abdeckung jeweils an den oberen Enden der beiden Seitenwände (12) gehalten werden; wobei ein oberes Ende jeder der Seitenwände (12) mit einer entsprechenden Seite der oberen Abdeckung (11) verbunden ist; und wobei alle zwei benachbarten oberen Abdeckungen (11) sowie alle zwei benachbarten Seitenwände (12) auf einer gleichen Seite jeweils mittels des Verbindungsstücks (2) verbunden sind.

3. Zusammengebauter Durchlass nach Anspruch 2, dadurch gekennzeichnet, dass die Seitenwand (12) eine Bodenkonsole (121) und eine vertikale Wand (122) umfasst; wobei die Bodenkonsole (121) eine horizontal in der Richtung von vorne nach hinten angeordnete Streifenplatte ist; wobei die vertikale Wand (122) vertikal auf der Bodenkonsole (121) in der Richtung von vorne nach hinten angeordnet ist; wobei ein vorderes Ende und ein hinteres Ende der vertikalen Wand (122) mit einem vorderen Ende bzw einem hinteren Ende der Bodenkonsole (121) bündig sind; und wobei ein oberes Ende der vertikalen Wand (122) das obere Ende der Seitenwand (12) bildet.

4. Zusammengesetzter Durchlass nach Anspruch 3, dadurch gekennzeichnet, dass eine linke Seite und eine rechte Seite der Bodenkonsole (121) von einer linken Seite und einer rechten Seite der entsprechenden vertikalen Wand (122) vorstehen.

5. Zusammengesetzter Durchlass nach Anspruch 3, dadurch gekennzeichnet, dass das obere Ende der vertikalen Wand (122) nach unten eingedellt ist, um eine Montagenut (1221) zu bilden, wobei untere Enden auf zwei Seiten der oberen Abdeckung (11) nach unten vorstehen, um Vorsprünge (111) zu bilden, die mit der Montagenut (1221) übereinstimmen, und wobei sich die Vorsprünge (111) auf den beiden Seiten der oberen Abdeckung (11) jeweils in die Montagenuten (1221) an den oberen Enden der vertikalen Wände (122) auf den entsprechenden Seiten erstrecken.

6. Zusammengesetzter Durchlass nach Anspruch 3, dadurch gekennzeichnet, dass erste gekrümmte Löcher (1222) in den Enden von jeweils zwei nahe beieinander liegenden vertikalen Wänden (122) nahe beieinander auf derselben Seite ausgebildet sind; wobei ein Ende des ersten gekrümmten Lochs (1222) an einem Endabschnitt der vertikalen Wand (122) angeordnet ist und das andere Ende des ersten gekrümmten Lochs (1222) an einer Seite der vertikalen Wand (122) angeordnet ist, die einer Außenseite des Durchlassabschnitts (1) entspricht; wobei die ersten gekrümmten Löcher (1222) an den Enden von jeweils zwei nahe beieinander liegenden vertikalen Wänden (122) zueinander ausgerichtet sind und zusammen ein bogenförmiges Loch bilden; und wobei eines der Verbindungsstücke (2) in das bogenförmige Loch eingesetzt wird, um die beiden benachbarten vertikalen Wände (122) zu verbinden.

7. Zusammengesetzter Durchlass nach Anspruch 6, dadurch gekennzeichnet, dass eine Vielzahl von ersten gekrümmten Löchern (1222) vertikal in Abständen in den Enden von jeweils zwei nahe beieinander liegenden vertikalen Wänden (122) auf derselben Seite in eins-zu-eins-Entsprechung ausgebildet sind; wobei die entsprechenden zwei ersten gekrümmten Löcher (1222) zueinander ausgerichtet sind und zusammen ein bogenförmiges Loch bilden; und wobei eines der Verbindungsstücke (2) in jedes der bogenförmigen Löcher eingesetzt ist.

8. Zusammengesetzter Durchlass nach Anspruch 3, dadurch gekennzeichnet, dass zweite gekrümmte Löcher (112) in den Enden von jeweils zwei zwei nahe beieinander liegenden oberen Abdeckungen (11) ausgebildet sind; wobei ein Ende des zweiten gekrümmten Lochs (112) an einem Endabschnitt der oberen Abdeckung (11) angeordnet ist und das andere Ende des zweiten gekrümmten Lochs (112) an einem oberen Ende der oberen Abdeckung (11) angeordnet ist; wobei die zweiten gekrümmten Löcher (112) an den Enden von jeweils zwei nahe beieinander liegenden oberen Abdeckungen miteinander ausgerichtet sind und zusammen ein bogenförmiges Loch bilden; und wobei eines der Verbindungsstücke (2) in das bogenförmige Loch eingeführt wird , um die zwei benachbarten oberen Abdeckungen (11) zu verbinden.

9. Zusammengesetzter Durchlass nach Anspruch 8, dadurch gekennzeichnet, dass eine Vielzahl von zweiten gekrümmten Löchern (112) in Abständen in den Enden von jeweils zwei benachbarten oberen Abdeckungen (11) in einer Richtung von links nach rechts in eins-zu-eins-Entsprechung ausgebildet sind; wobei die entsprechenden zwei zweiten gekrümmten Löcher (112) zueinander ausgerichtet sind und zusammen ein bogenförmiges Loch bilden; und wobei eines der Verbindungsstücke (2) in jedes der bogenförmigen Löcher eingesetzt ist.

10. Zusammengesetzter Durchlass nach einem der Ansprüche 6 bis 9, dadurch gekennzeichnet, dass das Verbindungsstück (2) eine bogenförmige Hülse (21), eine bogenförmige Schraube (22) und mindestens zwei Muttern (23) umfasst; wobei die bogenförmige Hülse (21) in das bogenförmige Loch eingesetzt ist und zwei Enden der bogenförmigen Hülse in dem bogenförmigen Loch angeordnet sind; wobei die bogenförmige Schraube (22) durch die bogenförmige Hülse (21) hindurchgeht und zwei Enden der bogenförmigen Schraube aus dem bogenförmigen Loch herausragen; und wobei jedes der beiden Enden der bogenförmigen Schraube (22) mit mindestens einer der Muttern (23) in Gewindeverbindung steht.

FIGURES

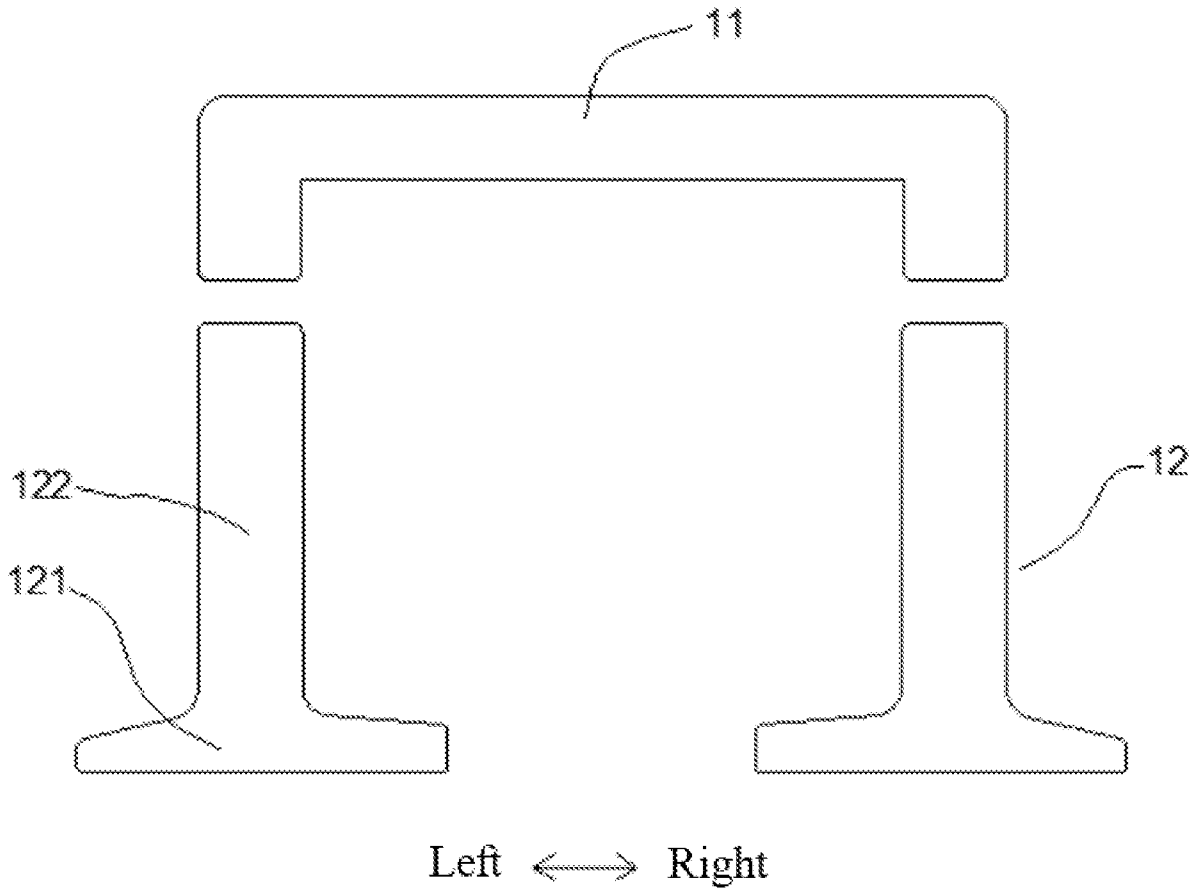


FIG. 1

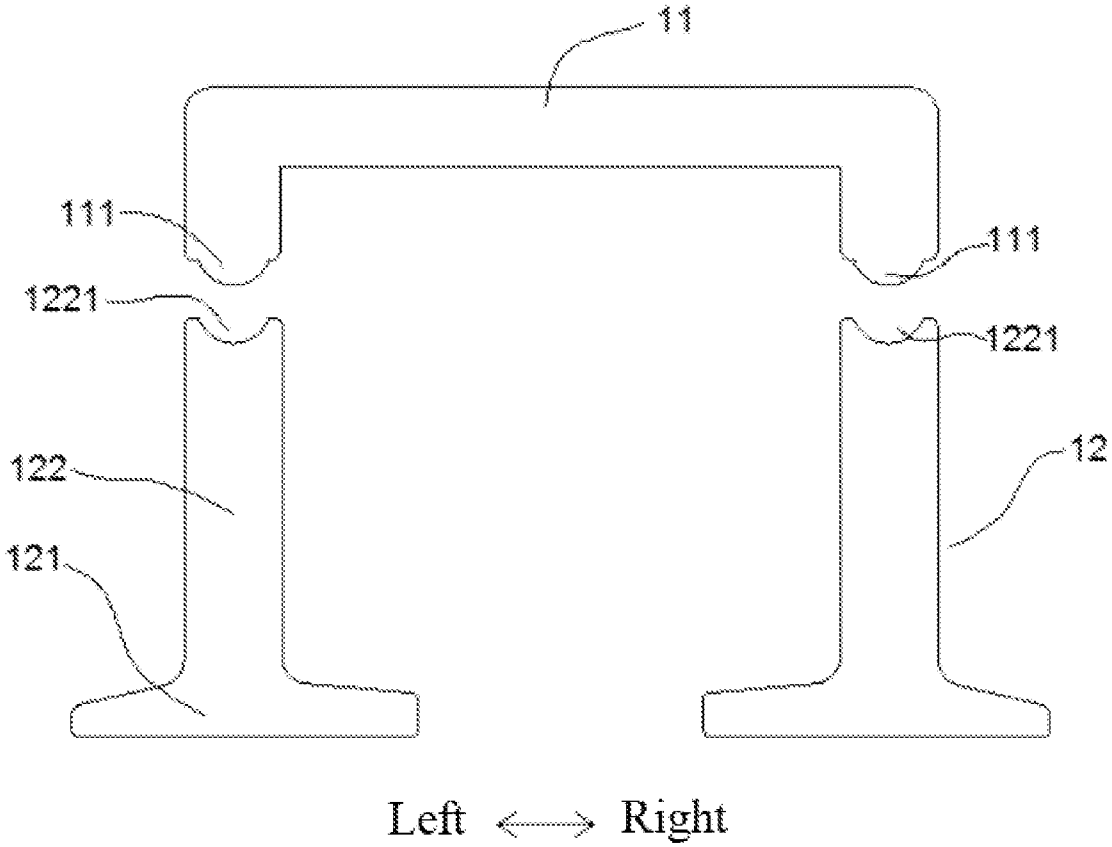

11
111
111
1221
1221
122
12
121
Left ⟷ Right

FIG. 2

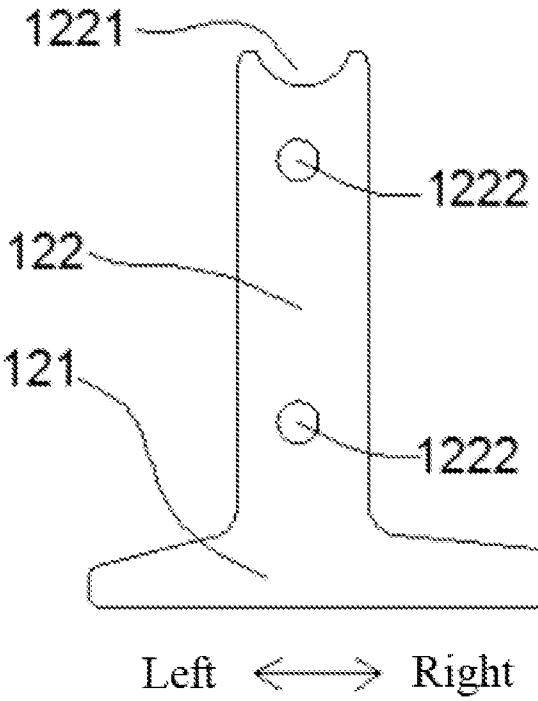

1221
1222
122
121
1222
Left ⟷ Right

Fig.3

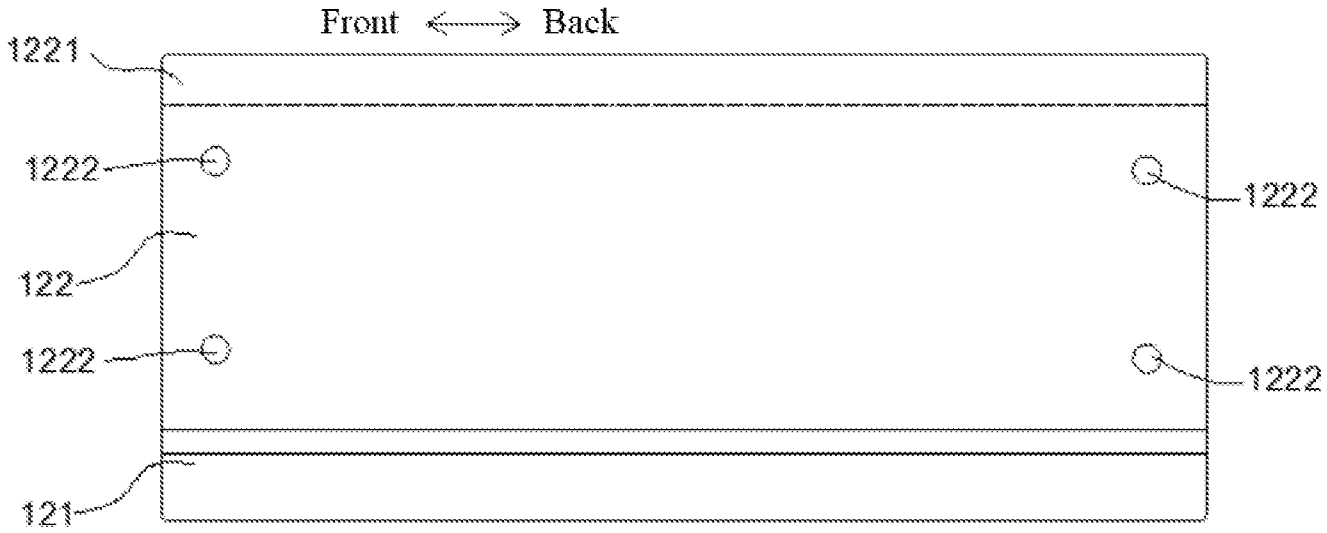

Front ⟷ Back
1221
1222
1222
122
1222
1222
121

FIG.4

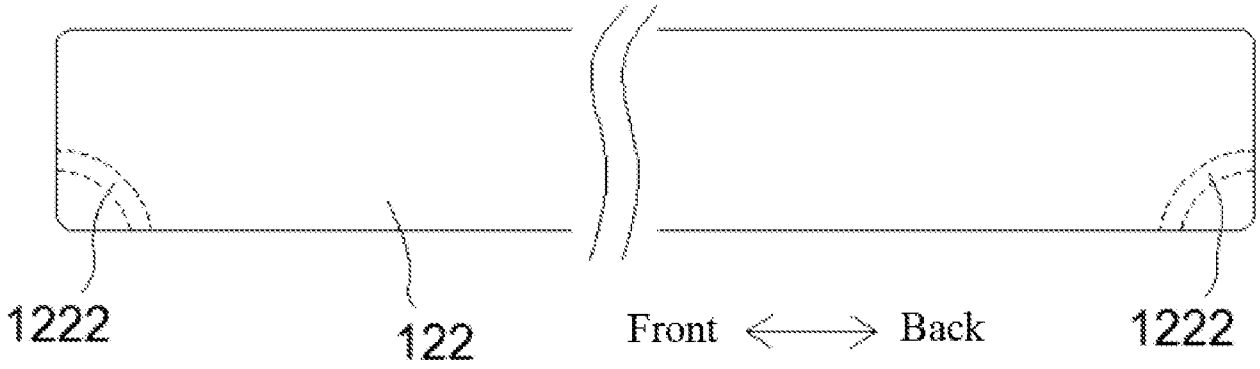
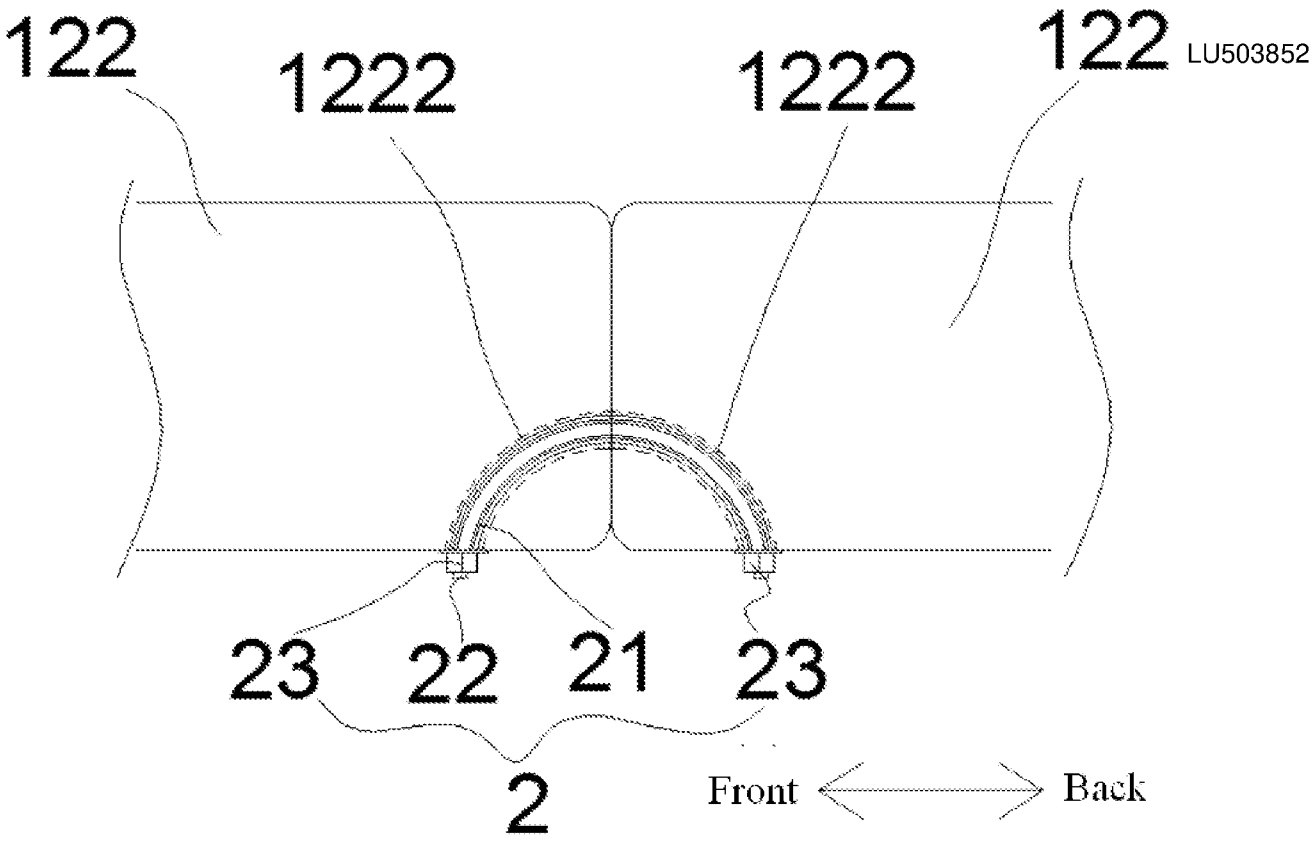

1222
122
Front ⟷ Back
1222

FIG. 5



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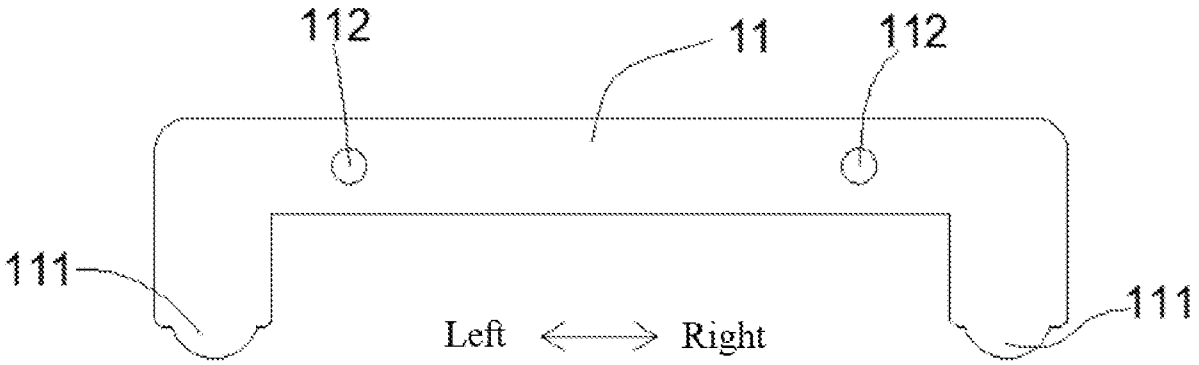

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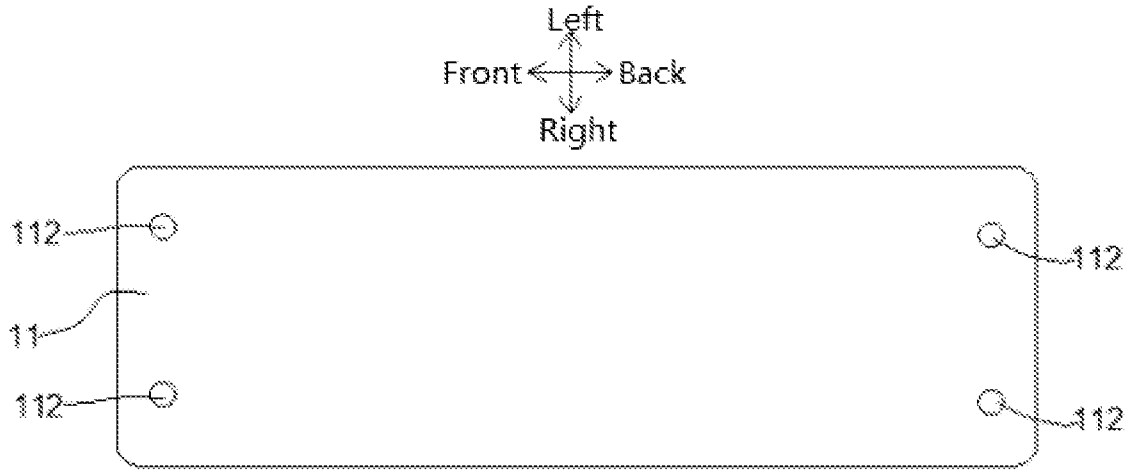

FIG. 8

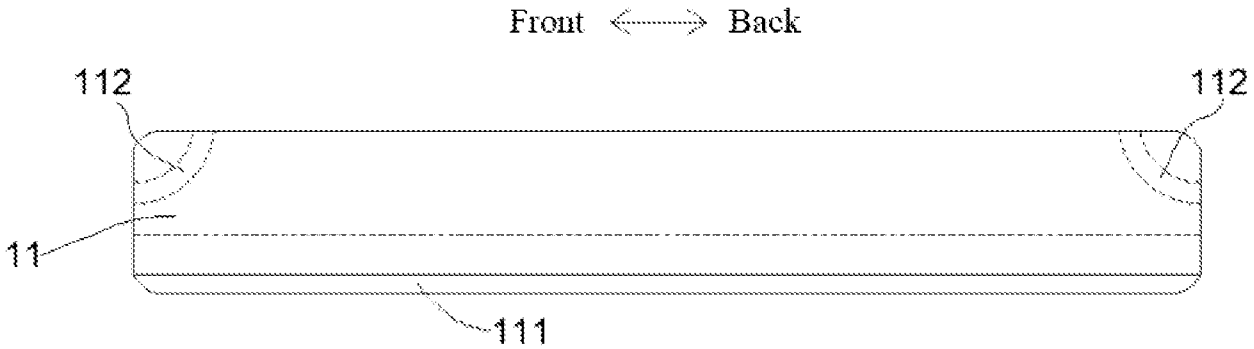

FIG. 9

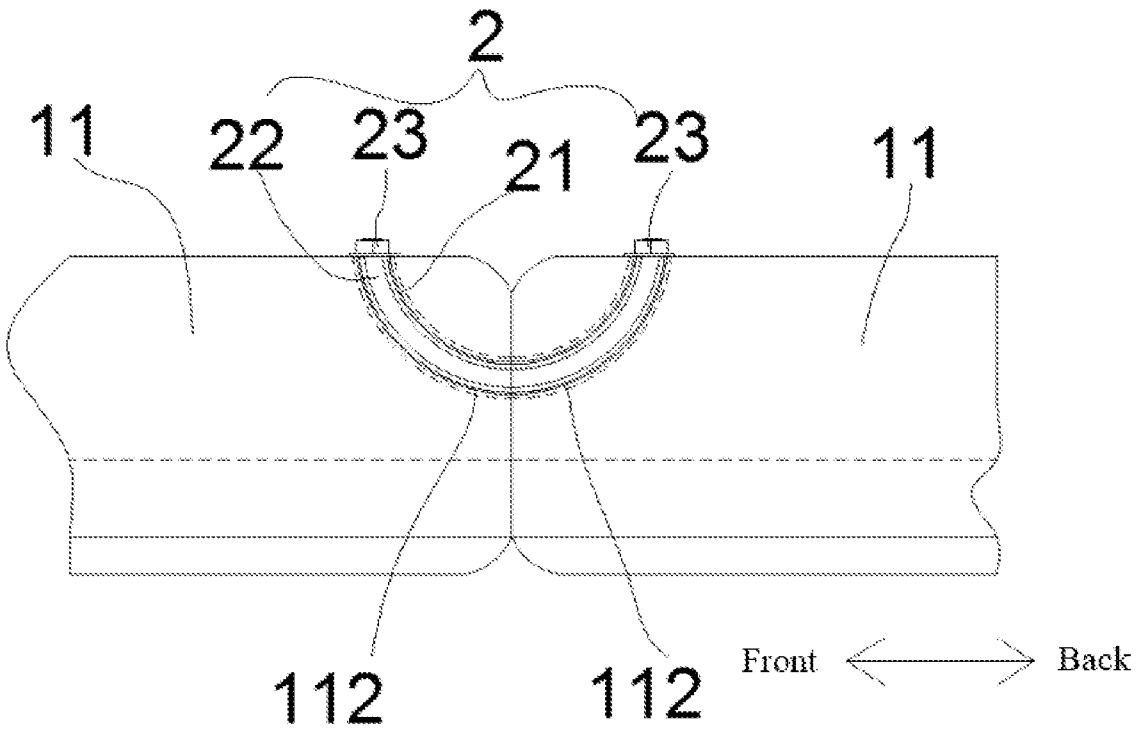

FIG. 10

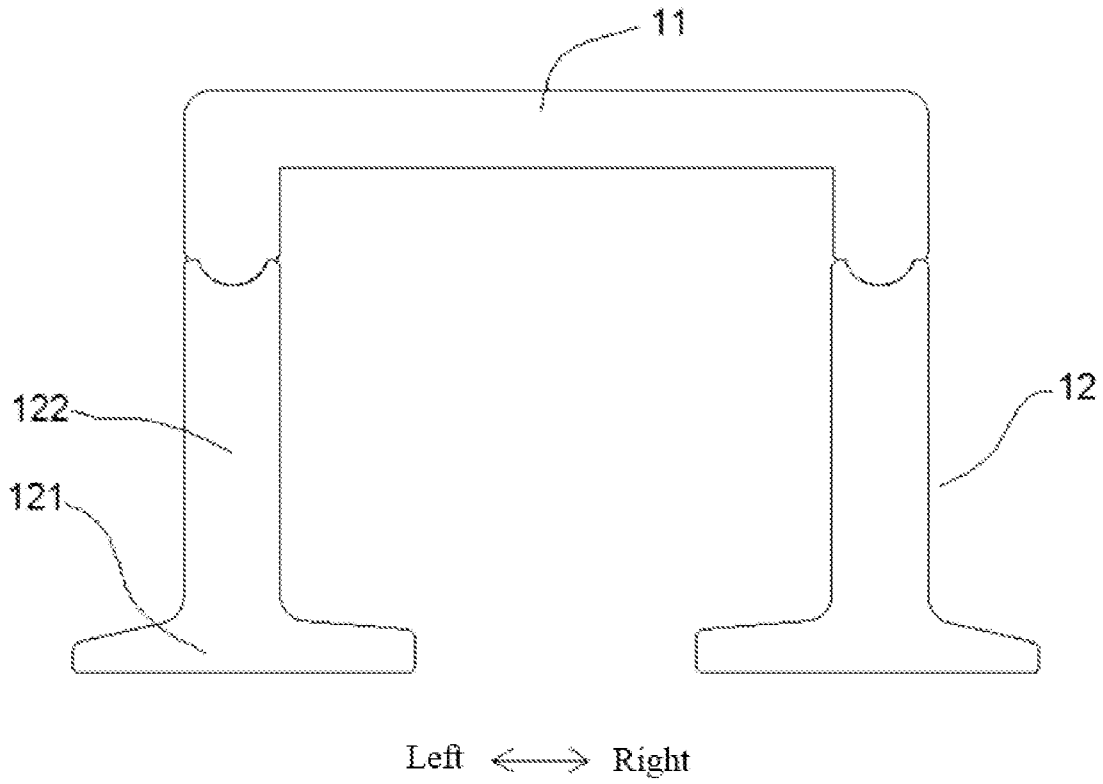

FIG. 11

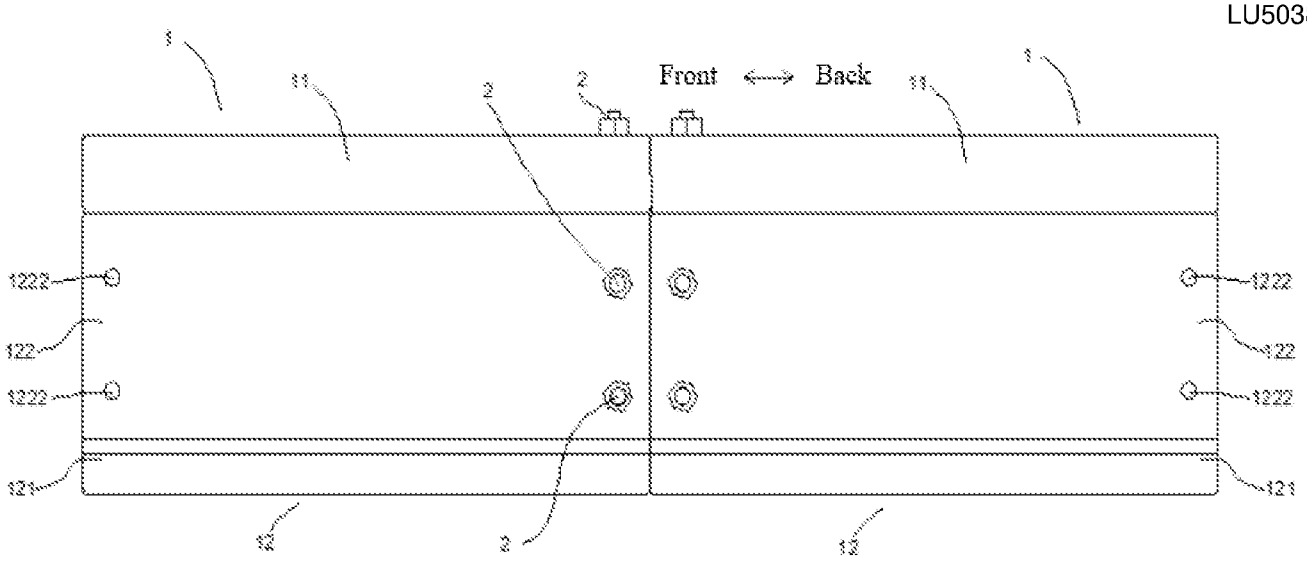
Front ⟷ Back
1
11
2
2
11
1
1222
122
1222
1222
122
1222
121
121
12
3
13

FIG. 12

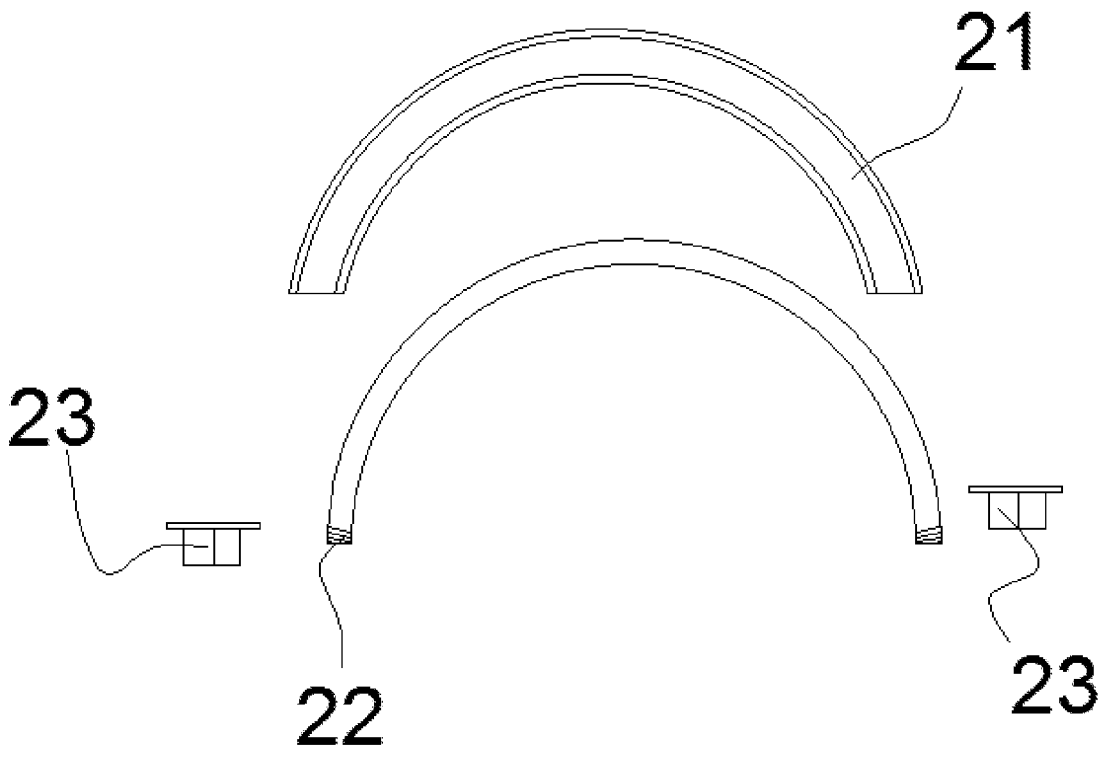
21
23
22
23

FIG. 13

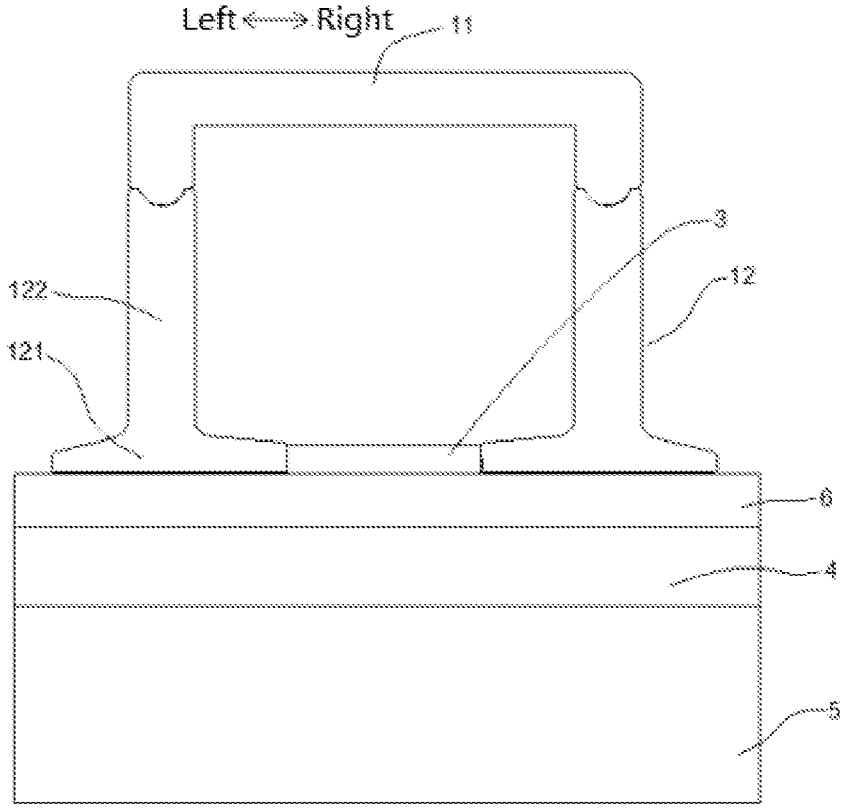

FIG. 14

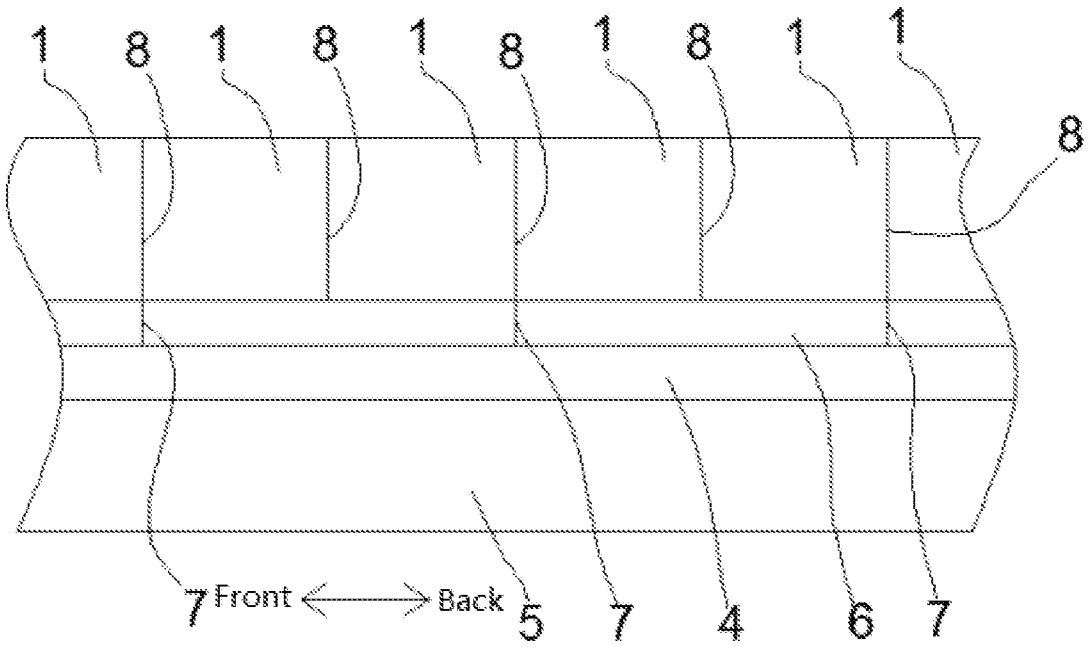

FIG. 15