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(54) ELECTROLYSIS SYSTEM WITH BUSBAR CONSTRUCTION

ELEKTROLYSESYSTEM MIT SAMMELSCHIENENKONSTRUKTION

SYSTÈME D'ÉLECTROLYSE EQUIPÉ D'UNE STRUCTURE DE BARRE OMNIBUS

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EP 2 491 165 B1

Description

Background of the invention

[0001] The invention relates to the busbar construction of an electrolysis tank intended for the electrolytic recovery of metals, the tank being designed so that the bracket members of the electrodes can be of the same length or almost the same length. The object of the invention comprises a busbar construction between the first and second electrolysis tanks intended for the electrolytic recovery of metals according to the preamble of Claim 1, the busbar construction being placed on top of the side wall between the first and second electrolysis tanks, the first and second electrolysis tanks containing electrodes, such as anodes and/or cathodes, the electrodes having a first bracket member and a second bracket member, and the electrodes being supported on the busbar construction by means of the first and second bracket members, the busbar construction including a main busbar and a first support member and a second support member.

[0002] Typically, an electrolysis plant intended for the electrolytic recovery of metals, such as copper, nickel and zinc comprises a large number of electrolysis tanks, which are series connected in groups, so that the anode of a previous tank is electrically connected to the cathode of the following tank by a busbar, which is on the wall between the tanks and which is highly conductive and generally made of copper.

[0003] The patent specification FI 104839 discloses a busbar construction of an electrolysis tank intended for the electrolytic recovery of metals, wherein a highly conductive main busbar is placed on top of the side wall of the electrolysis tank, electrically connecting the anodes of a previous tank and the cathodes of the following tank with each other. The main busbar comprises side bulges of different heights and continuous in the longitudinal direction of the busbar, so that some electrodes in the tank are lower than the others. Support members are also placed on top on the side edge of the electrolysis tank, supporting the side of the electrodes, which is not in contact with the main busbar. The support members are isolated from the main busbar and they consist of an electrically conductive material, whereby they balance the potential between the electrodes of the same sign in the tank. In this known busbar construction, both the lower bulges of the main busbar and the lower support members are placed closer to the edge part of the tank wall, whereby the bracket members of the electrodes that are placed lower are made shorter than those of the electrodes that are placed higher, for which the upper bulges and support members are placed close to the centre part of the tank wall. The support member of the electrodes that are placed higher is placed on top of the main busbar between its bulges. Outside the main busbar, next to its higher side bulge on top of the side edge of the tank and the insulating material, the support member of the lower

electrodes is placed. In practice, it does not matter whether the cathodes or anodes are placed on the lower or higher bulges. In the busbar construction disclosed in the specification, both the main busbar, the support members and the insulating material are continuous in the longitudinal direction of the tank, meaning that the material is of essentially equal strength throughout the length of the tank.

[0004] One problem with the solution disclosed in the specification is that the main busbar and the support member, i.e., the so-called potential balancing bar are superimposed, whereby there is a risk of a short circuit, as in the electrolysis, an acid solution, such as acid fog, the washing water of electrodes, electrolyte dripping from the electrodes, other impurities and refuse may be able to drip and run on top of the bars, whereby a short circuit is generated between the main busbar and the potential bar, impairing the efficiency and breaking the busbar and the insulator. In the solution disclosed in the specification, bracket members of different lengths must be used for the anodes and the cathodes, so that the bracket member of the electrode that is placed on the support member arranged between the bulges of the main busbar is longer than that of the electrode that is placed on the support member arranged outside the main busbar.

[0005] WO 2009/062005 A1 discloses an electrolytic cell contact bar according to preamble of claim 1. SU 703605 discloses a busbar assembly having contact projections.

Short description of the invention

[0006] The object of the invention herein is to provide an electrolysis system which avoids the disadvantages of previous constructions.

[0007] The object of the invention is achieved by the electrolysis system according to the independent Claim 1.

[0008] The preferred embodiments of the invention are disclosed in the dependent claims.

[0009] In the solution according to the invention, the busbar construction between the first and the second electrolysis tanks is arranged on top of the side edge of the electrolysis tank or on top of the side edges of adjacent tanks, so that the highly conductive main busbar electrically connects the anodes of the previous tank and the cathodes of the following tank with each other, whereby a connection in series of the tanks is provided in a known manner. The busbar construction according to the invention is arranged so that the support members of the electrodes, such as the potential balancing bars, are placed on the side of the main busbar, instead of on top as in the previous known solutions. The support members of the electrodes, such as the potential balancing bars, are located on the side of the main busbar on both sides thereof. The busbar construction according to the invention enables the bracket members of the electrodes to be almost as long or even of the same length. Accord-

ing to a preferred solution, the bracket members of electrodes that are supported on the busbar construction are of equal lengths.

[0010] In the present invention, an insulator is arranged on top of the side wall(s) between the first and second electrolysis tanks, which insulator can consist of, e.g., fibreglass, resin, a resin fibreglass mixture or other insulating material. In the insulator, spaces are arranged for the main busbar and the support members of the electrodes, such as the potential balancing bars, preferably so that the main busbar and the support members can be placed on top of the insulator. The busbar construction thus comprises an insulator for insulating the main busbar from the support members. The shape of the insulator is preferably one which also functions as insulator between the support members of the electrodes, such as potential balancing bars, and the main busbar. The insulator preferably comprises grooves for the support members of the electrodes and, between these grooves, a space for the main busbar.

[0011] The insulator is preferably made by mould casting, whereby one or more bulges can be provided in the insulator, by which bulges the main busbar and/or the support members of the electrodes can be locked in place. In that case, the main busbar and/or the support members of the electrodes should have, in respective places, one or more notches adaptable in the bulge, which can be made, e.g., by machining. This so-called locking nodule is preferably formed in the insulator in a place, wherein the bottom of the main busbar and/or the support member of the electrode is placed and, in this way, the main busbar and/or the support member of the electrode can be locked in place without an occurrence of movement in wrong places. In other words, locking members, such as locking nodule and/or locking notch, are arranged in the insulator and the main busbar and/or the support member. Thus, one or more locking nodules are arranged in the insulator and one or more locking notches are arranged in the main busbar, the locking nodule of the insulator fitting in the locking notch, to lock the insulator and the main busbar in place with respect to each other in the longitudinal direction of the electrode tank. To hold the support member in place, one or more locking nodules are arranged in the insulator and one or more locking notches are arranged in the support member, the locking nodule of the insulator fitting in the locking notch, to lock the insulator and the support member in place with respect to each other in the longitudinal direction of the electrode tank. The locking nodule and the locking notch can also be made in an opposite manner, i.e., one or more locking notches are arranged in the insulator, in which notch the one or more locking nodules in the main busbar and/or support member fits, to lock the insulator and the main busbar and/or the insulator and the support member in place with respect to each other in the longitudinal direction of the electrode tank. The main busbar and/or the support members of the electrodes can also be locked in place in the insulator, e.g., so that

locking nodules or similar locking means are arranged in the insulator at its both ends in a place, where the main busbar and/or the support members of the electrodes begin or end. The insulator can be continuous throughout the length of the tank side wall or it can be assembled of parts.

[0012] The insulator can also be one, which comprises locations for the bracket members of the anodes and those of the cathodes, so that between the bracket members of the anode and the cathode, a piece of insulator remains, by means of which the bracket members are not allowed to contact each other and, at the same time, the bracket members remain in place in the longitudinal direction of the main busbar. According to a preferred embodiment, the locations of the bracket members in the insulator are ones, where the location on top of which the bracket member rests, is preferably on the same level as the location of the main busbar or support member, respectively, with which the support member should have a contact. In other words, the insulator can comprise distribution combs between the bracket members of the electrodes, keeping the bracket members of the electrode in correct places in the longitudinal direction of the main busbar.

[0013] On top of the insulator, preferably in the grooves in the insulator, the support members of the electrodes, such as potential balancing bars, are arranged. The potential balancing bars can have any shape and their shape is not essential to this invention. However, the potential balancing bars are located on the side of the main busbar, so that a piece of insulator remains between the main busbar and the potential balancing bar.

[0014] The main busbar is provided with one or more first bulges in the longitudinal direction of the electrolysis tank and with one or more second bulges, on which the bracket member of the electrode can be supported, so that the current may flow between the main busbar and the electrode.

[0015] In an embodiment of the invention, the electrodes, i.e., the cathodes and the anodes are arranged alternately in the electrolysis tank and they "hang" in the tank by their bracket members, contacting the busbar constructions arranged on top of the side walls of the electrolysis tanks. The electrodes are symmetric or almost symmetric with respect to their centre lines, a possible deviation being 30 mm at the most; generally, less than 20 mm or even less than 5 mm in the lateral direction of the electrode. The busbar construction according to the invention provides that the possible asymmetry of the electrodes does not matter, when the bracket members in some cases extend slightly further than normal. Conventionally, the electrodes are arranged symmetrically in tanks, so that when viewed from the longitudinal direction of the busbar construction, an anode and an anode and a cathode and a cathode are always side by side in the busbar construction. The electrodes can also be arranged asymmetrically, so that an anode and a cathode are side by side. The bracket members of one electrode

are in contact with different busbar constructions. The second bracket member of the electrode is in contact with the main busbar of the first busbar construction and the second bracket member is in contact with the potential balancing bar of the second busbar construction. In other words, when the first bracket member of the electrode is supported on the main busbar of the busbar construction, the second bracket member of the electrode is supported on the support member of the second subsequent busbar construction. In the embodiment, next to the first bracket member of the anode in the electrolysis tank, a notch is arranged in the potential balancing bar of the cathode in the first busbar construction, so that the bracket member of the anode is allowed to pass by the potential balancing bar of the cathode without contacting the same and to extend on top of the main busbar, so that a contact is provided between the bracket member of the anode and the main busbar. The second bracket member of the anode in the second busbar construction has settled on top of the potential balancing bar of the anode and a notch is preferably arranged by machining or in another way from the main busbar next to the bracket member of the anode, in order for the long bracket member to fit in place without contacting the main busbar. The first bracket member of the cathode next to the anode in the electrolysis tank has settled on top of the potential balancing bar of the cathode in the first busbar construction, whereby a notch is preferably arranged by machining or in another way from the main busbar next to the bracket member of the cathode, in order for the long bracket member to fit in place without contacting the main busbar. Next to the second bracket member of the cathode in the second busbar construction, a notch is arranged in the potential balancing bar of the anode, so that the bracket member of the cathode is allowed to pass by the potential balancing bar of the anode without contacting it and to extend on top of the main busbar, so that a contact is provided between the main busbar and the bracket member of the cathode. The first bulge and/or the second bulge of the main busbar is thus dimensions and/or shaped so that when the bracket member is in contact with the support member, the bracket member is at a distance from the first or second bulge on the side of the said support member of the main busbar. The support member is also dimensioned and/or shaped so that the bracket member is at a distance from the support member at the location of the part between the main busbar and the electrolysis tank, where the bracket member is placed in contact with the main busbar.

[0016] The purpose of the invention is to make the busbar construction so that the support members of the electrodes, such as potential balancing bars, are located on the left and right sides of the main busbar, i.e., on the side of the main busbar. Such a construction enables a smaller main busbar construction, which in turn reduces the material needed and, thus, the price of the main busbar. At the same time, only one insulator can be used, comprising spaces for the support members and the main

busbar. The busbar construction according to the invention can also employ electrodes, which have almost as long or as long bracket members. As the support member on top of the main busbar must be insulated from the main busbar, two insulators have been used in previously known solutions. The construction of the invention also enables larger tolerances, such as differences in length of the electrode bars and the installation tolerances of the busbar construction and the electrolysis tanks, without weakening or discontinuing the action of the busbar construction. Generally, the new construction enables larger tolerances in dimensioning and installation. The construction of the invention improves the efficiency of the process by decreasing the risk of short circuits, particularly between the cathode potential bar and the main busbar, which in the prior art specification FI 104839 are superimposed. Now, the generation of salt bridges can be substantially reduced, as the solution does not remain on top of the insulator between two contacts of the main busbar. In the solution according to the invention, the need for maintenance in the process is smaller, and the construction does not need to be washed that often.

List of figures

[0017] In the following, some preferred embodiments of the invention are described in detail with reference to the appended figures, wherein:

- Fig. 1 shows the busbar construction of the electrolysis tank according to the invention;
- Fig. 2 shows a preferred embodiment of the busbar construction according to the invention;
- Fig. 3 shows an embodiment of the busbar construction according to the invention as viewed next to the bracket members of the anodes;
- Fig. 4 shows an embodiment of the busbar construction according to the invention as viewed next to the bracket members of the cathodes; and
- Fig. 5 shows a second embodiment of the busbar construction according to the invention.

Detailed description of the invention

[0018] Fig. 1 shows how the anodes 1 and the cathodes 2 are lowered into the electrolysis tanks A, B. According to the figure, the anodes 1 and the cathodes 2 are placed alternately in the electrolysis tank A, B and, in this case, slightly on different levels, the anodes 1 being slightly lower than the cathodes 2. The anodes 1 and the cathodes 2 can either be placed on the same or different levels in the electrolysis tank A, B. Both the anodes 1 and the cathodes 2 are supported by means of their bracket members 3, 4 on the busbar construction 6 according to the invention, which is placed on top of the side wall 5 between the first electrolysis tank A and the second electrolysis tank B. Naturally, the bracket members 3, 4 of the anodes 1 and the cathodes 2 can also

be either on the same or different levels. The side wall 5 refers to the side wall 5 of two adjacent electrolysis tanks A, B, which is formed from one or more adjacent parts. The busbar construction 6, in turn, comprises an insulator 7, on top of which the main busbar 8 and the potential balancing bars 9, 10 are placed.

[0019] Fig. 2 shows a busbar construction 6 according to the invention, which is arranged between two electrolysis tanks and wherein the main busbar 8 is placed on top of the insulator 7. The potential balancing bars 9, 10 are located on the sides of the main busbar 8, so that a piece of insulator 7 remains between the main busbar 8 and the potential balancing bar 9, 10. In this example, there are also preferably similar edges formed from the insulator 7 on both sides of the potential balancing bar 9, 10, but this is not necessary for the invention, as long as the potential balancing bars 9, 10 remain in place in the busbar construction 6. The anodes 1 and cathodes 2 (not shown) are placed alternately in the electrolysis tanks A, B (not shown), whereby their bracket members 3, 4 also settle alternately in the busbar construction 6. Thus, the figure shows the bracket members of electrodes of two different electrolysis tanks. As shown in the figure, the bracket members of the anodes and the cathodes are preferably of the same or almost the same length. In the arrangement according to the figure, the bracket members 3 of the anodes and the bracket members 4 of the cathodes are preferably located on slightly different levels, but they can also be located on the same level. The reference numbers 3A, 3B, 4A, 4B represent the bracket members 3, 4 of the electrodes in the electrolysis tank A and the electrolysis tank B.

[0020] Next to the bracket member 3A of the anode in the electrolysis tank A, a piece has been machined out of the main busbar 8 on side of the potential balancing bar 9 of the anode of the main busbar, so that the bracket member 3A of the anode would not hit the main busbar 8 on this side, but instead, would settle on top of the potential balancing bar 9 of the anode. The bracket member 3B of the anode in the second electrolysis tank B has settled on top of the main busbar 8, and a piece has been machined or in another way taken off the potential balancing bar 10 of the cathode next to the bracket member 3B of the anode.

[0021] The bracket member 4A of the cathode in the electrolysis tank A has settled on top of the main busbar 8, whereby there is a notch for the bracket member 4A of the cathode in the potential balancing bar 9 of the anode next to the bracket member 4A of the cathode for it not to contact the potential balancing bar 9 of the anode. The bracket member 4B of the cathode in the second electrolysis tank B has settled on top of the potential balancing bar 10 of the cathode, and a piece has been machined or in another way taken off the main busbar 8 next to the bracket member 4B of the cathode.

[0022] In the insulator 7, locations 7.3, 7.4 are arranged for the bracket members 3A, 3B of the anodes and the bracket members 4A, 4B of the cathodes, so that be-

tween the bracket members of the anode and the cathode, a piece of insulator 7 remains, by means of which the bracket members are not allowed to contact each other and, at the same time, the bracket members remain in place in the longitudinal direction of the main busbar 8. In other words, the insulator 7 comprises distribution combs between the bracket members 3a, 3b, 4a, 4b of the anodes and the cathodes, keeping the bracket members of the anodes and the cathodes in correct locations in the longitudinal direction of the main busbar.

[0023] Fig. 3 shows the busbar construction 6 according to the invention, viewed next to the bracket members 3A, 3B of the anodes 1 (not shown). This figure does not show any parts behind the bracket members of the anodes, even though they otherwise would perhaps be visible because of their size, i.e., the focus is now on the structures next to the bracket members 3 of the anodes only. In the figure, the bracket members 3A, 3B are the bracket members 3 of two different anodes, which are located in adjacent electrolysis tanks A, B (not shown). In the preferred embodiment of the invention shown in the figure, an insulator 7 is arranged on top of the side wall(s) (not shown) of two adjacent electrolysis tanks, on top of which insulator the main busbar 8 is placed. Next to the bracket members 3A, 3B of the anodes, the main busbar has such a shape, that when the bracket member 3B of the anode on the other side, in this example, on the right, is placed on top of the main busbar 8, the bracket member 3B is in contact with the main busbar 8. The bracket member 3A of the anode on the other side; in this example, on the left, does not contact the main busbar 8 at all, but a space is obtained in the main busbar 8, for example, by machining or in another way, for the left bracket member 3A of the anode without making a contact with the main busbar 8. A potential balancing bar 9, 10 is arranged on both sides of the main busbar 8; however, so that a piece of insulator 7 remains between the main busbar 8 and the potential balancing bar 9, 10. In this example, next to the anodes in the busbar construction 6, the bracket member 3B of the right anode 1 is placed in contact with the main busbar 8, whereby no contact with the potential balancing bar 10 of the cathode is desired. In that case, a piece is removed from the potential balancing bar 10 of the cathode next to the bracket member 3B of the anode by machining or in another way to prevent a contact between the same. Consequently, the right bracket member 3B is settled on top of the main busbar 8 only. Regarding the left bracket member 3A of the anode, the situation is different, as no contact with the main busbar 8 is desired on that side, whereby a notch is made in the main busbar 8 by machining or in another way, due to which the left bracket member 3A will not contact the main busbar 8. Instead, a contact is desired between the left bracket member 3A of the anode and the potential balancing bar 9 of the anode, whereby the bracket member 3A is placed on top of the same.

[0024] In other words, when the first bracket member 3a of the anode 1 of the first electrolysis tank A is sup-

ported on the support member 9 of the busbar construction 6, the second bracket member 3b of the anode 1 is supported on the second bulge 8b of the main busbar 8 of the second subsequent busbar construction 6.

[0025] Fig. 4 shows the busbar construction 6 according to the invention, viewed next to the bracket members 4A, 4B of the cathodes 2 (not shown). The main busbar 8, which is placed on top of the insulator 7 next to the bracket members 4A, 4B of the cathodes, has a shape wherein the bracket member 4A of the cathode on the other side, in this example, on the left, is placed on top of the main busbar 8, so that a contact is made between the bracket member 4A and the main busbar 8. Compared with Fig. 3, the contact of the bracket member 4A of the cathode with the main busbar 8 is, thus, on the opposite side of the main busbar 8 from the contact of the bracket member 3B of the anode with the main busbar 8. The bracket member 4B of the cathode on the other side; in this example, on the right, does not contact the main busbar 8 at all, but a space is obtained in the main busbar 8, for example, by machining or in another way, for the right bracket member 4B of the cathode without making a contact between the main busbar 8 and the bracket member 4B of the cathode. In this example, the potential balancing bar 9 of the anode is on the left side of the main busbar 8 and the potential balancing bar 10 of the cathode is on its right side, so that there is a piece of insulator 7 between the main busbar 8 and the potential balancing bar 9, 10. The bracket member 4B of the right anode is placed in contact with the potential balancing bar 10 of the cathode, whereby no contact with the main busbar 8 is desired. In that case, a notch is made in the main busbar 8 by machining or in another way for the bracket member 4B of the cathode to prevent the contact. Consequently, the right bracket member 4B rests on top of the potential balancing bar 10 of the cathode only. Regarding the bracket member 4A of the left cathode, the situation is different, as a contact with the main busbar 8 on that side is desired. Consequently, a notch is made in the potential balancing bar 9 of the anode by machining or in another way to prevent contact of the left bracket member 4A of the cathode with the potential balancing bar 9 of the anode. Instead, the bracket member 4A of the left cathode settles on top of the main busbar 8, whereby a contact between the same is provided.

[0026] In other words, when the first bracket member 4a of the cathode 2 of the first electrolysis tank A is supported on the first bulge 8a of the main busbar 8 of the busbar construction 6, the second bracket member 4b of the cathode is supported on the support member 10 of the second subsequent busbar construction 6.

[0027] The previous figures show an embodiment of the busbar construction 6 according to the invention, wherein the busbar construction 6 consists of the insulator 7, main busbar 7, the potential balancing bar 9 of the anode and the potential balancing bar 10 of the cathode. On top of the busbar construction 6, the bracket members 3 of the anode and the bracket members 4 of

the cathode are placed, preferably alternating in the longitudinal direction of the busbar construction 6. The previous figures show that an anode and an anode or a cathode and a cathode are always next to each other. The busbar construction according to the invention can also be used so that an anode and a cathode are next to each other. The busbar construction 6 can also have other supplementary parts, such as a supplementary insulator. The supplementary insulator can be, for example, a wall in the longitudinal direction of the main busbar 8, which keeps apart the bracket members 3, 4 of the anodes or the cathodes on different sides of the main busbar 8, so that they do not contact each other at their ends.

[0028] Fig. 5 shows an embodiment of the invention, wherein the busbar construction 6 comprises a supplementary insulator 11 on top of the main busbar 8 to prevent the contact of the bracket members 3, 4 of the electrodes of adjacent electrolysis tanks with each other. In this embodiment, the same supplementary insulator 11 also prevents the contact of the bracket members 3, 4 of the sequential electrodes in the electrolysis tank with each other. In the embodiment shown in the figure, the contact of the bracket members 3, 4 of the electrodes with each other is implemented so that the bracket members 3A, 3B of the electrodes, such as anodes, set at their ends on the supplementary insulator, which is placed on top of the main busbar 8 and the shape of which is preferably one, wherein the bottom of the supplementary insulator settles on top of the main busbar 8 between its first and second bulges and a wall protrudes from the bottom of the supplementary insulator 11 between the bracket members 3A, 3B in the longitudinal direction of the main busbar 8, separating the ends of the bracket members 3A, 3B from each other. The implementation of the bracket members 4A, 4B of the cathodes is similar. The supplementary insulator 11 also comprises walls in the transversal direction of the main busbar 8 to keep the bracket members 3, 4 of the sequential electrodes in the electrolysis tank in place in the longitudinal direction of the main busbar 8. The supplementary insulator 11 can also have a shape other than the one described in this example, such as an elongated piece of even thickness. The shape of the main busbar 8 can also be different from the one shown in the previous figures.

[0029] The present invention is a highly advantageous solution to the busbar construction that has mutually symmetrical bracket members. However, the present busbar construction 6 can also employ electrodes, the bracket members of which are of different lengths either so that the lengths of the bracket members of the anode and the cathode are different from each other or that the lengths of the bracket members on different sides of the electrode are different from each other.

[0030] It is obvious to those skilled in the art that with the technology improving, the basic idea of the invention can be implemented in various ways. Thus, the invention and its embodiments are not limited to the examples de-

scribed above but they may vary within the claims.

Claims

1. An electrolysis system comprising a first and a second electrolysis tank (A, B) that are intended for electrolytic recovery of metals and a busbar construction (6) between the first and the second electrolysis tank (A, B), the busbar construction (6) being placed on top of a side wall (5) between the first and second electrolysis tanks (A, B), the first and the second electrolysis tanks (A, B) comprising electrodes, such as anodes (1) and/or cathodes (2), the electrodes comprising a first bracket member (3a, 4a,) and a second bracket member (3b, 4b), the electrodes being supported to the busbar construction (6) by means of the first and the second bracket members (3a, 3b, 4a, 4b), the busbar construction (6) including a main busbar (8) and a first supporting member (9) and a second supporting member (10), the supporting members (9, 10) being potential balancing bars are arranged on both sides of the main busbar (8), a piece of insulator (7) being arranged between the main busbar (8) and the potential balancing bar (9, 10); **characterized in that** the main busbar (8) is provided with one or more first bulges (8a) that are in the longitudinal direction of the electrolysis tank (A, B) and with one or more second bulges (8b), to which the bracket member (3, 4) of the electrode can be supported so that current is able to move between the main busbar (8) and the electrode.
2. An electrolysis system according to claim 1, **characterised in that** the first bulge (8a) and/or the second bulge (8b) of the main busbar (8) is dimensioned and/or shaped so that when the bracket member (3, 4) is in contact with the support member (9, 10), the bracket member (3, 4) is at a distance from the first or second bulge (8a, 8b) on the side of the said support member (9, 10) of the main busbar (8).
3. An electrolysis system according to claim 1 or 2, **characterised in that** the support member (9, 10) is dimensioned and/or shaped so that the bracket member (3, 4) is at a distance from the support member (9, 10) at the location of the part between the main busbar (8) and the electrode tank (A, B), where the bracket member (3, 4) is placed in contact with the main busbar (8).
4. An electrolysis system according to claim any of claims 1-3, **characterised in that** when the first bracket member (3, 4) of the electrode is supported by the main busbar (8) of the busbar construction (6), the second bracket member (3, 4) of the electrode is supported by the support member (9, 10) of a second subsequent busbar construction (6).
5. An electrolysis system according to claim 4, **characterised in that** when the first bracket member (4a) of the cathode (2) of the first electrolysis tank (A) is supported by the first bulge (8a) of the main busbar (8) of the busbar construction (6), the second bracket member (4b) of the cathode is supported by the support member (10) of the second subsequent busbar construction (6).
6. An electrolysis system according to claim 4, **characterised in that** when the first bracket member (3a) of the anode (1) of the first electrolysis tank (A) is supported by the support member (9) of the busbar construction (6), the second bracket member (3b) of the anode (1) is supported by the second bulge (8b) of the main busbar (8) of the second subsequent busbar construction (6).
7. An electrolysis system according to any of claims 1-6, **characterised in that** a locking means, such as a locking nodule and/or locking notch are arranged in the insulator (7) and the main busbar (8) and/or the support member (9, 10).
8. An electrolysis system according to any of claims 1-7, **characterised in that** one or more locking nodules are arranged on the insulator (7) and one or more locking notches are arranged in the main busbar (8), the locking nodule of the insulator (7) fitting in the locking notch, to lock the insulator (7) and the main busbar (8) in place with respect to each other in the longitudinal direction of the electrode tank (A, B).
9. An electrolysis system according to any of claims 1-8, **characterised in that** one or more locking nodules are arranged on the insulator (7) and one or more locking notches are arranged in the support member (9, 10), the locking nodule of the insulator (7) fitting in the locking notch, to lock the insulator (7) and the support member (9, 10) in place with respect to each other in the longitudinal direction of the electrode tank (A, B).
10. An electrolysis system according to any of claims 1-9, **characterised in that** one or more locking notches are arranged in the insulator (7), the one or more locking nodules on the main busbar (8) and/or the support member (9, 10) fitting in the locking notch, to lock the insulator (7) and the main busbar (8) and/or the insulator (7) and the support member (9, 10) in place with respect to each other in the longitudinal direction of the electrode tank (A, B).

Patentansprüche

1. Elektrolysesystem enthaltend einen ersten und ei-

- nen zweiten Elektrolysebehälter (A, B), die zur elektrolitischen Gewinnung von Metallen vorgesehen sind, und eine Sammelschienenkonstruktion (6) zwischen dem ersten und dem zweiten Elektrolysebehälter (A, B), wobei die Sammelschienenkonstruktion (6) oben auf einer Seitenwand (5) zwischen dem ersten und dem zweiten Elektrolysebehälter (A, B) platziert ist, wobei der erste und zweite Elektrolysebehälter (A, B) Elektroden, wie zum Beispiel Anoden (1) und/oder Kathoden(2), enthält, wobei die Elektroden ein erstes Bügelglied (3a, 4a) und ein zweites Bügelglied (3b, 4b) enthalten, wobei die Elektroden an der Sammelschienenkonstruktion (6) mit Hilfe des ersten und zweiten Bügelglieds (3a, 3b, 4a, 4b) abgestützt sind, wobei die Sammelschienenkonstruktion (6) eine Hauptsammelschiene (8) und ein erstes Stützelement (9) und ein zweites Stützelement (10) enthält, wobei die Stützelemente (9, 10), die Potential-ausgleichende Riegel sind, auf beiden Seiten der Hauptsammelschiene (8) angeordnet sind, wobei ein Stück Isolator (7) zwischen der Hauptsammelschiene (8) und dem Potential-ausgleichenden Riegel (9, 10) angeordnet ist; **dadurch gekennzeichnet, dass** die Hauptsammelschiene (8) mit einer oder mehreren ersten Aufwölbungen (8a), die sich in Längsrichtung des Elektrolysebehälters (A,B) befinden, versehen ist und mit einer oder mehreren zweiten Aufwölbungen (8b), an welchen das Bügelglied (3, 4) der Elektrode abgestützt werden kann, so dass Strom zwischen der Hauptsammelschiene (8) und der Elektrode fließen kann.
2. Elektrolysesystem nach Anspruch 1, **dadurch gekennzeichnet, dass** die erste Aufwölbung (8a) und/oder die zweite Aufwölbung (8b) der Hauptsammelschiene (8) so dimensioniert und/oder geformt ist, dass, wenn das Bügelglied (3, 4) in Kontakt mit dem Stützelement (9, 10) steht, das Bügelglied (3, 4) sich in einem Abstand von der ersten oder zweiten Aufwölbung (8a, 8b) auf der Seite des Stützelements (9, 10) der Hauptsammelschiene (8) befindet.
 3. Elektrolysesystem nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** das Stützelement (9, 10) so dimensioniert und/oder geformt ist, dass sich das Bügelglied (3, 4) in einem Abstand vom Stützelement (9, 10) an der Stelle des Teils zwischen der Hauptsammelschiene (8) und dem Elektrodenbehälter (A, B) befindet, wo das Bügelglied (3, 4) in Kontakt mit der Hauptsammelschiene (8) platziert ist.
 4. Elektrolysesystem nach einem der Ansprüche 1 bis 3, **dadurch gekennzeichnet, dass**, wenn das erste Bügelglied (3, 4) der Elektrode durch die Hauptsammelschiene (8) der Sammelschienenkonstruktion (6) gestützt wird, das zweite Bügelglied (3, 4) der Elektrode durch das Stützelement (9, 10) einer zweiten anschließenden Sammelschienenkonstruktion (6) gestützt wird.
 5. Elektrolysesystem nach Anspruch 4, **dadurch gekennzeichnet, dass**, wenn das erste Bügelglied (4a) der Kathode (2) des ersten Elektrolysebehälters (A) durch die erste Aufwölbung (8a) der Hauptsammelschiene (8) der Sammelschienenkonstruktion (6) gestützt wird, das zweite Bügelglied (4b) der Kathode durch das Stützelement (10) der zweiten anschließenden Sammelschienenkonstruktion (6) gestützt wird.
 6. Elektrolysesystem nach Anspruch 4, **dadurch gekennzeichnet, dass**, wenn das erste Bügelglied (3a) der Anode (1) des ersten Elektrolysebehälters (A) durch das Stützelement (9) der Sammelschienenkonstruktion (6) gestützt wird, das zweite Bügelglied (3b) der Anode (1) durch die zweite Aufwölbung (8b) der Hauptsammelschiene (8) der zweiten anschließenden Sammelschienenkonstruktion (6) gestützt wird.
 7. Elektrolysesystem nach einem der Ansprüche 1 bis 6, **dadurch gekennzeichnet, dass** ein Verriegelungsmittel, wie zum Beispiel eine Verriegelungsknolle und/oder einer Verriegelungskerbe in dem Isolator (7) und der Hauptsammelschiene (8) und/oder dem Stützelement (9, 10) angeordnet sind.
 8. Elektrolysesystem nach einem der Ansprüche 1 bis 7, **dadurch gekennzeichnet, dass** eine oder mehrere Verriegelungsknollen auf dem Isolator (7) angeordnet sind und eine oder mehrere Verriegelungskerven in der Hauptsammelschiene (8) angeordnet sind, wobei die Verriegelungsknolle des Isolators (7) in die Verriegelungskerbe passt, um den Isolator (7) und die Hauptsammelschiene (8) zueinander in Längsrichtung des Elektrodenbehälters (A, B) einzurasten.
 9. Elektrolysesystem nach einem der Ansprüche 1 bis 8, **dadurch gekennzeichnet, dass** eine oder mehrere Verriegelungsknollen auf dem Isolator (7) angeordnet sind und eine oder mehrere Verriegelungskerven in dem Stützelement (9, 10) angeordnet sind, wobei die Verriegelungsknolle des Isolators (7) in die Verriegelungskerbe passt, um den Isolator (7) und das Stützelement (9, 10) zueinander in Längsrichtung des Elektrodenbehälters (A, B) einzurasten.
 10. Elektrolysesystem nach einem der Ansprüche 1 bis 9, **dadurch gekennzeichnet, dass** eine oder mehrere Verriegelungskerven im Isolator (7) angeordnet sind, wobei die eine oder mehreren Verriegelungsknollen auf der Hauptsammelschiene (8) und/oder dem Stützelement (9, 10) in die Verriegelungskerbe passen, um den Isolator (7) und die Hauptsammel-

schiene (8) und/oder den Isolator (7) und das Stützelement (9, 10) zueinander in Längsrichtung des Elektrodenbehälters (A, B) einzurasten.

Revendications

1. Système d'électrolyse comprenant une premier et un second réservoir d'électrolyse (A, B) qui sont destinés à la récupération électrolytique de métaux et une structure de barre omnibus (6) entre le premier et le second réservoir d'électrolyse (A, B), la structure de barre omnibus (6) étant placée au sommet de la paroi latérale (5) entre le premier et le second réservoir d'électrolyse (A, B), le premier et le second réservoir d'électrolyse (A, B) comprenant des électrodes, telles que des anodes (1) et/ou des cathodes (2), les électrodes comprenant un premier élément de console (3a, 4a) et un second élément de console (3b, 4b), les électrodes étant supportées sur la structure de barre omnibus (6) au moyen du premier et du second élément de console (3a, 3b, 4a, 4b), la structure de barre omnibus (6) comprenant une barre omnibus principale (8) et un premier élément de support (9) et un second élément de support (10), les éléments de support (9, 10) étant des barres d'équilibrage de potentiel qui sont agencées sur les deux côtés de la barre omnibus principale (8), une pièce d'isolant (7) étant agencée entre la barre omnibus principale (8) et la barre d'équilibrage de potentiel (9, 10) ; **caractérisé en ce que** la barre omnibus principale (8) est pourvue d'un ou plusieurs premiers renflements (8a) qui sont dans la direction longitudinale du réservoir d'électrolyse (A, B) et d'un ou plusieurs seconds renflements (8b) sur le ou lesquels l'élément de console (3, 4) de l'électrode peut être supporté de sorte que le courant soit à même de se déplacer entre la barre omnibus principale (8) et l'électrode.
2. Système d'électrolyse selon la revendication 1, **caractérisé en ce que** le premier renflement (8a) et/ou le second renflement (8b) de la barre omnibus principale (8) est ou sont dimensionnés et/ou moulés de sorte que, lorsque l'élément de console (3, 4) est en contact avec l'élément de support (9, 10), l'élément de console (3, 4) soit à une distance du premier ou du second renflement (8a, 8b) sur le côté dudit élément de support (9, 10) de la barre omnibus principale (8).
3. Système d'électrolyse selon la revendication 1 ou 2, **caractérisé en ce que** l'élément de support (9, 10) est dimensionné et/ou moulé de sorte que l'élément de console (3, 4) soit à une distance de l'élément de support (9, 10) à l'emplacement de la partie entre la barre omnibus principale (8) et le réservoir d'électrode (A, B) où l'élément de console (3, 4) est placé

en contact avec la barre omnibus principale (8).

4. Système d'électrolyse selon l'une quelconque des revendications 1 à 3, **caractérisé en ce que**, lorsque le premier élément de console (3, 4) de l'électrode est supporté par la barre omnibus principale (8) de la structure de barre omnibus (6), le second élément de console (3, 4) de l'électrode est supporté par l'élément de support (9, 10) d'une seconde structure de barre omnibus ultérieure (6).
5. Système d'électrolyse selon la revendication 4, **caractérisé en ce que**, lorsque le premier élément de console (4a) de la cathode (2) du premier réservoir d'électrolyse (A) est supporté par le premier renflement (8a) de la barre omnibus principale (8) de la structure de barre omnibus (6), le second élément de console (4b) de la cathode est supporté par l'élément de support (10) de la seconde structure de barre omnibus ultérieure (6).
6. Système d'électrolyse selon la revendication 4, **caractérisé en ce que**, lorsque le premier élément de console (3a) de l'anode (1) du premier réservoir d'électrolyse (A) est supporté par l'élément de support (9) de la structure de barre omnibus (6), le second élément de console (3b) de l'anode (1) est supporté par le second renflement (8b) de la barre omnibus principale (8) de la seconde structure de barre omnibus ultérieure (6).
7. Système d'électrolyse selon l'une quelconque des revendications 1 à 6, **caractérisé en ce qu'un** moyen de verrouillage, tel qu'un nodule de verrouillage et/ou une encoche de verrouillage, est ménagé dans l'isolant (7) et la barre omnibus principale (8) et/ou l'élément de support (9, 10).
8. Système d'électrolyse selon l'une quelconque des revendications 1 à 7, **caractérisé en ce qu'un** ou plusieurs nodules de verrouillage est ou sont agencés sur l'isolant (7) et une ou plusieurs encoches de verrouillage est ou sont ménagées dans la barre omnibus principale (8), le nodule de verrouillage de l'isolant (7) s'ajustant dans l'encoche de verrouillage, pour verrouiller l'isolant (7) et la barre omnibus principale (8) en place l'un par rapport à l'autre dans la direction longitudinale du réservoir d'électrode (A, B) .
9. Système d'électrolyse selon l'une quelconque des revendications 1 à 8, **caractérisé en ce qu'un** ou plusieurs nodules de verrouillage est ou sont agencés sur l'isolant (7) et une ou plusieurs encoches de verrouillage est ou sont ménagées dans l'élément de support (9, 10), le nodule de verrouillage de l'isolant (7) s'ajustant dans l'encoche de verrouillage, pour verrouiller l'isolant (7) et l'élément de support

(9, 10) en place l'un par rapport à l'autre dans la direction longitudinale du réservoir d'électrode (A, B).

10. Système d'électrolyse selon l'une quelconque des revendications 1 à 9, **caractérisé en ce qu'**une ou plusieurs encoches de verrouillage est ou sont ménagées dans l'isolant (7), les un ou plusieurs nodules de verrouillage sur la barre omnibus principale (8) et/ou l'élément de support (9, 10) s'ajustant dans l'encoche de verrouillage, pour verrouiller l'isolant (7) et la barre omnibus principale (8) et/ou l'isolant (7) et l'élément de support (9, 10) en place l'un par rapport à l'autre dans la direction longitudinale du réservoir d'électrode (A, B).

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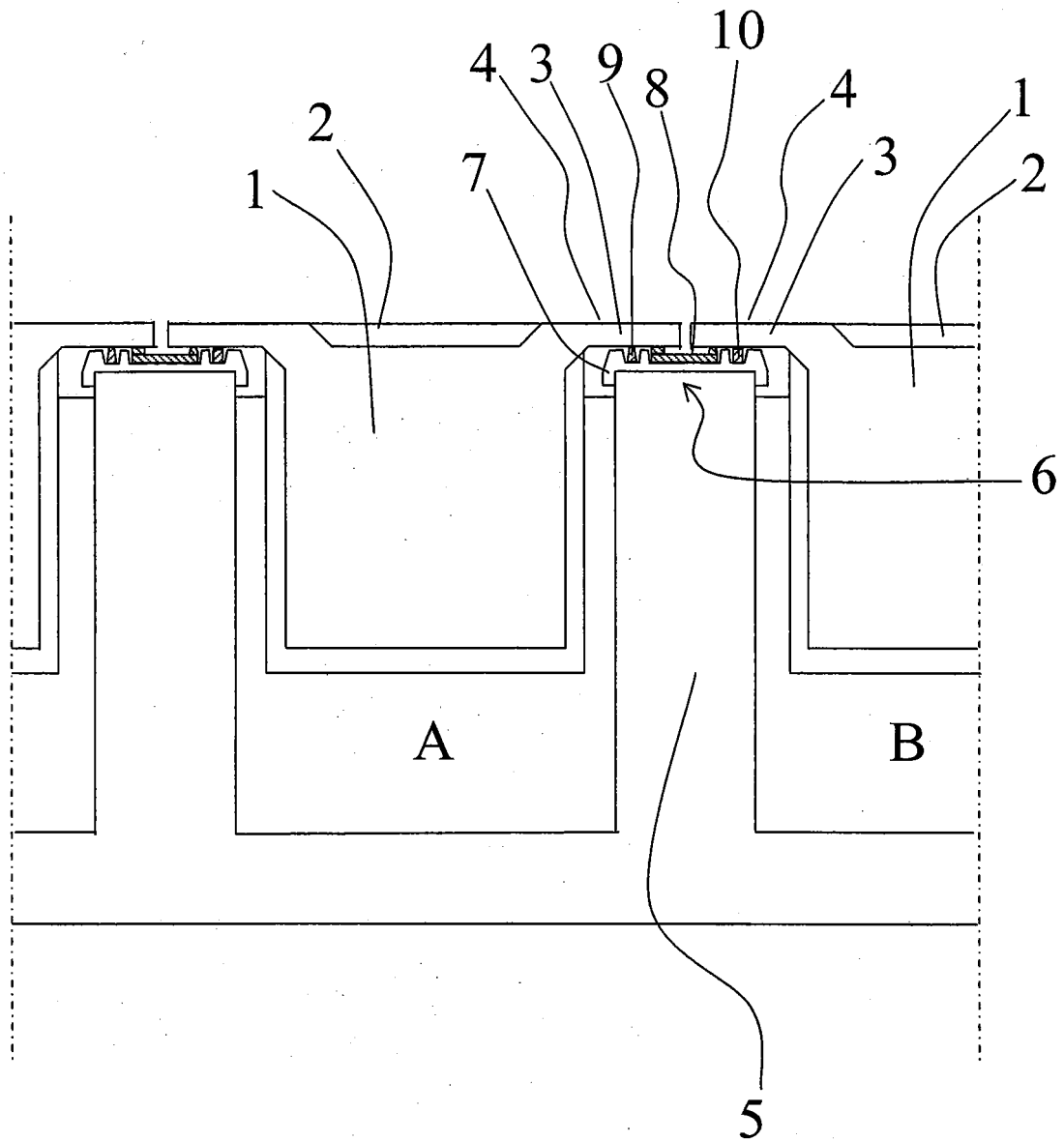


Fig. 1

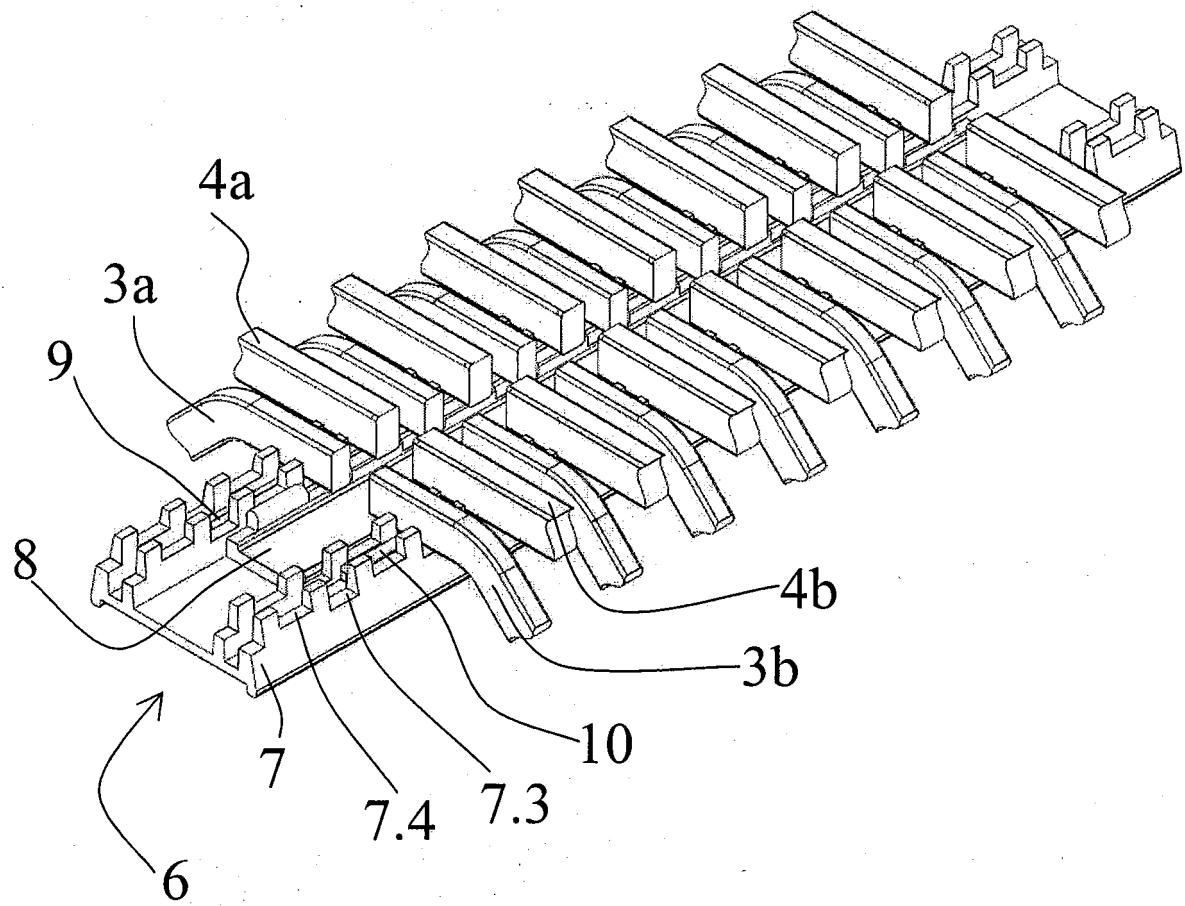


Fig. 2

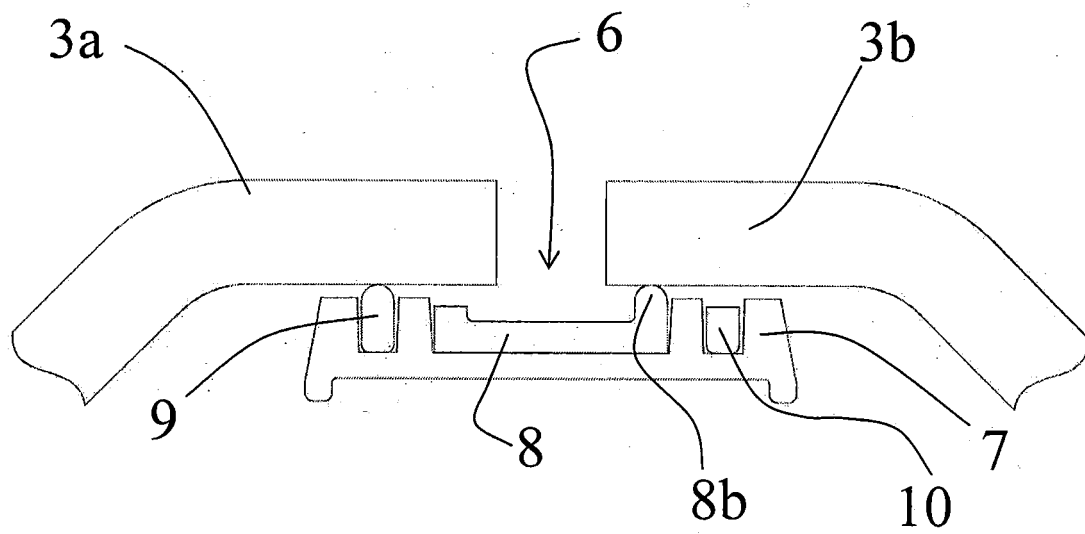


Fig. 3

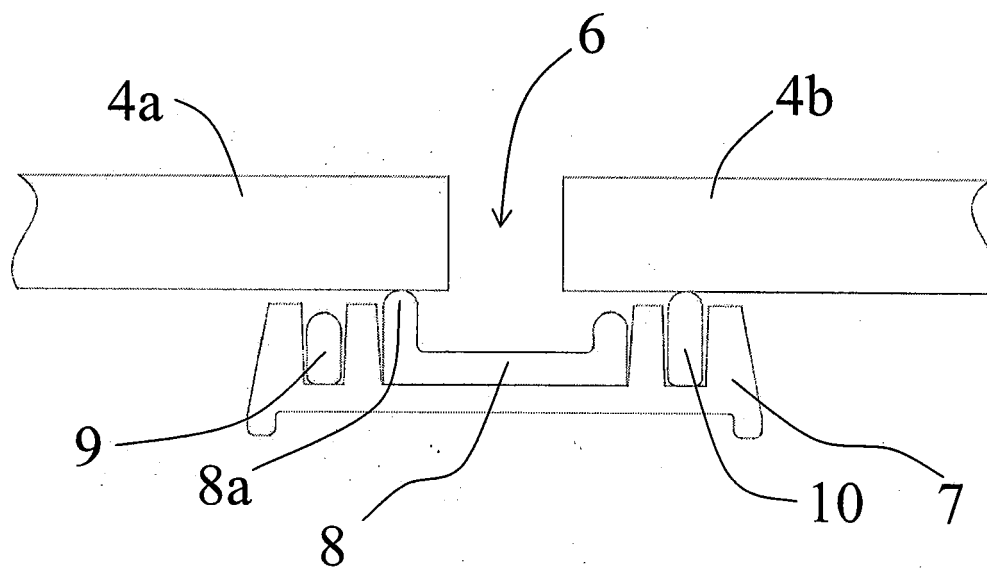


Fig. 4

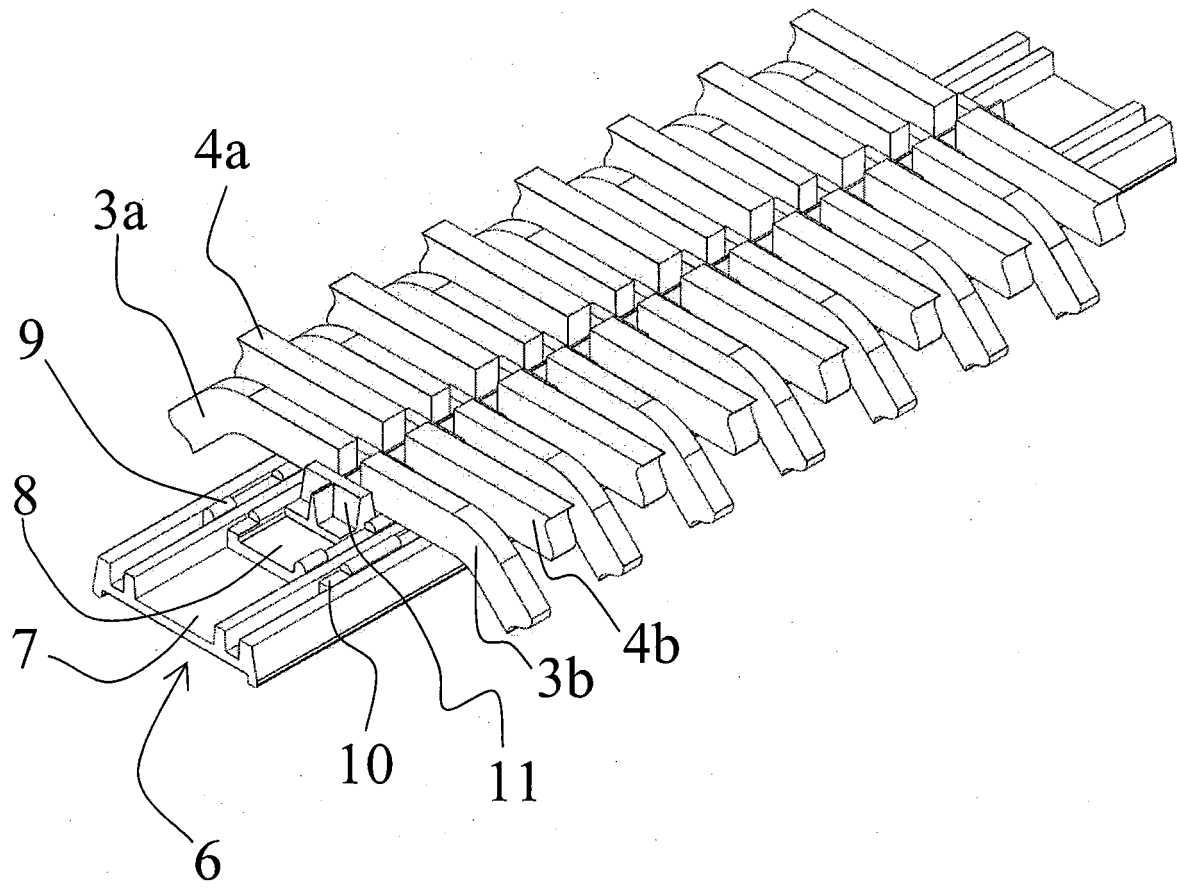


Fig. 5

REFERENCES CITED IN THE DESCRIPTION

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