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(54) **MODULAR WALL SYSTEM**

(57) A modular wall system comprising a first set of posts (8), a second set of posts (8b) and a first set of panels (70a), said panels having a left side edge and a right side edge arranged to be fastened to a first and a second post respectively from said first or second set of posts. The posts from the first set of posts are made of steel and in that the posts from the second set of posts are made of aluminium and the panels of the first set of panels and/or the posts of the first and second set of posts comprise a panel spacing arrangement which ensure that the spacing between two adjacent panels which are connected to a post will be the same when using a post from the first set of posts and when using a post from the second set of posts.

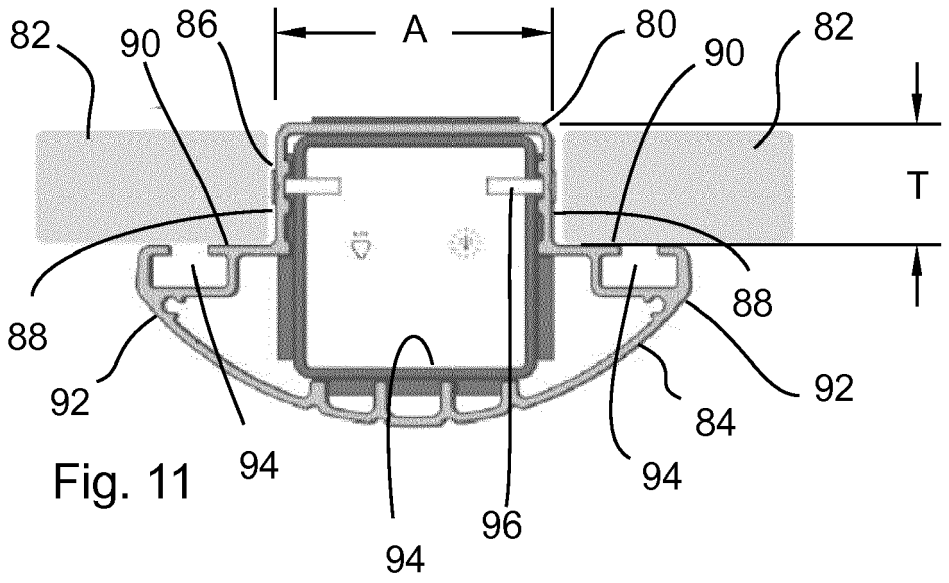

Fig. 11

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Description

[0001] The current invention relates to a modular wall system comprising a number of standard elements which are suitable for use in building a wall, said wall system comprising a first set of posts, a second set of posts and a first set of panels, posts from said first set of posts having a common cross section and being arranged to be fastened upright on a support surface, posts from said second set of posts having a common cross section and being arranged to be fastened upright on a support surface and said panels from said first set of panels having a rectangular form with a left side edge, a top edge, a right side edge and a bottom edge and where said left side edge and said right side edge are arranged to be fastened to a first and a second post respectively from said first or second set of posts to support the panel in an upright position between the two posts.

[0002] In one embodiment, the wall system is suitable for a multipurpose sports arena. One typical application of such multipurpose sports arenas is outdoor playing fields or playing pitches. It should be noted that while the current embodiments disclosed in this specification all relate to wall systems for sports arenas, the wall system according to the current invention could also be used for other purposes. For example in playgrounds, next to walkways, as general fences, etc.

[0003] A modular wall system should be understood as a system of components where the components can be assembled into different wall configurations. In other words, the system comprises different elements or different modules which can be joined in different ways to provide different wall structures. It should be noted that a manufacturer might have two or more different modular wall systems. For example, the manufacturer could have one wall system with aluminium components and another wall system with steel features. However, the components of one system will not be designed to be used with the components of the other system. Within a system, the different components will be designed to be used in different configurations.

Description of related art

[0004] Wall systems for sports arenas are well known in the art. Different manufacturers have different offerings. Different wall systems for sports arenas are therefore available in many different levels of quality, different types of materials and different sizes.

[0005] Likewise, sports arenas can have many different purposes. For example, one sports arena could be suitable for playing floor ball, another could be suitable for playing soccer, another for playing basketball, etc... It is therefore often desired to provide a sports arena which can be used for different purposes.

[0006] Customers have therefore become accustomed to being able to choose between many different options.

[0007] As a manufacturer of wall systems for sports arenas, if all the customers' requirements and desires should be met, it would require a large number of different variants. This is expensive to manufacture, keep in stock and complicated for the client to order.

Summary of the invention

[0008] Hence, a first aspect of the current invention is to provide a modular wall system as mentioned in the introductory paragraph which reduces the number of necessary variants to be kept in stock while still providing a large number of options for the client.

[0009] A second aspect of the current invention is to provide a modular wall system as mentioned in the introductory paragraph which provides for an option which has an attractive design and an option which has a lower cost.

[0010] A third aspect of the current invention is to provide a modular wall system as mentioned in the introductory paragraph which provides for a system which is easy to assemble.

[0011] These aspects are provided at least in part by a modular wall system as mentioned in the introductory paragraph and comprising the features of claim 1.

[0012] Additional interesting embodiments are disclosed by the features mentioned in the claims which are hereby incorporated in the description and by the additional features discussed below.

[0013] In one embodiment, the panels have a thickness T and the posts have an outwardly facing surface arranged between the support surfaces and the minimum horizontal distance from the support surfaces of the posts to said inwardly facing surface is less than 120% of the thickness of the panels. In one embodiment, the distance is less than 110% of the thickness of the panels or less than or equal to 100%. Typically, the assembled wall structure will be surrounding a playing area or area of interest. One surface of the wall will be facing the area of interest and another surface will be facing away from the area of interest. In the understanding of the above "inwardly facing surface", the surface should be understood as the surface which faces the area of interest. As such in one embodiment, the perpendicular distance relative to the plane of the panels from the inwardly facing support surface of the posts to the inwardly facing surface of the posts facing the area of interest which is closest to the area of interest will be less than 120%, less than 110% or less than or equal to 100% of the thickness of the panels.

[0014] In one embodiment, the posts from the first and/or second set of posts could be arranged such that when two panels are connected to the post, a surface of a first panel, a surface of a second panel and a surface of the post are arranged essentially flush and in a common plane. This would be similar to the case described above where the distance and the thickness are identical.

[0015] In one embodiment, the aluminium shell could

be an extruded aluminium profile. In one embodiment, the aluminium shell could be a closed extruded aluminium profile. In one embodiment, the aluminium shell could be provided with a cavity arranged outside the inner steel core and behind the support surfaces and running the length of the post.

[0016] In one embodiment, rails could extend along the entire length of the posts from the second set of posts. In one embodiment, the rails could be arranged on the inwards facing surfaces of the supporting surfaces. By inwards facing surfaces could be understood as surfaces facing the area of interest as discussed above. In one embodiment, the rails could be suitable for receiving a T-nut like fitting. In one embodiment, the posts from the second set of posts could comprise a recess running along the longitudinal axis of the post, said recess being suitable for accepting self-tapping screws.

[0017] It should be emphasized that the term "comprises/comprising/comprised of" when used in this specification is taken to specify the presence of stated features, integers, steps or components but does not preclude the presence or addition of one or more other features, integers, steps, components or groups thereof. For example, in the claims it is stated that the system comprises a first and a second set of posts. However, the system could comprise any number of sets of posts.

Brief description of the drawings

[0018] In the following, the invention will be described in greater detail with reference to embodiments shown by the enclosed figures. It should be emphasized that the embodiments shown are used for example purposes only and should not be used to limit the scope of the invention.

Figure 1 shows a first example of a sports arena using one embodiment of a modular wall system according to the current invention.

Figure 2 shows a second example of a sports arena using one embodiment of a modular wall system according to the current invention.

Figure 3 shows a series of steel posts in different lengths.

Figure 4 shows two different posts both having different functions.

Figure 5 shows a top view of a first embodiment of a steel post for connecting two inline and adjacent panels.

Figure 6 shows a top view of a second embodiment of a post for joining two panels which meet at a corner with a 90 degree angle between them.

Figure 7 shows a perspective top view of a wall assembly showing two inline panels and one connecting post.

Figures 8 and 9 shows detailed perspective views of the connection between a steel post and a panel from two different viewpoints.

Figure 10 shows some examples of aluminium posts according to one embodiment of the wall system according to the invention.

Figure 11 shows a top cross sectional view of an embodiment of an aluminium post connected to two inline panels.

Figure 12 shows a top cross sectional view of an embodiment of an aluminium post connected to two panels meeting at a corner and forming a 90 degree angle to each other.

Figure 13 shows a top cross sectional view of an embodiment of an aluminium post connected to two panels meeting at a corner and forming a 135 degree angle to each other.

Figure 14 shows a top perspective view from the inside of the sports arena of an aluminium post connected to two inline panes.

Figure 15 shows a top perspective view from the outside of the sports arena of an aluminium post connected to two inline panels.

Figure 16 shows two embodiments of how the aluminium and steel posts are fastened to the support surface.

Detailed description of the embodiments

[0019] Figures 1 and 2 show two examples of multipurpose sports arenas which make use of components from the modular wall system according to the current invention. The sports arena 1 of figure 1 comprises a playing area 2 and a wall structure 4 arranged to encompass the playing area 2. The wall structure, for the most part, comprises rectangular panels 6 and posts 8. Posts are placed at uniformly spaced apart locations around the playing area and panels are supported between adjacent posts. Additional elements like goal nets 10 and smaller target nets 12 and basketball nets 14 are also included in this example embodiment.

[0020] In the sports arena of figure 1, the posts 8 come in two varieties, short posts 8 and long posts 8b. At one end of the sports arena, angled upper post portions 16 are provided to support nets 18 to prevent balls or other playing objects from leaving the end zone of the sports arena. In those areas where there are short posts 8, a

single upright panel 6a is used between adjacent posts 8. In the cases where there are long posts, two panels 6a,6b can be stacked on top of each other.

[0021] In other embodiments (not shown) it could be imagined that even longer posts were used and a net was connected to the top of the posts to cover the entire sports arena to prevent high flying balls.

[0022] In the sports arena of figure 1, the posts are made of steel and have a simple square cross sectional form with two support flanges to which the panels can be mounted. The posts and panels will be described in more detail later on in this specification.

[0023] The sports arena 30 of figure 2 is similar to the sports arena of figure 1 and won't be described in great detail here. As with the sports arena of figure 1, the sports arena of figure 2 also comprises panels 32 supported by spaced-apart posts 34. A mix of different types of panels is shown. Some of the panels 36 are provided as plates of plastic material and other panels 38 are provided as net elements.

[0024] In the sports arena 30 of figure 2, instead of steel posts, aluminium posts are used. The use of aluminium allows more complex shapes to be provided and allows a more interesting design to be used. Likewise, additional features, such as extruded rails, extruded channels for electrical cables, etc can be provided with an aluminium construction. However, aluminium is typically less strong than steel and therefore, the aluminium posts can be supported with an inner steel core. This will be described in more detail later on in this specification.

[0025] It should be noted that the sports arenas of figure 1 and 2 show a wall structure surrounding a playing area. In most cases, the playing area will be the main area and the surface of the wall structure facing the playing area will be most exposed and used by the users of the sports arena. However, it should also be noted that the users of the sports arena could also use the outwardly surface of the wall structure which faces away from the playing area. For example, while a game of floor ball is being played in the playing area, other users could be using the surface of the wall structure facing away from the playing area for target practice or other activities.

[0026] Figure 3 shows some different embodiments of steel posts. A first post 40 is shown to the left of figure 3 which can support one vertical layer of panels. A second post 42 is shown which can support two vertical layers of panels, one above the other. A third post 44 is shown which can support three vertical layers of panels. A fourth post 46 is provided which is similar to the third post but which has an additional thinner post section 48 at the top to support an additional vertical layer of panels. The fifth post 50 can also support three vertical layers of panels on the thick section of the post and two additional panels on the upper thinner section 52 of the post.

[0027] Figure 4 shows a more detailed view of two different embodiments of posts. A first post 40, shown to the right in figure 4 is identical to the post 40 shown in figure 3 to the left. The post comprises a vertically extending central section 60 having a hollow square cross section (as seen in figure 5) and four flanges 62 extending from the left and right sideways facing surfaces 64 of the central section. Holes 66 in the flanges are provided to receive bolts which can hold the panels in place. In the terminology of the claims, the holes 66 could be understood as fastening element openings. Fastening elements should be understood as elements which can be used to fasten the panels to the posts, for example bolts 72.

[0028] The four flanges are all provided in the same plane. The surface of the flanges facing the playing area can be called a support surface or an inwardly facing support surface for the panels. Figure 5 shows how the post 40 is connected to two inline panels 70. A left panel 70a is fastened to the left side of the post 40. A bolt 72 is passed through a hole in the panel 70a and through the hole 66 in the flange and then fastened via a nut 74, such that the panel is fastened to the post. The same can be done on the right side.

[0029] As can be seen, the width of the central section 60 of the post is shown as A. As the two side edges of the panels are arranged to abut the sideways facing surfaces 64 of the central section, the distance between the side edges of adjacent panels will be the same as the width of the post. In this case, the two sideways facing surfaces 64 of the post can be understood as a two vertically extending surfaces which function as a panel spacing arrangement since the two surfaces 64 ensure the spacing of the panels.

[0030] The spacing between adjacent panels is also determined by the spacing by the holes 66 in the flanges of the post and the holes in the left and ride side of the panels. If the position of the holes in the panels are fixed and the position of the holes in the flanges are fixed, then the distance between adjacent panels will always be the same. In this case, the holes in the panels and the holes in the flange elements can also be thought of as a panel spacing arrangement.

[0031] It can also be seen from figure 5, that the panels have a thickness which is shown as T in the figures. It can also be seen that the distance between the surface of the flanges which faces the playing area when the wall is setup and the surface 68 of the post which is facing the playing area is also provided by T. In this way, the surface of the panels is flush with the inwardly facing surface of the post. In this way, when playing a sport where a ball or other playing implement can contact the post and/or the panel, the ball will not deflect in strange ways when it hits the intersection between a panel and a post.

[0032] The left post in figure 4 shows a post with two flanges which make an angle of 90 degrees to each other. A top view of this post is shown in figure 6. Using this post, corners can be provided in the wall structure. Other posts could be provided with flanges which meet at other angles, for example 135 degrees to form a corner with a 135 degree angle between adjacent panels. As with the

post of figure 5, the post of figure 6 shows that the distance from the support surface of the flanges to the corner of the post is the same as the thickness of the panels. I this way, a clean corner is provided in the wall structure.

[0033] Figure 7 shows an assembly of two panels and a post. Details of the bolt connections between the flanges and the panels are shown. In the figure, a panel is shown which comprises two horizontal cross pieces and a plurality of vertically arranged rod elements. The vertically spaced rods are welded to the horizontal cross pieces as is known in the art.

[0034] Figures 8 and 9 show two different views of the connection between a panel and a post from respectively inside the playing area and outside the playing are.

[0035] Figure 10 shows a number of different sizes and forms of posts made from aluminium. As with the steel posts discussed previously, the aluminium posts of figure 10 are provided in different lengths and in different forms. From figure 10 it can be seen that the posts do not have individual welded on flanges as in the steel post embodiments. Rather, as will be described later on, the aluminium posts are provided as extruded aluminium profiles into which tracks can be formed whereby the assembly of the wall structure can be made easier and faster. The tracks can also be used for example for mounting components and accessories via for example T-nuts, bolts/nuts, clamps, etc..

[0036] Figures 11 to 13 show cross sectional views of some different versions of the aluminium posts. The embodiment of figure 11 shows a post 80 where two inline panels 82 are connected to the post. Figure 12 shows a version where two panels can be connected to the post to meet at a 90 degree angle. Figure 13 shows a version where two panels can be connected to the post such that they meet at a 135 degree angle.

[0037] As can be seen from figure 11, the aluminium profile element 84 comprises a rectangular portion 86 having two side surfaces 88 which face sideways, just like the steel version. When two panels are connected to the aluminium post, these two sideways facing surfaces ensure the spacing between the panels. In the aluminium posts, the distance between the two sideways facing surfaces is chosen to be A just like the steel panels. In this way, the aluminium posts can be mixed with the steel posts. Likewise, the panels can be used with both the aluminium posts and the steel posts without there being any effect on the dimensions of the playing area.

[0038] Likewise, the aluminium portion has two inwardly facing supporting surfaces 90 which face the playing area, just like the two flanges of the steel version. However, instead of being flanges, the inwardly facing surfaces are formed as a portion 92 of the extruded aluminium profile element. Furthermore, rails 94 are formed in the surfaces into which T nuts can be placed to easily connect panels to the posts. It can also be noted that the distance between the rails is identical to the distance between the holes in the flanges in the steel version. In this way, the spacing between panels in the steel post version and the aluminium post version will be identical.

[0039] In order to provide strength to the aluminium posts, an inner steel core 94 is provided inside the extruded aluminium profile. The inner steel core is typically slid into the aluminium profile and then screws 96 are placed through the side of the aluminium profile to engage with the inner steel core. This can be seen in figures 11 to 13. It can also be seen that in the embodiments of figure 11 and 12, when the screws are placed into the inner steel core, the screws meet the surface of the steel core at a 90 degree angle. This provides a strong connection between the steel and aluminium components.

[0040] Since the aluminium profile is extruded, it is easy to add cosmetic details, such as arcs and ribs. Likewise, it is easy to add channels in the profile through which electrical cables, etc can be run.

[0041] It should be clear from the above, that the same panels can be mounted to both the steel posts and the aluminium posts. Likewise, since the spacing between panels is held constant, no matter if the steel or the aluminium posts are used, a customer can mix and match between the steel and aluminium posts as desired. In addition, two very different designs of posts can be provided while still making use of common panels. In this way, the number of possibilities for the client to choose are increased while the number of variants which need to be kept in stock and manufactured are decreased. In the language of the claims, the steel posts can be said to be a part of the first set of posts and the aluminium posts can be said to be a part of the second set of posts. Likewise, the posts shown in figures 11 to 13 could be said to be members of three different sets of posts.

[0042] Figures 14 and 15 show different views of panels assembled with the aluminium posts. In this case, a more advanced form of upper cross piece is provided on the panels by providing them with extruded aluminium profiles. In this way, extra features can be provided. For example, a broader rail can be provided to provide a broader surface to rest on more comfortably. In the embodiment shown in figures 14 and 15, the inner portion of the upper cross piece of the panel is flush with the inside of the playing area, so no edges are provided which players can injure themselves on. Likewise, the top part of the cross piece is flush with the top of the post. In this way a smooth upper surface can be provided.

[0043] Figure 16 shows how the different posts could be fastened to and supported on the support surface. On the left side of the figure, posts are extended into a hole in the ground and then fastened by pouring cement or concrete into the hole. In the aluminium version, the inner steel core is cemented into place and the aluminium profile is arranged above ground. In the right of figure 16, the posts are supported on the support surface by plates which are bolted into the ground. The plates can be welded to the steel post and to the inner steel core. In the case where steel posts are to be cemented into the ground the steel posts are made longer than if they are to be supported on plates.

[0044] In one embodiment of assembling a wall structure, holes are dug at relevant positions around the playing field. Posts are then inserted into the holes, but without fastening them yet. Panels are then connected to the posts until the wall structure is completed. The panels are then supported above the playing area and adjusted until the panels are level and arranged properly. At this point, the posts are essentially floating since they are being held in place by the panels. Once everything looks correct, cement or concrete is poured into the holes to fasten the posts to the support surface. Other processes to assemble the wall structure can also be used.

[0045] It is to be noted that the figures and the above description have in some cases shown the example embodiments in a simple and schematic manner. Many of the specific mechanical details have not been shown or described since the person skilled in the art should be familiar with these details and they would just unnecessarily complicate this description. For example, many of the specific materials used and the specific manufacturing procedures have not been described in detail since it is maintained that the person skilled in the art would be able to find suitable materials and suitable processes to manufacture the elements according to the current invention. Likewise, many features of the figures have not been described in detail. However, the figures can be used as a teaching for the person skilled in the art and features can therefore be derived from the figures.

[0046] The current specification also discloses a second invention related to a panel for use in a wall system, said panel comprising a first horizontal elongated element, a second horizontal elongated element and at least one vertically extending element arranged between the first and second horizontal elements and fastened to said first and second horizontal elongated elements, suitable for use in assembling a wall for a sports arena.

[0047] While the embodiments disclosed in the current specification relate to panels for walls in sports arenas, it should be clear that the panels according to this second invention can be used in any number of other applications. Some non-limiting examples are: playgrounds, bridges, general fencing, etc

[0048] Panels suitable for use in wall assemblies in a sports arena are well known in the art. Typically these panels comprise wooden sections or welded steel structures comprising a welded frame with metal horizontal elongated elements and vertically arranged rods/slats welded to the horizontal elongated elements.

[0049] These structures are often time consuming and therefore expensive to assemble. Furthermore, when a sudden force is applied to the known panels, for example when a ball hits a panel, then the panel will vibrate and/or rattle, generating undesired noise.

[0050] It is therefore a first aspect of this second invention, to provide a panel which is fast to assemble.

[0051] A second aspect of the second invention is to provide a panel which can be assembled without welding or with a reduced amount of welding.

[0052] A third aspect of this second invention is to provide a panel suitable for wall assembly in a sports arena which absorbs force and reduces noise.

[0053] These aspects are provided at least in part by providing a panel according to claim 1.

[0054] Additional interesting embodiments are disclosed by the features mentioned in the items below.

[0055] In the following, the second invention will be described in greater detail with reference to embodiments shown by the enclosed figures 1, 2 and 18 to 26. It should be emphasized that the embodiments shown are used for example purposes only and should not be used to limit the scope of the second invention.

[0056] Figure 1 shows a first example of a sports arena where a panel according to the second invention could be used.

[0057] Figure 2 shows a second example of a sports arena where a panel according to the second invention could also be used.

[0058] Figure 17 shows a first embodiment of a panel according to the second invention.

[0059] Figure 18 shows an exploded view of the panel of figure 17.

[0060] Figure 19 shows a top view of one embodiment of a resilient element used in the assembly of the panel of figure 17.

[0061] Figure 20 shows a bottom view of the resilient element of figure 19.

[0062] Figure 21 shows an exploded detail view of one bottom corner portion of the panel of figure 17.

[0063] Figure 22 shows an assembled detail view of the bottom corner portion of the panel shown in figure 21.

[0064] Figure 23 shows one set of steps of an assembly sequence of a panel according to the invention.

[0065] Figure 24 shows a second set of steps of an assembly sequence of a panel according to the invention.

[0066] Figure 25 shows another embodiment of a panel according to the current invention.

[0067] Figure 26 shows another embodiment of a panel according to the current invention.

[0068] The panel 200 of figure 17 comprises a horizontal upper cross piece 202 and a horizontal lower cross piece 204. A plurality of vertically arranged rods 206 are arranged between the upper and lower horizontal cross pieces. Panels similar in appearance have been known in the art. However, in the panels known in the art, the vertically arranged rods are typically welded to the horizontal cross pieces to form an integrated welded structure. This is a time consuming process to make since all the rods need to be welded to the cross pieces.

[0069] In the embodiment shown in figure 17, instead of welding, the vertically arranged rods 206 are press fitted into recesses 208 in resilient elements 210 which are press fitted into the horizontal cross pieces. As such no welding needs to be performed. A side benefit of this technique is that due to the use of resilient elements between the rods and the cross pieces, a shock absorbing structure is provided. When a ball or other article impacts

the vertical rods, the force is at least partially absorbed by the resilient elements. This results in less noise.

[0070] In the embodiment shown in figure 18, the upper and lower horizontal cross pieces are provided respectively as downward 212 and upwards 214 facing U shaped extruded or bent steel channels. A plurality of resilient elements 210 are placed in the U shaped channels by pressing them into the channel (see figure 23). A press can be used to press the resilient elements into the U shaped channel. In figure 18, fasteners 216 are shown which fasten the resilient elements to the U shaped channels. This is not always necessary, but will increase the strength of the system in certain cases. Moulded corner pieces 218 are provided to provide a nice corner for the panels.

[0071] Once the U shaped channels and resilient elements are joined together, the cross pieces can be moved into another form (see figure 24). A number of spaced apart vertically arranged rods are then also placed in the form. It should be noted that the vertically arranged rods are first vertically arranged once the panel is installed. In the actual assembly method, the rods are placed on a table in a lying down position. Once all the rods are in place, a press is activated which presses the cross pieces onto the rods. The recesses 208 in the resilient elements engage with the rods. Due to the high pressure forces, a good friction fit will be established between the rods and the resilient elements. A strong panel is therefore prepared in a simple and cost effective manner.

[0072] Figures 21 and 22 show details of the corner assembly. As can be seen, a through-going hole 220 is provided in the top and bottom left and right corners of the panel at well-defined positions. These through going holes can be used to place bolts which engage with posts or other supporting members.

[0073] In figures 17-24 panels having a plurality of elongated rods with circular cross sections have been shown. However, the same technique can also be used with other embodiments. For example figure 25 shows an embodiment 230 where a number of wooden slats 232 are fastened between two horizontal cross pieces 234. In this embodiment, a resilient element (not shown) is provided with a series of elongated recesses which match the ends of the slats 232. Likewise, figure 26 shows an embodiment 240 where a number of HDPE plastic panels 242 are engaged with the cross pieces 244. In this embodiment, instead of providing a resilient element with a series of recesses, a resilient element (not shown) could be provided with a U shaped channel suitable for engaging with the upper or lower edge of the HDPE panel. In one embodiment (not shown), a flat sheet of resilient material can be folded into the U shaped channel of the horizontal cross pieces and the HDPE panel can be inserted into the folded sheet. It should be noted that a similar panel can be formed with any number of different types of materials. Some non-limiting examples are steel rods, WPC, DHPE, Aluminium, wooden rods, glass fibre rods, composite panels, etc...

[0074] It is to be noted that the figures and the above description have in some cases shown the example embodiments in a simple and schematic manner. Many of the specific mechanical details have not been shown or described since the person skilled in the art should be familiar with these details and they would just unnecessarily complicate this description. For example, many of the specific materials used and the specific manufacturing procedures have not been described in detail since it is maintained that the person skilled in the art would be able to find suitable materials and suitable processes to manufacture the elements according to the current invention.

[0075] The second invention is defined in more detail via the following items which could be converted to claims in a potential divisional application.

[0076] Item 1. A panel for use in a wall system, said panel comprising a first horizontal elongated element, a second horizontal elongated element and at least one vertically extending element arranged between the first and second horizontal elements and fastened to said first and second horizontal elongated elements, **characterized** in that the panel further comprises an first resilient element between the first horizontal element and the vertically arranged element and in that the panel further comprises a second resilient element between the second horizontal element and the vertically arranged element.

[0077] Item 2. A panel according to item 1, **characterized** in that the first resilient element comprises a recess into which an end portion of the vertically extending element is engaged and in that the second resilient element comprises a recess into which an opposite end portion of the vertically extending element is engaged.

[0078] Item 3. A panel according to item 1 or 2, **characterized** in that the panel comprises a plurality of vertically extending elements, said plurality of vertically extending elements being arranged spaced apart, parallel to each other and co planar.

[0079] Item 4. A panel according to item 3, **characterized** in that the first and second resilient elements comprise a plurality of recesses which matches the plurality of vertically extending elements.

[0080] Item 5. A panel according to any one of items 1 to 4, **characterized** in that the first and/or second resilient elements are comprises of a plurality of elongated elements which are arranged in-line with each other.

[0081] Item 6. A panel according to any one of items 1 to 5, **characterized** in that the first horizontal elongated element comprises a downwardly open channel and in that the first resilient element is accessible through the downwardly open channel and in that the second horizontal elongated element comprises an upwardly open channel and in that the second resilient element is accessible through the upwardly open channel.

[0082] Item 7. A panel according to item 6, **characterized** in that the downwardly open channel is a downwards facing U shaped channel and in that the upwardly open channel is an upwards facing U shaped channel.

[0083] Item 8. A panel according to item 6, **characterized** in that the downwardly open channel is a sideways facing U shaped channel to allow the resilient element to be added from the side and that the channel comprises an opening in the bottom of the channel to allow the vertically extending elements to engage with the resilient element.

[0084] Item 9. A panel according to any one of items 1 to 8, **characterized** in that the vertically extending element is press fitted into the first resilient element and the second resilient element.

[0085] Item 10. A panel according to any one of items 1 to 9, **characterized** in that the first and second resilient elements are press fitted into the first and second horizontal elongated elements.

[0086] Item 11. A method of assembling a panel according to any one of items 1 to 10, **characterized** in that the method comprises the steps of

a) providing a first horizontal elongated element having a first channel,
b) providing a second horizontal elongated element having a second channel,
c) providing a first resilient element,
d) providing a second resilient element,
e) arranging the first resilient element in the first channel,
f) arranging the second resilient element in the second channel,
g) providing a vertically extending element,
h) press fitting a first end of the vertically extending element into the first resilient element and
i) press fitting a second end of the vertically extending element into the second resilient element.

[0087] Item 12. A method according to item 11 **characterized** in that in step g) a plurality of vertically extending elements are provided and in that in steps h) and i) the plurality of vertically extending elements are press fitted into the resilient elements.

[0088] Item 13. A method according to item 11 or 12 **characterized** in that the method further comprises the steps of

a) arranging the vertically extending element in a form,
b) arranging the first and second horizontal elongated elements in the form
c) pressing the first and second horizontal elongated elements towards each other to engage with the ends of the vertically extending elements.

[0089] In one embodiment, instead of press fitting the vertically extending elements into the resilient elements, glue could be provided between the resilient elements and the vertically extending elements.

[0090] In one embodiment, glue could be arranged in the recesses in the resilient elements and the vertically extending elements could be pressed into the glue in the recesses during assembly.

[0091] In one embodiment, the resilient elements could be connected to the horizontal elongated elements via glue as well.

[0092] A third invention which is disclosed in the current specification is a goal assembly suitable for ball sports, said goal assembly comprising a frame defining a goal opening and a net connected to the goal frame and enclosing the goal opening such that balls entering the goal opening are caught by the net, **characterized** in that the net is made of a flexible steel cable mesh.

[0093] In one embodiment, the net is made of stainless steel cable mesh. In one embodiment, the net assembly is made from a series of individual steel cables which are joined at regular intervals to adjacent steel cables by clamp elements. A more specific product which is covered by the invention would be an outdoor public sports arena with a goal assembly having a goal opening and a steel cable mesh net assembly covering the goal opening.

[0094] The cable mesh is similar to a normal rope net which is well known in goal assemblies, for example soccer goals, however, instead of using braided plastic fibres, in this case, the elements of the mesh are thin steel wires braided or twisted together.

[0095] In this way, a net assembly is provided for a goal which is flexible and behaves like a normal net assembly, but which is vandalism proof and robust enough for use in an outdoor public sports arena. In contrast, in the prior art when a goal assembly is provided, a rope net is used which needs to be replaced at regular intervals due to vandalism. Or a stiff wire net is provided. However, when a ball hits the stiff wire net, the ball rebounds out of the goal assembly which is not desired.

[0096] Steel cable mesh suitable for use in a goal assembly according to this third invention is well known in the art and is commonly available. Searching on google for "steel cable mesh" discloses many suitable examples. However, this type of net has previously only been used for safety nets, security nets, fencing, etc. It has previously not been imagined that this type of net would be suitable for use in a goal assembly for outdoor public sports arenas.

Claims

1. A modular wall system comprising a number of standard elements which are suitable for use in building a wall, said wall system comprising a first set of posts, a second set of posts and a first set of panels, posts from said first set of posts having a common cross section and being arranged to be fastened upright on a support surface, posts from said second set of posts having a common cross section and being arranged to be fastened upright on a support surface and said panels from said first set of panels

having a rectangular form with a left side edge, a top edge, a right side edge and a bottom edge and where said left side edge and said right side edge are arranged to be fastened to a first and a second post respectively from said first or second set of posts to support the panel in an upright position between the two posts **characterized in that** the posts from the first set of posts are made of steel and **in that** the posts from the second set of posts are made of aluminium and **in that** the panels of the first set of panels and/or the posts of the first and second set of posts comprise a panel spacing arrangement which ensures that the spacing between two adjacent panels which are connected to a post will be the same when using a post from the first set of posts and when using a post from the second set of posts.

2. A modular wall system according to claim 1, **characterized in that** the panel spacing arrangement comprise two vertically extending supporting surfaces on the posts of both the first and second set of posts which are arranged to abut the side edges of adjacent panels when two panels are assembled with the post and **in that** the distance and angle between the two opposing supporting surfaces on the posts from the first set of posts and the posts from the second set of posts are the same.

3. A modular wall system according to claim 1 or 2, **characterized in that** the panel spacing arrangement comprises a set of fastening element openings in the panels from the first set of panels near the left side edge of the panels and a second set of fastening element openings in the panels of the first set of panels near the right side edge of the panels and a first set of fastening element openings in the posts from the first and second set of posts on a left side of the posts and a second set of fastening element openings in the posts from the first and second set of posts on a right side of the posts and **in that** the horizontal distance between the first set of fastening element openings and the second set of fastening element receiving openings is the same for posts from the first set of post and for posts from the second set of posts.

4. A modular wall system according to any one of claims 1 to 3, **characterized in that** the posts from the first set of posts and the posts from the second set of posts both comprise a left inwardly facing support surface extending from a left side of the posts and a right inwardly facing support surface extending from a right side of the posts, said left and right inwardly facing support surfaces having normal vectors which are perpendicular to a longitudinal axis of the post, said inwardly facing support surfaces of the posts being arranged to support a surface of the left and right side edges of the panels when the panels are connected to a post.

5. A modular wall system according to claim 4, **characterized in that** the panels have a thickness T and **in that** the posts have an inwardly facing surface arranged between the support surfaces and **in that** the minimum horizontal distance from the inwardly facing support surfaces of the posts to said inwardly facing surface of the posts is less than 120% of the thickness of the panels.

6. A modular wall system according to any one of claims 1 to 5, **characterized in that** said posts from said first and/or second set of posts are arranged such that when two panels are connected to the post, an inwardly facing surface of a first panel, an inwardly facing surface of a second panel and an inwardly facing surface of the post are arranged essentially flush and in a common plane.

7. A modular wall system according to any one of claims 1 to 6, **characterized in that** the wall system further comprises a third set of posts which comprises posts having two inwardly facing support surfaces which are arranged at an angle to each other which is equal to or between 90 and 180 degrees.

8. A modular wall system according to any one of claims 1 to 7 **characterized in that** the posts from the second set of posts comprise an aluminium shell and an inner steel core.

9. A modular wall system according to claim 8 **characterized in that** the aluminium shell is fastened to the inner steel core with screws which pass through the aluminium shell and engage a surface of the inner steel core at an angle which is perpendicular to said surface.

10. A modular wall system according to any one of claims 1 to 9, **characterized in that** the posts from the second set of posts comprise rails arranged parallel to the longitudinal axis of the post.

11. A modular wall system according to any one of claims 1 to 10 **characterized in that** said first set of panels comprises a panel comprising a first horizontal elongated element, a second horizontal elongated element and at least one vertically extending element arranged between the first and second horizontal elements and fastened to said first and second horizontal elongated elements, and **in that** the panel further comprises an first resilient element between the first horizontal element and the vertically arranged element and **in that** the panel further comprises a second resilient element between the second horizontal element and the vertically arranged element.

12. A modular wall system according to claim 11, **characterized in that** the first resilient element comprises a recess into which an end portion of the vertically extending element is engaged and **in that** the second resilient element comprises a recess into which an opposite end portion of the vertically extending element is engaged.

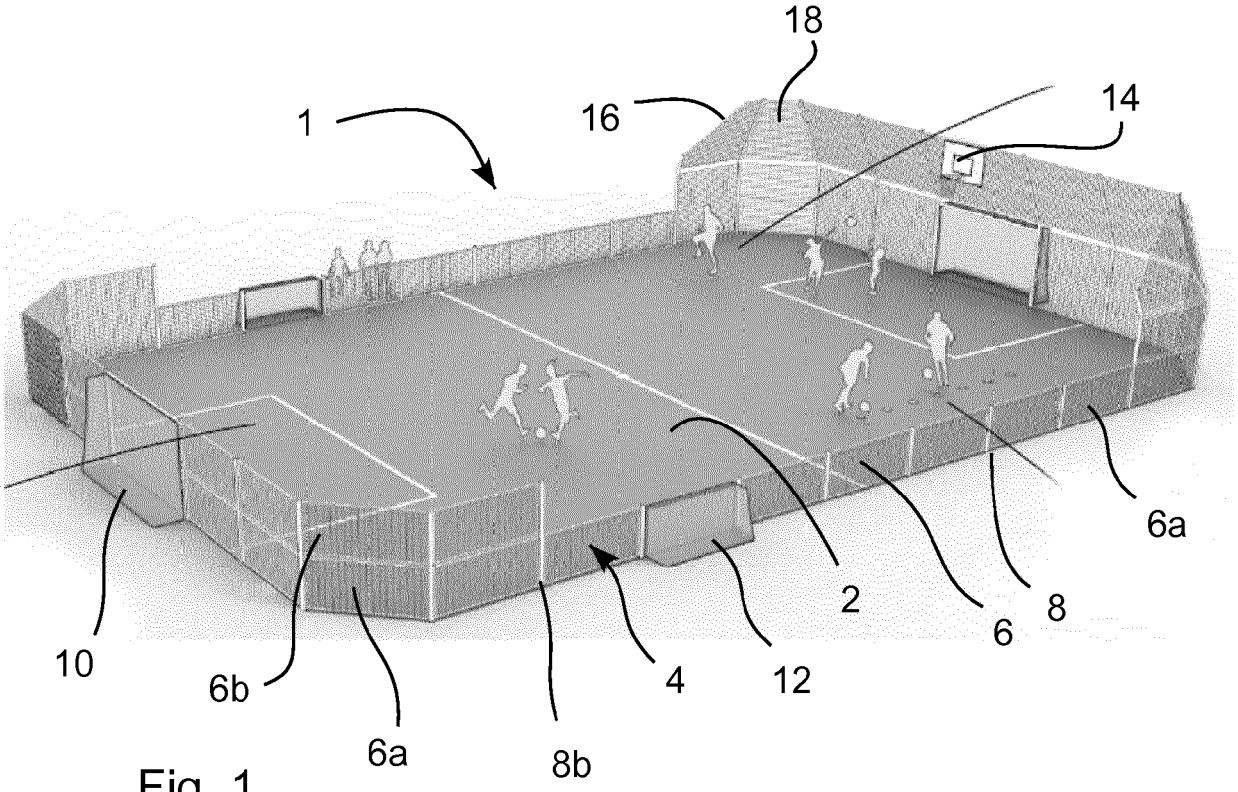


Fig. 1

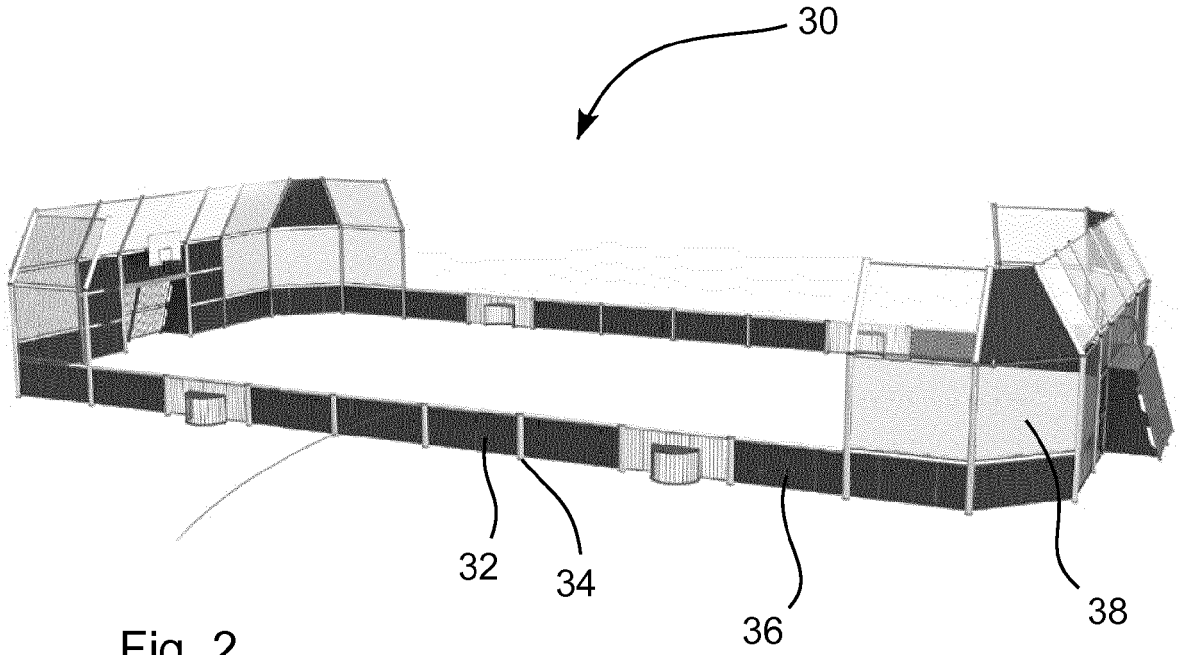


Fig. 2

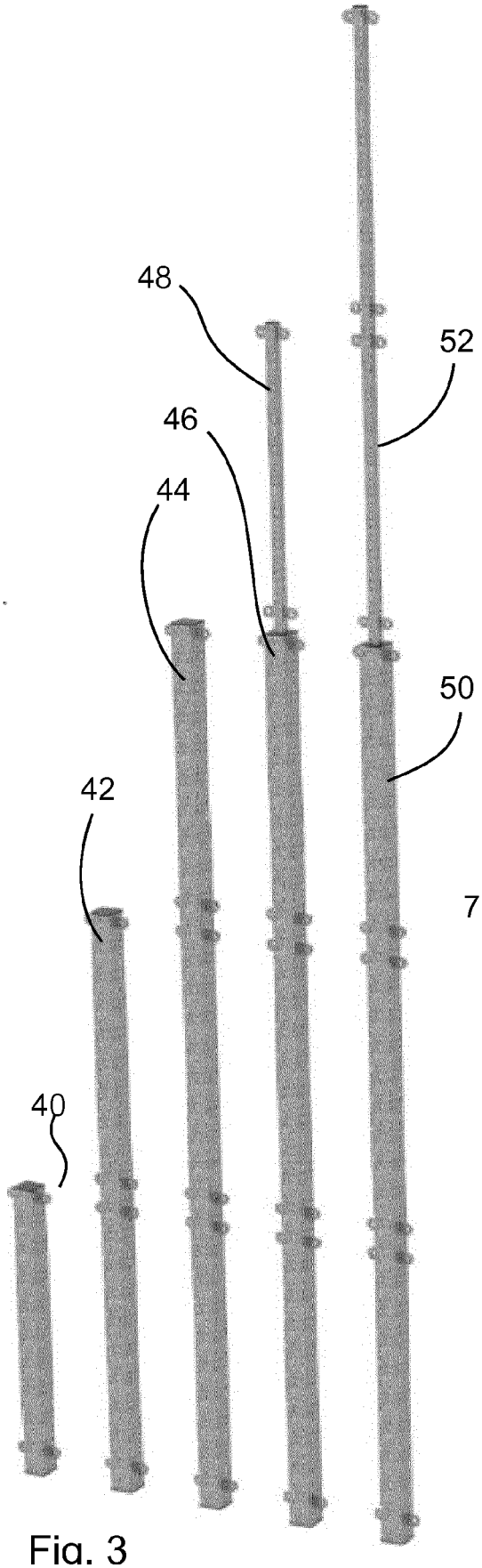
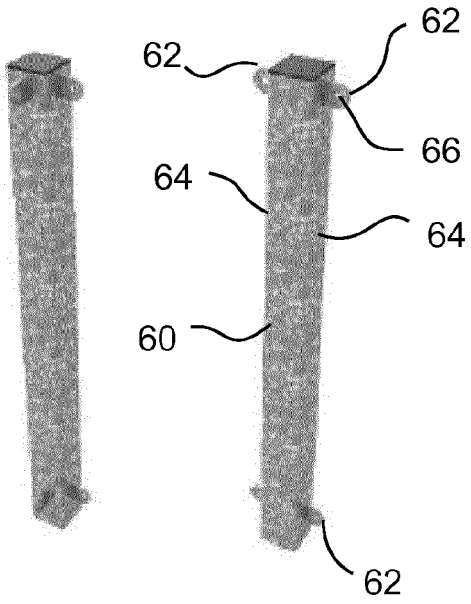


Fig. 3



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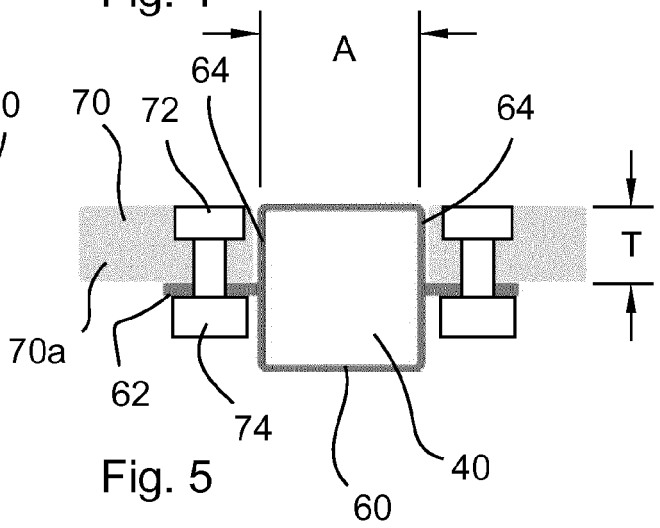

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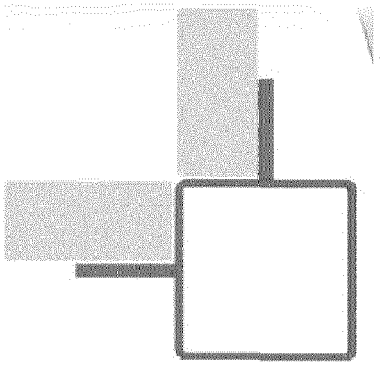

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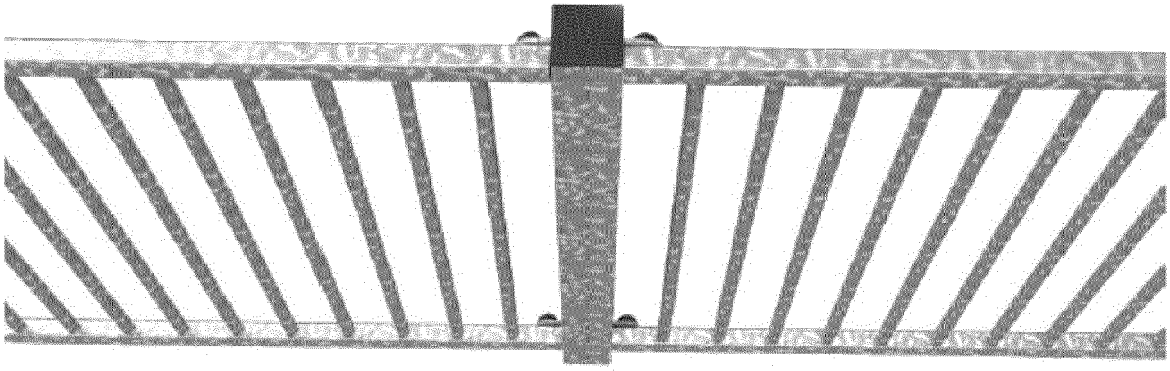

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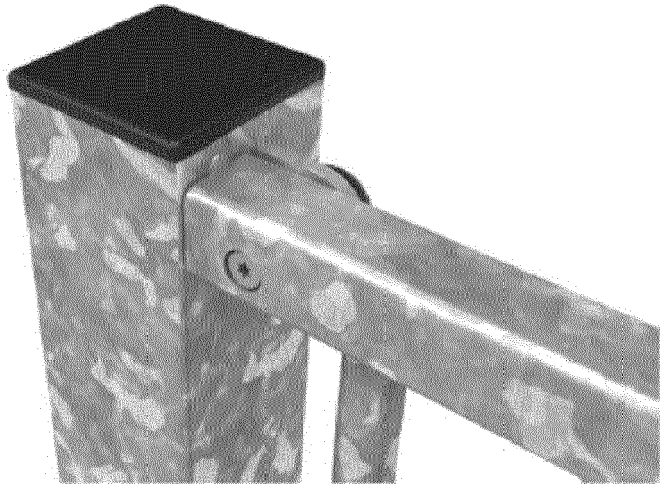

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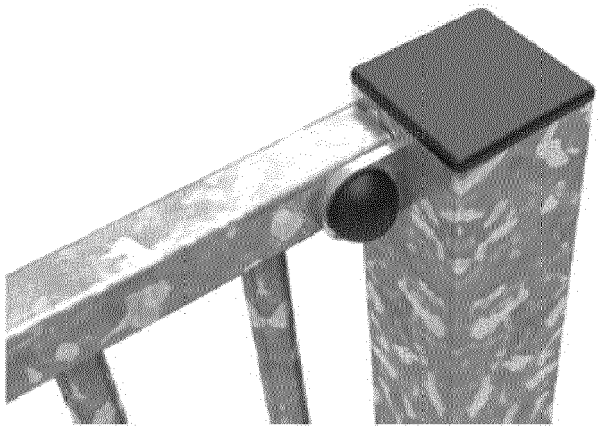

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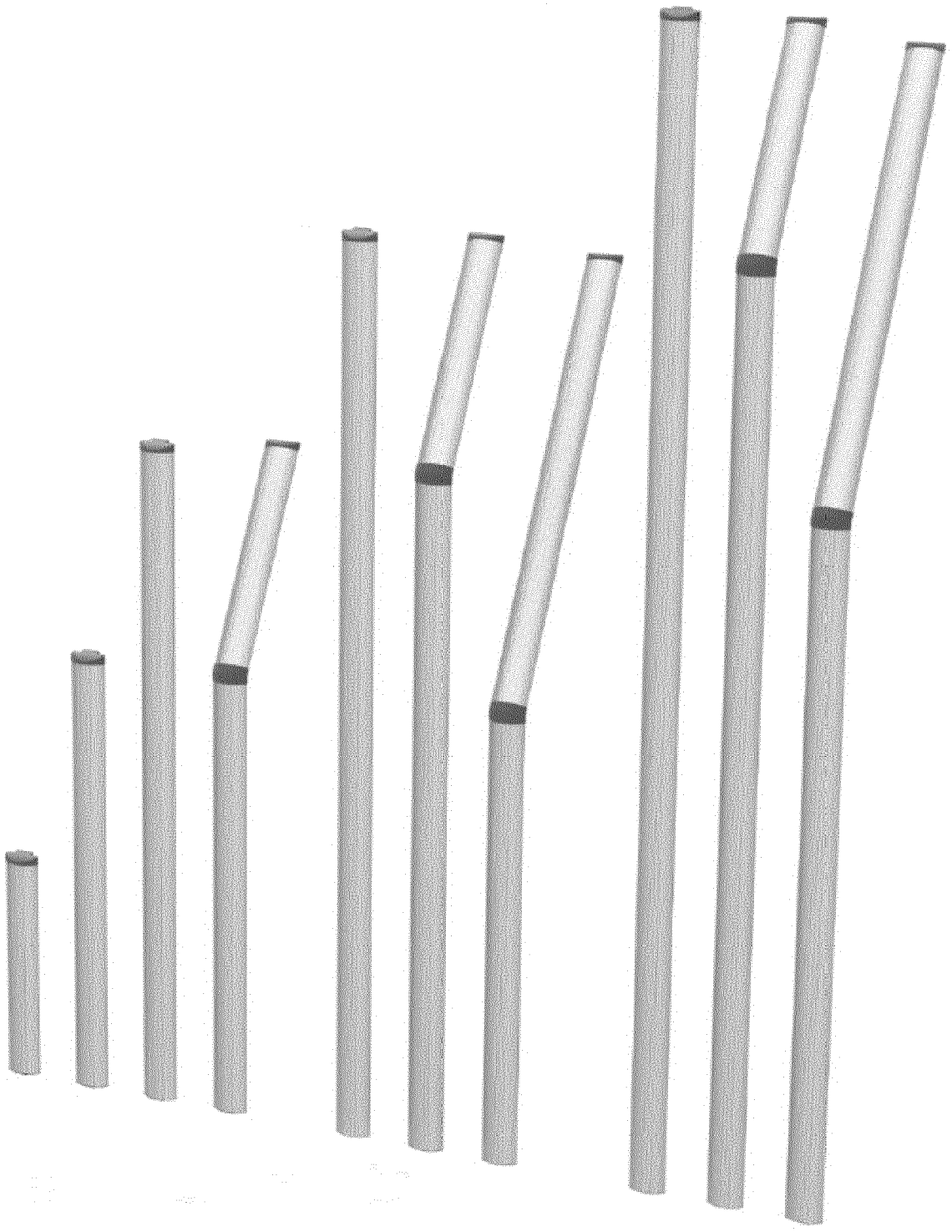


Fig. 10

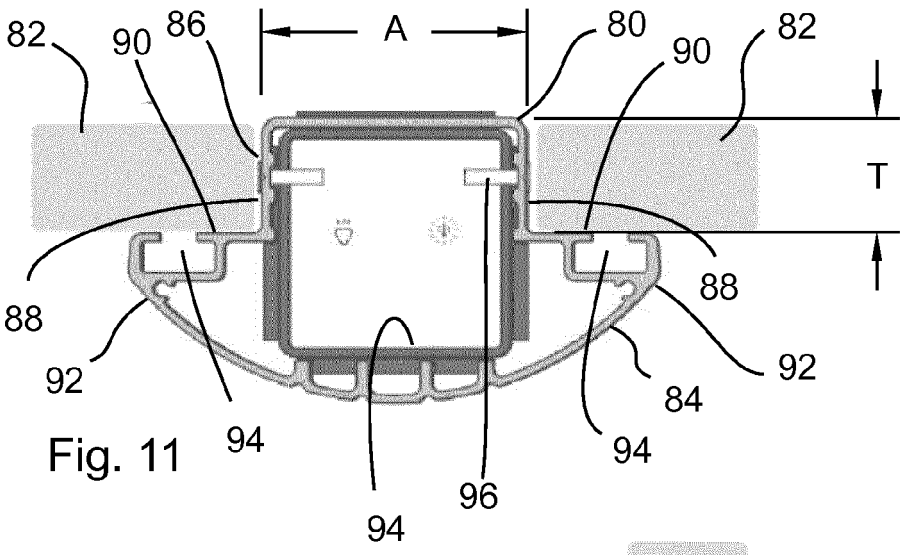
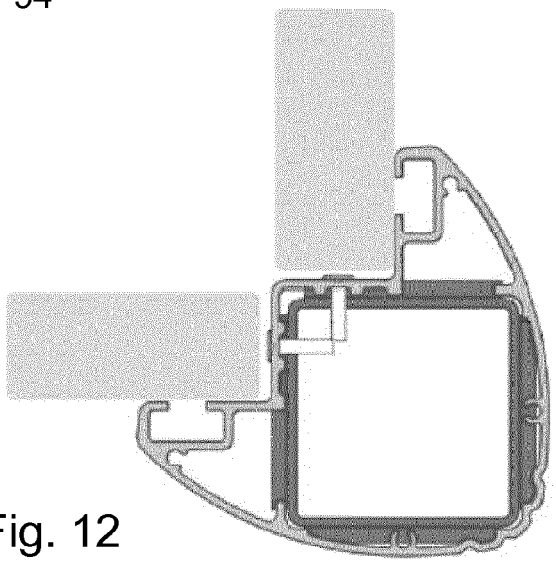


Fig. 11



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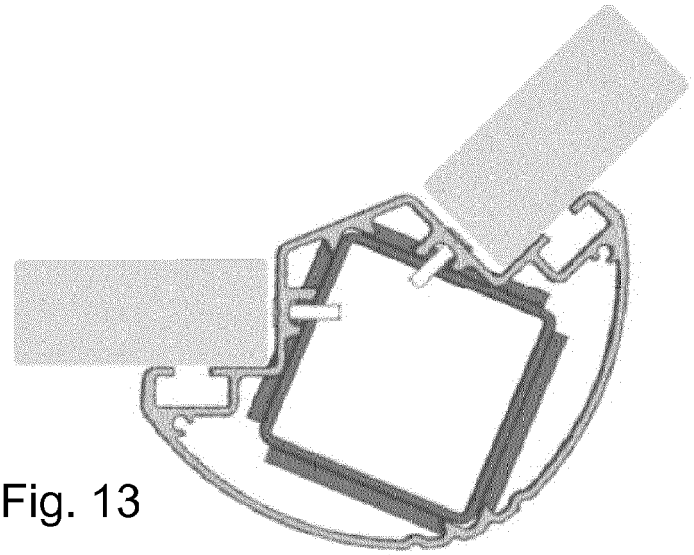

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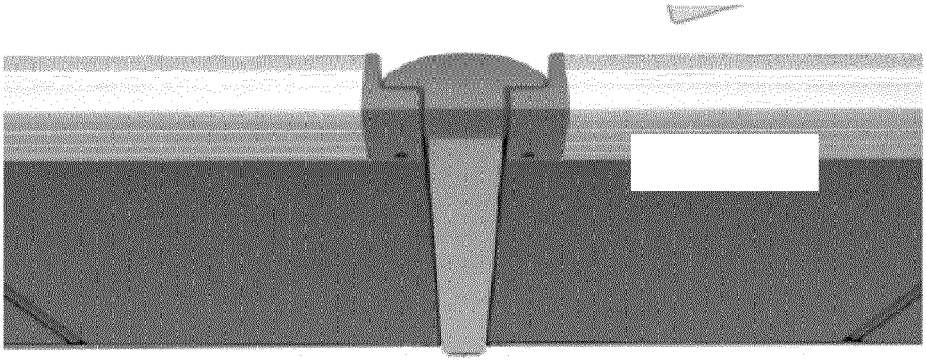

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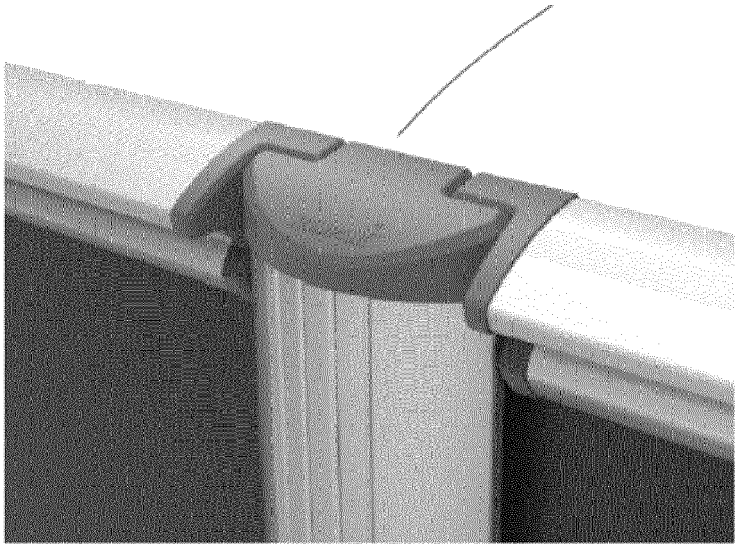

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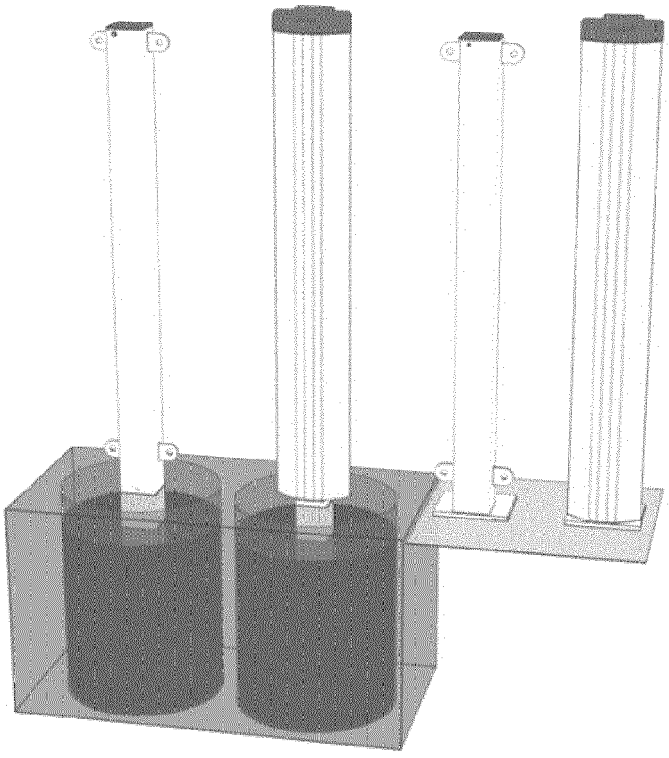

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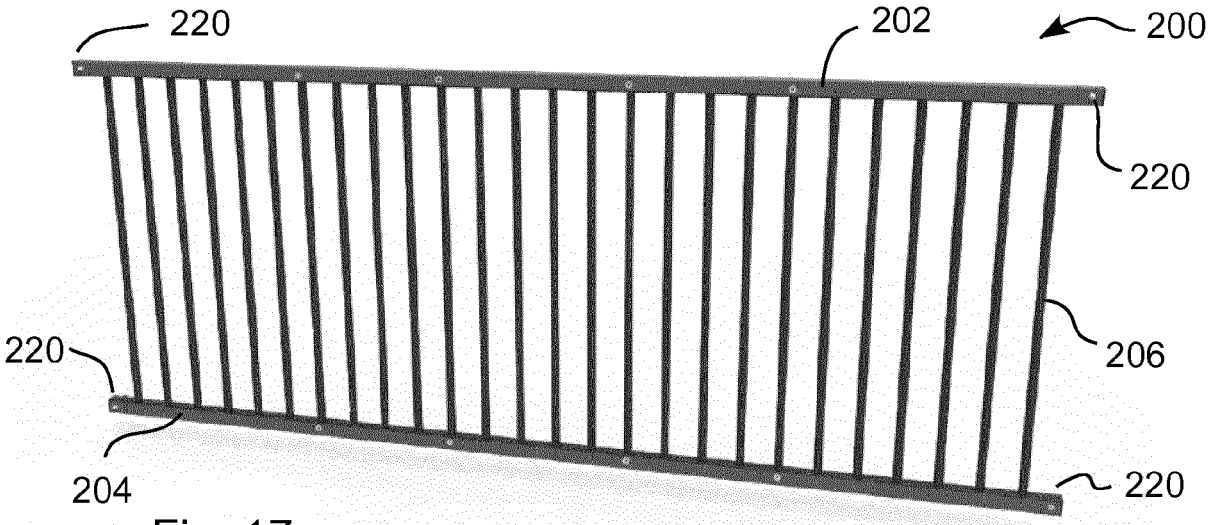

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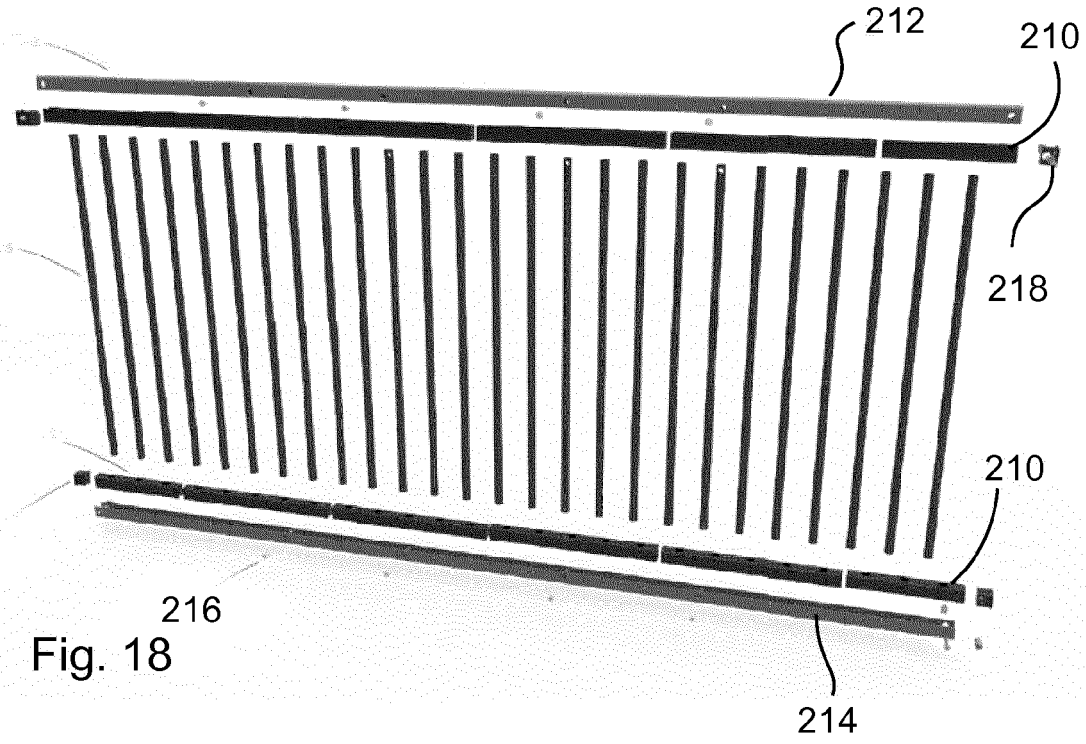

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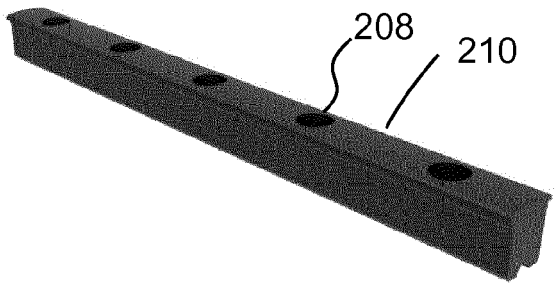

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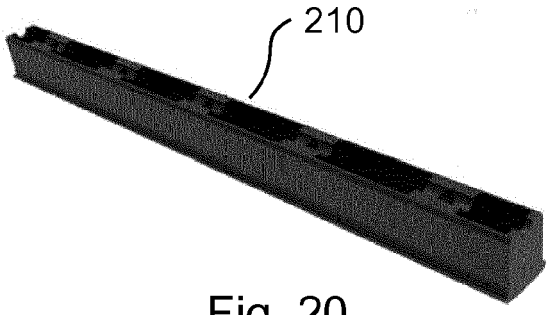

Fig. 20

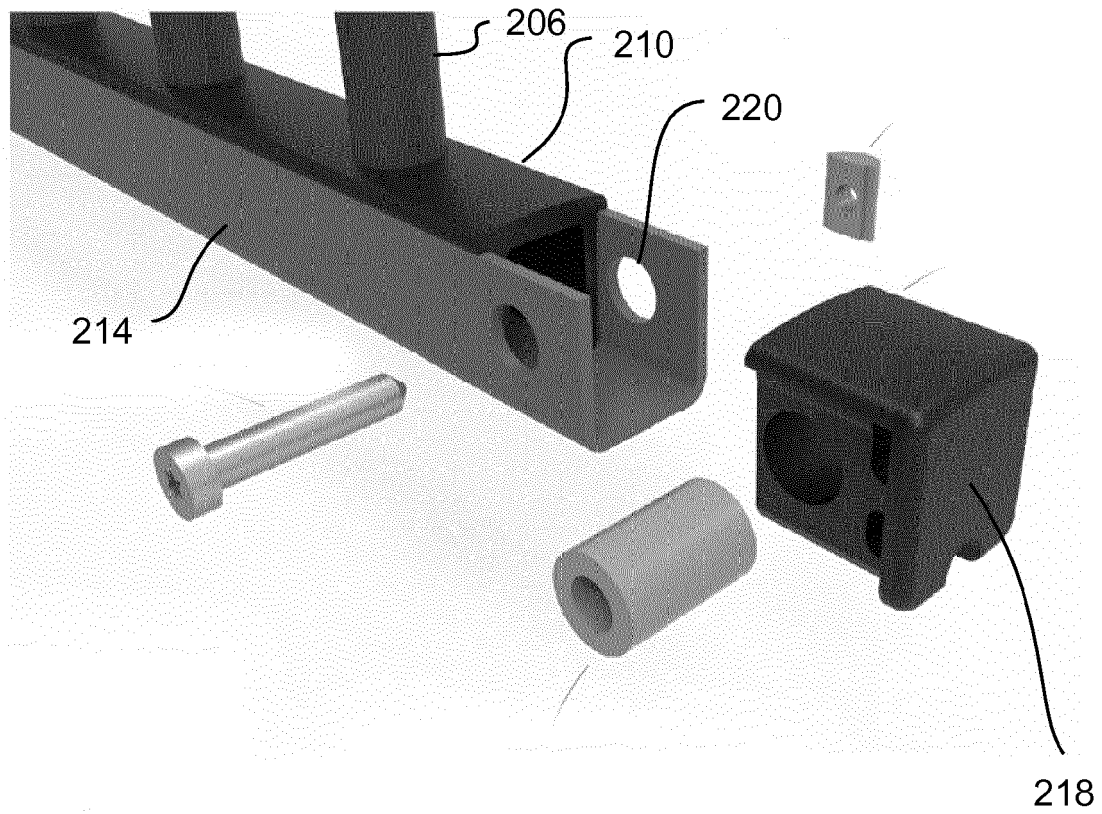

Fig. 21

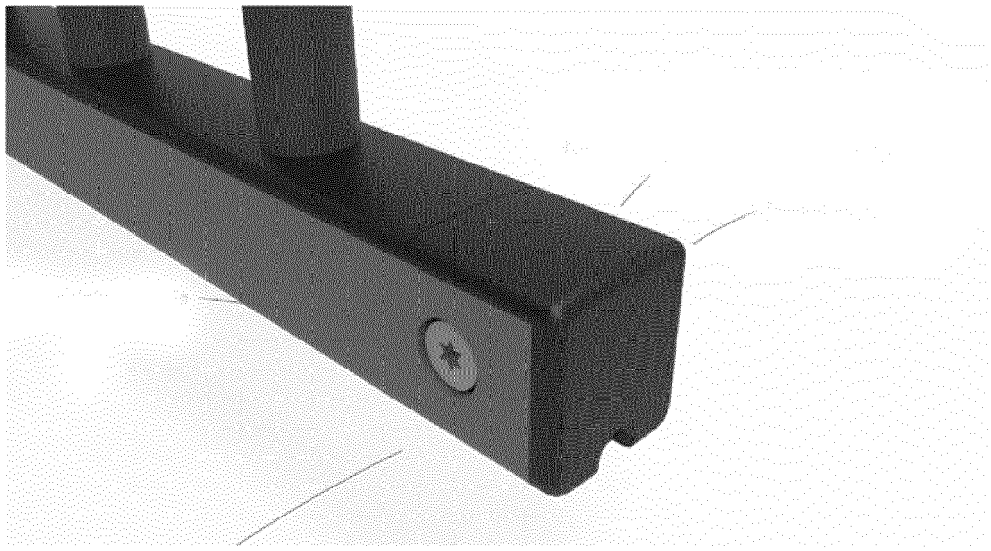

Fig. 22

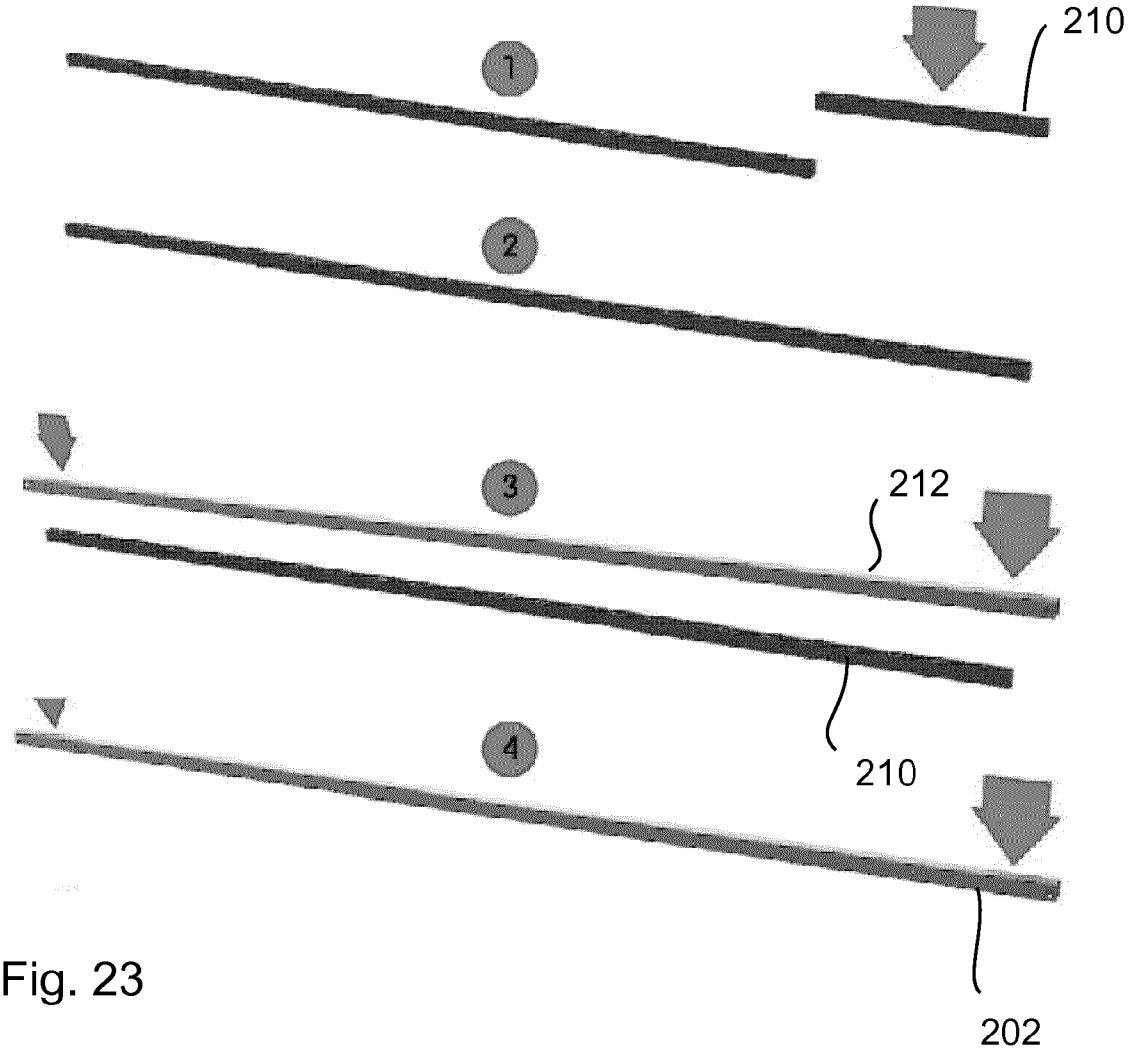

Fig. 23

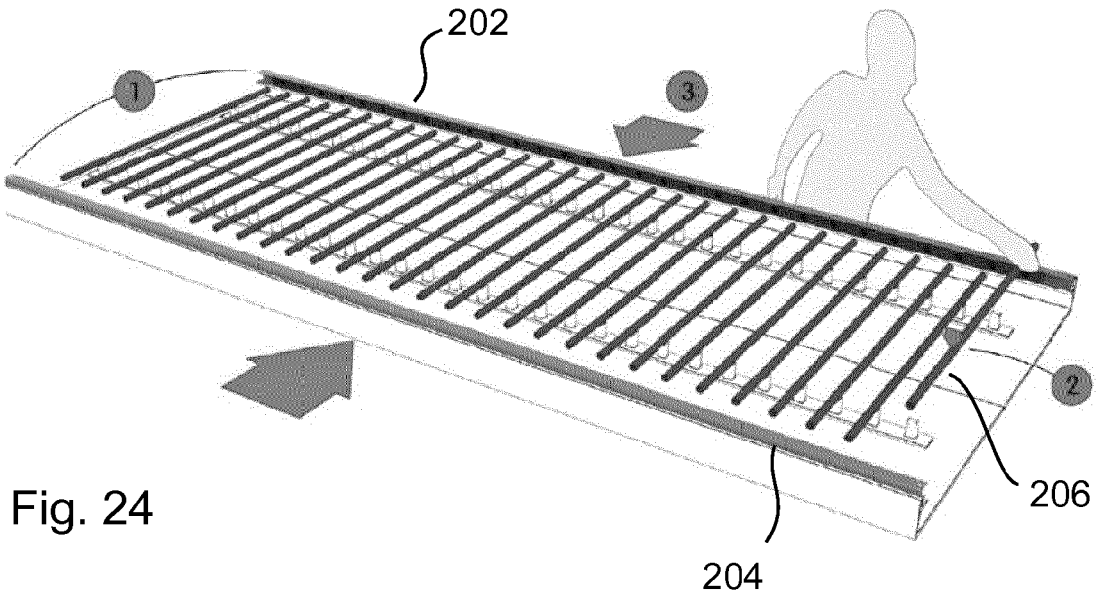

Fig. 24

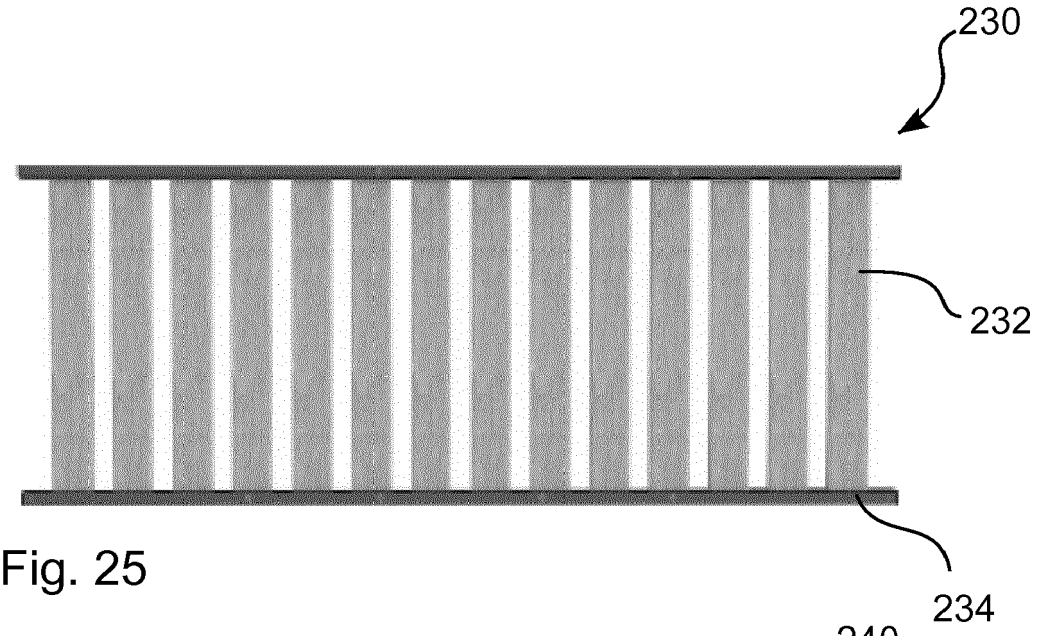

Fig. 25

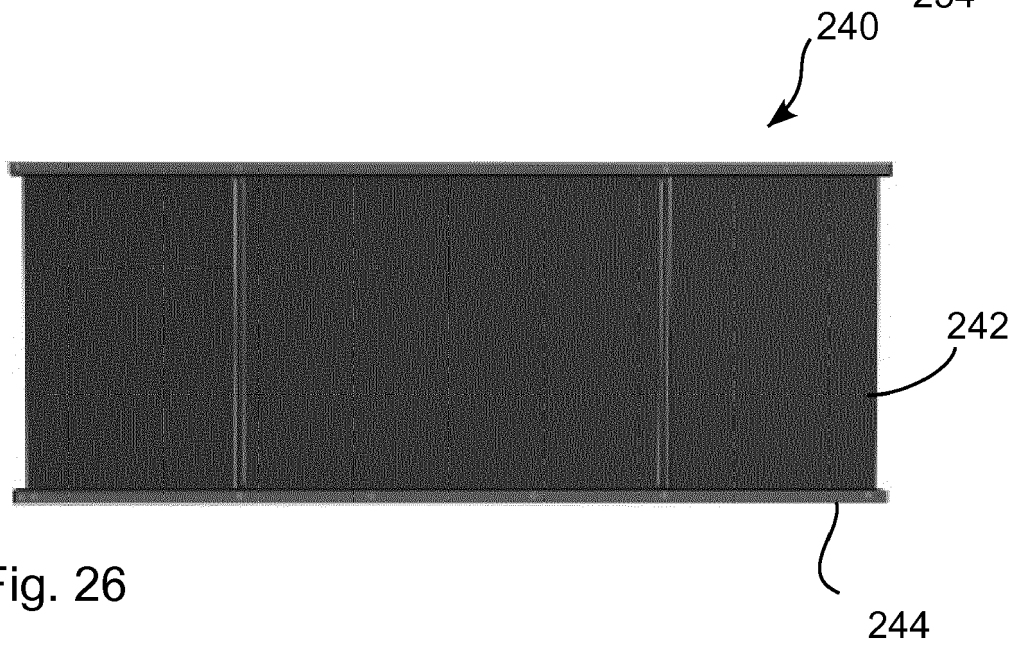

Fig. 26

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EUROPEAN SEARCH REPORT

Application Number
EP 18 17 0719

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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A	WO 2007/063570 A2 (FEDELE CINO [IT]) 7 June 2007 (2007-06-07) * page 5, lines 10-27; figures 1,3 * -----	1-12	ADD. A63C19/08
A	US 2008/173856 A1 (PAYNE JOHN F [US]) 24 July 2008 (2008-07-24) * figure 95 * -----	7	
A	EP 2 716 842 A1 (EHRET GMBH [DE]) 9 April 2014 (2014-04-09) * figure 3b * -----	10	
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A63B
A63C
E04B
E01F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	20 September 2018	Rosborough, John

CATEGORY OF CITED DOCUMENTS

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