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(54) Grid and method of assembling thereof

(57) A grid (1) comprises an inner grid (2) and a frame element (3) for framing at least a portion of the inner grid (2). The inner grid (2) comprises a series of carriers (21) and a series of fillers (22), wherein the carriers (21) and the fillers (22) cross and are engaged with each other. The frame element (3) is engaged with end portions of the carriers (21) and the fillers (22), and is connected to these end portions by means of a pressed fit. A direction (13) in which the engagement between the frame element (3) and the end portions of the carriers (21) and the fillers (22) has been realized is substantially at a right angle to directions (11, 12) in which the carriers (21) and the fillers (22) are extending. In this way, it is achieved that, in a normal application, the frame element (3) can not become detached from the grid (1), even when a laterally directed force is exerted on the grid (1).

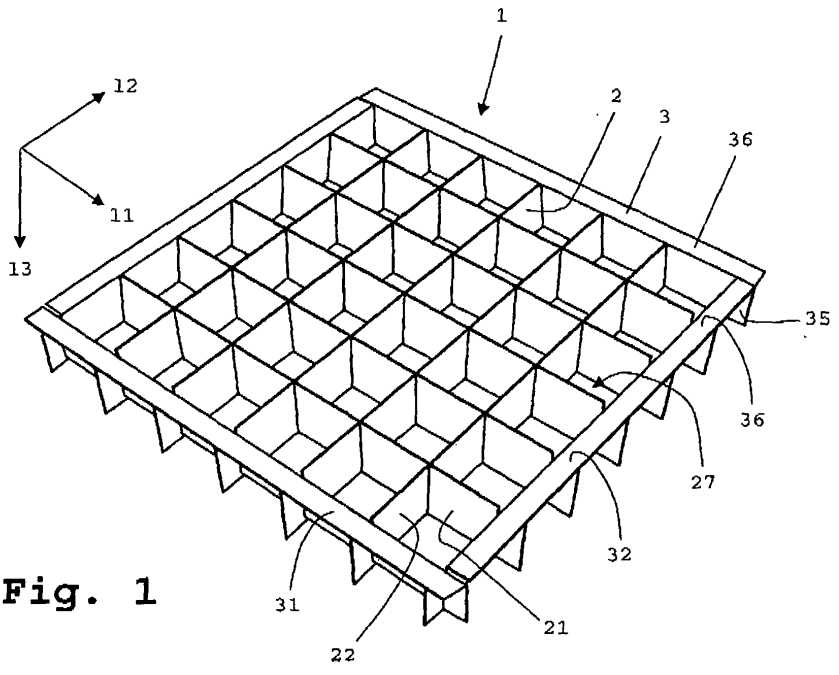

Fig. 1

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Description

[0001] The invention relates to a grid, comprising:

- an inner grid comprising a series of first grid elements and a series of second grid elements, wherein the first grid elements and the second grid elements cross and are engaged with each other; and
- a frame element for framing at least a portion of the inner grid, wherein the frame element and end portions of at least a number of the grid elements of the inner grid are engaged with each other and are connected to each other, exclusively under the influence of clamping forces. The invention also relates to a method for assembling such a grid.

[0002] Grids have been known for many years, and are suitable to be used for the purpose of many applications, wherein covering floor openings, drains and window openings are known examples of such applications. Grids are suitable to be applied in industry, in office buildings, as well as in private housing and other fields of application. Furthermore, grids may be manufactured of all kinds of materials, wherein, usually, the choice of material is closely related to the intended application. For example, a floor grid is usually manufactured of a metal, such as iron.

[0003] In general, a grid comprises a first series of elongated elements, which are usually indicated as carriers or carrying elements, and which are usually located at a certain mutual distance in the grid. Besides, the grid comprises a second series of elongated elements, which are also located at a certain mutual distance in the grid, and which are extending at an angle with respect to the elements of the first series. The elements of the second series are usually indicated as fillers or filling elements.

[0004] Usually, the grid elements comprise elongated sections, for example metal strips. At the positions where the elements of the first series and the elements of the second series cross, the elements are connected to each other in a suitable manner, for example by means of a pressed fit. For the purpose of such a connection, the grid elements are provided with slots: the carrying elements comprise slots at an upper side, whereas the filling elements comprise slots at an under side. A portion of a filling element, in particular a portion of the filling element that is located above the notch in the filling element, is accommodated in each of the slots of the carrying elements. Also, a portion of a carrying element, in particular a portion of the carrying element that is located below the notch in the carrying element, is accommodated in each of the slots of the filling elements. Therefore, the notches in the carrying elements and the filling elements are extending in line, wherein the notches in the carrying elements are filled with portions of the filling elements, and wherein the notches in the filling elements are filled with portions of the carrying elements. In such a configuration, a mutual distance of the carrying elements is determined by a mutual distance of the slots in the filling elements, whereas, in a similar manner, a mutual distance of the filling elements is determined by a mutual distance of the slots in the carrying elements.

[0005] The entirety of interconnected carrying elements and filling elements constitutes an inner grid. In many cases, a frame is arranged around the inner grid. This frame may be connected to the inner grid in different ways, for example by means of a pressed fit or a welded joint. The invention is situated in the field of grids in which a connection between the frame and the inner grid is exclusively based on clamping forces.

[0006] A grid is known from DE 1 044 380, wherein the carrying elements and the filling elements are connected to each other by means of welding, for example. The frame comprises a section that, in a cross-section, has the shape of an F, i.e. a section having a standing leg, a bottom flange and a top flange. In a first embodiment of the grid, the bottom flange of the section of the frame is accommodated in notches which are located in end portions of the elements of the inner grid. The notches are alternately oriented in a somewhat upwardly oriented fashion and a somewhat downwardly oriented fashion, so that in pressing the frame onto the inner grid, a firm pressed fit between the frame and the inner grid has been obtained. In a second embodiment of the grid, the ends of the elements of the inner grid comprise conical connecting members, which are accommodated in a space that is present between the flanges of the frame. As a result of the conical shape of the connecting members, a firm pressed fit between the frame and the inner grid has been obtained.

[0007] GB 1 102 597 shows a grid that is comparable to the first embodiment of the grid known from DE 1 044 380, but wherein the frame comprises simple strips, which are laterally arranged in notches in the end portions of the elements of the inner grid. In respect of the grid known from GB 1 102 597, it is also true that the pressed fit is particularly based on a somewhat alternating orientation of the notches.

[0008] A disadvantage of the grids known from DE 1 044 380 and GB 1 102 597 is that it is difficult to realize the construction of the grid in practice. In both the first embodiment of the grid known from DE 1 044 380 and the grid known from GB 1 102 597, the notches in the end portions of the grid elements need to be arranged in a predetermined, specified way, so that they get the required specific orientations. In the second embodiment of the grid known from DE 1 044 380, the conical connecting members need to be formed at the ends of the grid elements.

[0009] It is an objective of the invention to provide a grid having a construction in which the frame and the inner grid are connected to each other in a sufficiently firm fashion, exclusively on the basis of clamping forces, while the construction is considerably simpler than the known constructions, so that the grid may be manufactured in a simple and fast manner. This objective is

achieved by a grid, comprising:

- an inner grid comprising a series of first grid elements and a series of second grid elements, wherein the first grid elements and the second grid elements cross and are engaged with each other; and
- a frame element for framing at least a portion of the inner grid, wherein the frame element and end portions of at least a number of the grid elements of the inner grid are engaged with each other and are connected to each other, exclusively under the influence of clamping forces,

characterized in that a direction in which the engagement between the frame element and the end portions of the grid elements has been realized is substantially at a right angle to directions in which the grid elements are extending.

[0010] In the grid according to the invention, the frame element and end portions of at least a number of the grid elements of the inner grid are engaged with each other and are connected to each other, exclusively under the influence of clamping forces. Due to the fact that the direction of the engagement is substantially at a right angle to directions in which the grid elements are extending, a robust construction has been obtained. When the grid is arranged in a floor, for example, and forces which are substantially laterally directed are exerted on the grid, for example under the influence of a tire of a fork-lift truck or the like, there is no danger at all of the frame element getting pushed away from the inner grid, because the engagement of the frame element with the inner grid has been realized in a direction which is substantially at a right angle to the direction in which the forces are being exerted. In the case of a floor grid, the engagement of the frame element with the inner grid could only become undone in a substantially vertical direction, under the influence of high tensile forces. As, in practice, such forces are not exerted on a floor grid, the construction of the grid according to the invention will remain completely intact, under all circumstances.

[0011] The construction of the grid according to the invention can be very simple. For example, it is possible that the end portions of the grid elements are provided with notches, wherein all notches are located at one side of the grid, and wherein the frame element is clamped in the notches, at every position where the frame element crosses a grid element. The notches in the end portions of the grid elements may simply be formed as slots, which are arranged at a right angle in the grid elements.

[0012] In a preferred embodiment of the grid according to the invention, the direction in which the engagement between the frame element and the end portions of the grid elements has been realized is substantially equal to a direction in which the engagement between the first grid elements and the second grid elements has been realized. Usually, the first grid elements and the second grid elements are put into engagement in a direction which is substantially at a right angle to a direction in which the grid elements are extending. In such a case, the frame element can be put to engagement with the inner grid in a fashion that is comparable to the fashion in which the first grid elements and the second grid elements are put into engagement with each other. In that case, the process of arranging the frame element requires no other measures than the assembly of the inner grid does.

[0013] In a practical embodiment of the grid according to the invention, at least one of the grid element and the frame element that is put into engagement with this grid element is provided with a notch in which a portion of another of the grid element and the frame element is accommodated. However, it is also possible that the engagement between the frame element and the various grid elements is realized in another manner than by applying notches.

[0014] For sake of completeness, it is noted that in case notches are applied in the process of realizing a pressed fit, the dimensions of the notches are adapted to the dimensions of the parts to be received. In particular, a space offered by a notch is somewhat smaller than an outer dimension of the part to be received, wherein the part to be received is pressed into the notch under the influence of pressure. It is also possible for the notch to have a narrowed portion, wherein the part to be received may be easily inserted in the notch, and may subsequently be moved to a position in the narrowed portion, under the influence of pressure. In such a case, the actual pressed fit is realized at the position of the narrowed portion.

[0015] Advantageously, the frame element is not a single piece, but this element comprises at least two border elements, wherein each border element engages another side of the inner grid, and wherein end portions of adjacent border elements are engaged with each other and are connected to each other, exclusively under the influence of clamping forces. In respect of the connection between the border elements, it is also true that this may be established in a relatively simple manner by applying notches in the end portions of the border elements.

[0016] During the assembly of a grid having a frame element comprising four border elements, wherein end portions of the border elements are connected to each other, it is advantageous when a first pair of border elements are put into engagement with end portions of grid elements first, at opposite circumferential sides of the inner grid, and when, subsequently, a second pair of border elements are put into engagement with end portions of grid elements, at opposite circumferential sides of the inner grid, wherein end portions of the second pair of border elements are also put into engagement with end portions of the first pair of border elements.

[0017] Moreover, it is advantageous if the frame element comprises a connecting portion and a covering portion, which are differently oriented with respect to each other, wherein the connecting portion is directly engaged

with end portions of grid elements, and wherein the covering portion hides from view parts of end portions of grid elements extending beyond the connecting portion, at one side of the grid. For example, this may be practically realized when the frame element has an L-shaped cross-section, wherein the connecting element is formed as one of the legs of the L-shape, and wherein the covering portion is formed as another of the legs of the L-shape. Due to the fact that the covering portion hides from view parts of the end portions of grid elements extending beyond the connecting portion, a beautiful design of the grid is guaranteed by the embodiment of the frame element having a connecting portion and a covering portion.

[0018] In a very advantageous embodiment, the grid is designed in such a way that, at one side of the grid, at least a number of the grid elements of the inner grid contacts an imaginary surface such as may be held against this side of the grid, while at least a part of the connecting portion of the frame element is located at a distance of the surface. In this way, it is achieved that when the grid is located in a receiving frame, the said part of the connecting portion of the frame element does not contact this receiving frame. Consequently, there is little chance that dirt is accumulated around the grid. Nevertheless, in case dirt is present, this may be easily removed, namely by spraying water on the borders of the grid, while the grid is left in its place in the receiving frame. In the process, the water and the dirt are washed away through the space that is present between the frame element and the receiving frame. The specific design by means of which this may be achieved is not limited to a grid according to the invention, and is applicable to any grid.

[0019] Preferably, not only the frame element and the grid element are exclusively connected to each other on the basis of clamping forces. It is also advantageous when the first grid elements and the second elements are connected to each other by means of pressed fits. In that case, in the assembly of the grid, it is not necessary to apply another connecting technique such as welding. As welding has many disadvantages, including the risk of warping of the construction of the grid, the pressure exerted on human beings and the environment, and the relatively high costs, assembling the entire grid on the basis of clamping forces alone is preferred. Apart from that, pressed fits do not need to be essentially weaker than welded joints.

[0020] The invention will be explained in greater detail on the basis of the following description, with reference to the drawing, in which the same or similar parts are indicated by the same reference signs, and in which:

figure 1 shows a perspective view of a grid according to the invention;
figure 2 shows portions of two grid elements of the grid shown in figure 1;
figure 3 shows a side view of a long border element of the grid shown in figure 1;
figure 4 shows a side view of a short border element of the grid shown in figure 1; and
figure 5 shows a side view of a corner portion of the grid shown in figure 1.

[0021] Figure 1 shows a grid 1 according to the invention, which comprises an inner grid 2 and a frame element 3. The inner grid 2 comprises first grid elements 21 extending at a distance with respect to each other, in a first direction, and second grid elements 22 extending at a distance with respect to each other, in a second direction. For the purpose of clarification, in figure 1, the first direction is indicated by means of an arrow 11, and the second direction is indicated by means of an arrow 12.

[0022] In the shown example, the grid elements 21, 22 comprise metal strips, and the first grid elements 21 and the second grid elements 22 are extending at a substantially right angle (an angle of 90°) to each other. However, the grid elements 21, 22 can also be designed in another fashion, and an angle between the directions 11, 12 in which the grid elements 21, 22 are extending may deviate from a right angle.

[0023] At positions where the first grid elements 21 and the second grid elements 22 cross, the first grid elements 21 and the second grid elements 22 are engaged with each other, wherein the first grid elements 21 and the second grid elements 22 are firmly clamped onto each other. Apart from that, it is not necessary that a pressed fit is realized at each crossing between the first grid elements 21 and the second grid elements 22, but this is preferred in view of the firmness of the grid 1.

[0024] The manner in which the first grid elements 21 and the second grid elements 22 are connected to each other is illustrated in figure 2. The first grid elements 21 comprise slots 23, and the second grid elements 22 also comprise slots 24. During the assembly of the inner grid 2, the sides of the first grid elements 21 and the second grid elements 22 where the slots 23, 24 are located are directed at each other. Subsequently, the first grid elements 21 and the second grid elements 22 are pressed into each other, at the positions of the slots 23, 24. For sake of clarity, in the following description, it is assumed that the first grid elements 21 are directed with their slots 23 upward, and that the second grid elements 22 are directed with their slots 24 downward. Therefore, the first grid elements 21 will also be indicated as carriers 21, whereas the second grid elements 22 will also be indicated as fillers 22.

[0025] When the fillers 22 are pressed onto the carriers 21, a portion of the filler 22 that is located above the slot 24 in the filler 22 is received in the slot 23 of the carrier 21. In a similar fashion, a portion of the carrier 21 that is located below the slot 23 in the carrier 21 is received in the slot 24 in the filler 22. The slots 23, 24 in the carriers 21 and the fillers 22 have a narrowed portion 25, 26. At the position of the narrowed portion 25, 26, the inner dimension is somewhat smaller than the dimension of the portion to be received. In this way, it is achieved that a good pressed fit is obtained, which can not become un-

done under normal circumstances.

[0026] In a practical embodiment, a thickness D of the carriers 21 and the fillers 22 may be 2 mm, for example, a width B of an entrance opening of the slots 23, 24 may be 2.1 mm, and a width BN at the position of the narrowed portions 25, 26 may be 1.9 mm. On the basis of such a relationship of dimensions, it is achieved that the carriers 21 and the fillers 22 may easily be positioned with respect to each other, and that a firm pressed fit may be realized. The process of pressing the carriers 21 and the fillers 22 onto each other takes place by exerting a considerable pressure.

[0027] In the grid 1 as shown in figure 1, the carriers 21 and the fillers 22 have an equal height h, and the slots 23, 24 have a height that corresponds to a half of the height h, so that, when the inner grid 2 has been formed, upper sides of the carriers 21 and the fillers 22 are at an equal level, and under sides of the carriers 21 and the fillers 22 are at an equal level as well.

[0028] It is not necessary that the connection between the carriers 21 and the fillers 22 is realized in the above-described way; within the scope of the invention, other possibilities exist, for example the application of clamping springs, clips, and the like.

[0029] In the shown example, the grid 1 is square. That does not alter the fact that the grid according to the invention may have any shape. Also, the number of carriers 21 and fillers 22 may be chosen freely. It is not necessary that all carriers 21 are positioned at a similar distance with respect to each other, and the same applies to the fillers 22. Furthermore, mutual distances between the carriers 21 on the one hand and the fillers 22 on the other hand do not need to correspond to each other.

[0030] Besides the inner grid 2 having the carriers 21 and the fillers 22, the grid 1 comprises a frame element 3 framing the inner grid 2. The frame element 3 comprises two pairs of border elements 31, 32, wherein the border elements 31, 32 of each pair are located at opposite circumferential sides of the inner grid 2. A border element 31 of a first pair is shown in figure 3, and is provided with slots 33 at one side. For sake of clarity, in the following, this border element 31 will be indicated as long border element 31. A border element 32 of a second pair is shown in figure 4, and is provided with slots 34 at two sides. For sake of clarity, in the following, this border element 32 will be indicated as short border element 32.

[0031] In the grid 1, the long border elements 31 are engaged with end portions of the fillers 22, whereas the short border portions 32 are engaged with end portions of the carriers 21. Within the scope of the invention, this is not essential, and therefore, it could also be the other way round. In view of this fact, the end portions of the carriers 21 and the fillers 22 are provided with slots 23, 24, at an upper side. Just like the carriers 21 and the fillers 22 are clamped onto each other, the carriers 21 and the short border elements 32, and the fillers 22 and the long border elements 31, respectively, are clamped onto each other. Within the scope of the invention, it is not necessary that the long border elements 31 are connected to all fillers 22 and that the short border elements 32 are connected to all carriers 21, but, in view of the firmness of the grid 1, this is desirable. For the purpose of additional firmness, the long border elements 31 and the short border elements 32 are engaged with each other and are pressed onto each other, at their ends. This aspect of the grid 1 is also not essential within the scope of the invention. Furthermore, it is not necessary that the pressed fit between the long border elements 31 and the fillers 22, and between the short border elements 32 and the carriers 21 is realized in the above-described manner; within the scope of the invention, other possibilities exist. For example, clamping springs, clips and the like may be applied.

[0032] The border elements 31, 32 have an L-shaped cross-section. This is clearly shown in figure 5, in which a side view of a corner portion of the grid 1 is shown. A longest leg 35 of the border elements 31, 32, which, in the following, will be indicated as connecting portion 35, is a part of the border elements 31, 32 that is provided with the slots 33, 34. A shortest leg 36 of the border elements 31, 32, which, in the following, will be indicated as covering portion 36, is extending at an angle with respect to the connecting portion 35.

[0033] In the shown grid 1, the connecting portion 35 of each border element 31, 32 is engaged with the end portion of the relevant carrier 21 or filler 22, at a distance from the end of the carrier 21 or filler 22. Consequently, parts of the end portions of the carriers 21 and the fillers 22 are projecting with respect to the connecting portion 35. The covering portion 36 is extending over these parts, so that it is achieved that these parts are hidden from view at one side of the grid 1. Consequently, a nicely finished appearance of the grid 1 is obtained, with a frame that completely frames the grid 1 in an optical sense. An additional advantage of the fact that the connecting portion 35 of each border element 31, 32 is engaged with the end portion of the relevant carrier 21 or filler 22, at a distance from the end of the carrier 21 or filler 22, is that, when the grid 1 is located in a receiving frame, the grid 1 does not contact the receiving frame through the connecting portion 35. On the contrary, there is only a small extent of contact, wherein ends of the carriers 21 and the fillers 22 are contacting the receiving frame. As a result, the removal of the grid 1 from the receiving frame is facilitated. Also, the grid 1 is prevented from getting stuck in the receiving frame.

[0034] In a direction which is substantially at a right angle to the directions 11, 12 in which the carriers 21 and the fillers 22 are extending, the connecting portion 35 of the border elements 31, 32 is engaged with the end portions of the carriers 21 and the fillers 22, respectively. For the purpose of clarification, in figure 1, this direction is indicated by means of an arrow 13. In fact, during the assembly of the grid 1, the direction 13 in which the border elements 31, 32 are pressed onto the end portions of the carriers 21 and the fillers 22, respectively, is equal to the

direction 13 in which the carriers 21 and the fillers 22 are pressed onto each other. Consequently, an exceedingly robust grid 1 is obtainted, wherein, under normal circumstances and in normal use, there is no danger that the border elements 31, 32 can be shifted out of place.

[0035] The grid 1 is suitable to be applied as a floor grid, for example. In that case, the grid 1 is located in a receiving frame in a floor, and may be reached at one side, namely the side where the covering portions 36 of the border elements 31, 32 are extending. When the grid 1 is loaded in the vertical direction, i.e. in a direction at a right angle to the directions 11, 12 in which the carriers 21 and the fillers 22 are extending, especially the carriers 21 are loaded, wherein the other elements 22, 31, 32 of the grid 1 encounter a pressure which presses these elements 22, 31, 32 down on the carriers 21, as it were. Thus, there is not any risk of one or more elements 21, 22, 31, 32 becoming detached from the grid

1. When the grid 1 is loaded in the horizontal direction, i.e. in a direction in a same plane as the directions 11, 12 in which the carriers 21 and the fillers 22 are extending, for example under the influence of a tire of a vehicle that is rolling across the grid 1, the elements 21, 22, 31, 32 of the grid 1 encounter lateral forces. Due to the fact that all elements 21, 22, 31, 32 are engaged with each other in a direction 13 which is substantially at a right angle to the directions 11, 12 in which the carriers 21 and the fillers 22 are extending, there is no possibility of a lateral movement of one of the elements 21, 22, 31, 32.

[0036] The carriers 21 and the fillers 22 may have an equal height in the inner grid 2. However, it is also possible that the fillers 22 have a smaller height than the carriers 21, wherein under edges of the carriers 21 and the fillers 22 are extending at different levels. In other words, when, at one side of the grid 1, an imaginary surface is held against the inner grid 2, the carriers 21 contact this surface, while the fillers 22 are extending at a distance from this surface. For example, a height of the fillers 22 can correspond to half of a height of the carriers 21, wherein the slots 24 in the fillers 22 may be omitted.

[0037] Advantageously, it is also true in respect of the border elements 31, 32 that these elements 31, 32 are extending at a distance from an imaginary surface that is held against the inner grid 2, at one side of the grid 1. In this way, it is achieved that when the grid 1 is located in a receiving frame, there is little chance that dirt accumulates between the grid 1 and the receiving frame. Nevertheless, in case dirt gets stuck between the grid 1 the receiving frame with the lapse of time, this may be easily removed by spraying water between the grid 1 and the receiving frame. When an under edge of he border elements 31, 32 would contact the receiving frame, this would not be possible, and the grid 1 would need to be removed from the receiving frame for the purpose of cleaning it. In figure 5, it is clearly shown that the border elements 31, 32 are less high (or are extending downwardly to a lesser extent) than the carriers 21 and the fillers 22.

[0038] The process of assembling the grid 1 is a relatively simple process. As a first step in this process, the carriers 21 and the fillers 22 are engaged with each other, wherein, under the influence of pressure, portions of the carriers 21 are pressed into the slots 24 in the fillers 22, and wherein, under the influence of pressure, portions of the fillers 22 are pressed into the slots 23 in the carriers 21. Subsequently, the short border elements 32 are put into engagement with the end portions of the carriers 21, wherein portions of the short border elements 32 are pressed into the slots 23 in the end portions of the carriers 21, and wherein, under the influence of pressure, portions of the carriers 21 are pressed into the slots 34 in the short border elements 32. Finally, the long border elements 31 are put into engagement with the end portions of the fillers 22, wherein portions of the long border elements 31 are pressed into the slots 24 in the end portions of the fillers 22, and wherein, under the influence of pressure, portions of the fillers 22 are pressed into the slots 33 in the long border elements 31.

[0039] During the process of assembling the grid 1, connections between the border elements 31, 32 and the carriers 21 and the fillers 22, respectively, are exclusively established on the basis of clamping forces. The connections between the carriers 21 and the fillers 22 may also be realized in this manner. Therefore, it is not at all necessary to weld the grid 1. When this is not done, indeed, undesired distortions are prevented. Moreover, in that case, it is possible to produce the grid 1 in a more dimension-stable manner, wherein the tolerances may be considerably smaller. Also, in that case, it is possible to produce the grid 1 in a stress-free manner, as a result of which a straightening operation is unnecessary. Furthermore, no extra materials are added, as a result of which it is not necessary to subsequently remove any superfluous or spilt material, and as a result of which the grid 1 may be lighter. It is also not necessary to subject the grid 1 to a pickling operation.

[0040] As a consequence of the relatively simple production method, there is practically no reject during the production process of the grid 1. All in all, the production of the grid 1 is harmless to human beings and the environment, to a large extent.

[0041] In suitable embodiments, the grid 1 has dimensions in a range of 100x100x20 mm to 2000x2000x50 mm. That does not alter the fact that the grid 1 may also be smaller or larger. In the said range, a length of the carriers 21 and the fillers 22 is between 100 mm and 2000 mm. A height h of the carriers 21 and the fillers 22 is between 20 mm and 50 mm. A thickness D of the carriers 21 and the fillers 22 may be 2 mm, for example, as has already been indicated, but may also be smaller or larger, for example 3 mm.

[0042] The width of mesh, that is the dimension of meshes 27 in the grid 1, may be 33x33 mm, for example,

or 22x22 mm, in a case in which mutual distances between the carriers 21 on the one hand and between the fillers 22 on the other hand are equal, and the meshes 27 are square. It is also possible that the mutual distances between the carriers 21 on the one hand and the fillers 22 on the other hand are not equal, wherein the meshes 27 are rectangular, and have the following dimensions, for example: 33x66 mm, 33x100 mm, or 22x44 mm. Apart from that, it is not necessary that all meshes 27 in the grid 1 have the same dimensions, because it is not necessary that all carriers 21 and all fillers 22, respectively, are located at a same mutual distance.

[0043] The border elements 31, 32 may comprise L-sections having dimensions of 15x5 mm to 45x20 mm, but the border elements 31, 32 may also be designed in any other suitable way, and have other dimensions. Examples of materials of which the grid 1 may be manufactured are steel, such as steel 37-2, stainless steel RVS 304 or 316, or aluminium.

[0044] It will be clear to a person skilled in the art that the scope of the present invention is not limited to the examples discussed in the foregoing, but that several amendments and modifications thereof are possible without deviating from the scope of the present invention as defined in the attached claims.

[0045] In the foregoing, a grid 1 having an inner grid 2 and a frame element 3 for framing at least a portion of the inner grid 2 has been described. The inner grid 2 comprises a series of carriers 21 and a series of fillers 22, wherein the carriers 21 and the fillers 22 cross and are engaged with each other. The frame element 3 is engaged with end portions of the carriers 21 and the fillers 22, and is connected to these end portions by means of a pressed fit. A direction 13 in which the engagement between the frame element 3 and the end portions of the carriers 21 and the fillers 22 has been realized, is substantially at a right angle to the directions 11, 12 in which the carriers 21 and the fillers 22 are extending. In this way, it is achieved that, in a normal application, the frame element 3 can not become detached from the grid 1, even in case a laterally directed force, i.e. a force in a direction in a same plane as directions 11, 12 in which the carriers 21 and the fillers 22 are extending, is exerted on the grid 1.

Claims

1. Grid (1), comprising:

- an inner grid (2) comprising a series of first grid elements (21) and a series of second grid elements (22), wherein the first grid elements (21) and the second grid elements (22) cross and are engaged with each other; and
- a frame element (3) for framing at least a portion of the inner grid (2), wherein the frame element (3) and end portions of at least a number of the grid elements (21, 22) of the inner grid (2) are engaged with each other and are connected to each other, exclusively under the influence of clamping forces,

characterized in that a direction (13) in which the engagement between the frame element (3) and the end portions of the grid elements (21, 22) has been realized is substantially at a right angle to directions (11, 12) in which the grid elements (21, 22) are extending.

2. Grid (1) according to claim 1, **characterized in that** the direction (13) in which the engagement between the frame element (3) and the end portions of the grid elements (21, 22) has been realized is substantially equal to a direction (13) in which the engagement between the first grid elements (21) and the second grid elements (22) has been realized.

3. Grid (1) according to claim 1 or 2, wherein, at the position of an engagement between the frame element (3) and an end portion of a grid element (21, 22), at least one of the frame element (3) and the grid element (21, 22) has a notch (23, 24, 33, 34) in which a portion of another of the frame element (3) and the grid element (21, 22) is accommodated.

4. Grid (1) according to any of claims 1-3, **characterized in that** the frame element (3) comprises at least two border elements (31, 32), wherein each border element (31, 32) is engaged with another circumferential side of the inner grid (2), and wherein end portions of adjacent border elements (31, 32) are engaged with each other and are connected to each other, exclusively under the influence of clamping forces.

5. Grid (1) according to any of claims 1-4, **characterized in that** the frame element (3) has a connecting portion (35) and a covering portion (36), which are differently oriented with respect to each other, wherein the connecting portion (35) is directly engaged with end portions of grid elements (21, 22), and wherein the covering portion (36) hides from view parts of end portions of grid elements (21, 22) extending beyond the connecting portion (35), at one side of the grid (1).

6. Grid (1) according to claim 5, wherein the frame element (3) has an L-shaped cross-section, wherein the connecting portion (35) is formed as one of the legs of the L-shape, and wherein the covering portion (36) is shaped as another of the legs of the L-shape.

7. Grid (1) according to claim 5 or 6, **characterized in that**, at one side of the grid (1), at least a number of the grid elements (21, 22) of the inner grid (2) contacts an imaginary surface such as may be held

against this side of the grid (1), while at least a part of the connecting portion (35) of the frame element (3) is located at a distance of the surface.

8. Grid (1) according to any of claims 1-7, **characterized in that** the first grid elements (21) and the second grid elements (22) are connected to each other under the influence of clamping forces alone.

9. Grid (1), comprising:

- an inner grid (2) comprising a series of first grid elements (21) and a series of second grid elements (22), wherein the first grid elements (21) and the second grid elements (22) cross and are engaged with each other; and
- a frame element (3) for framing at least a portion of the inner grid (2), wherein the frame element (3) and end portions of at least a number of the grid elements (21, 22) of the inner grid (2) are engaged with each other and are connected to each other, exclusively under the influence of clamping forces, wherein the frame element (3) comprises a connecting portion (35) and a covering portion (36), which are differently oriented with respect to each other, wherein the connecting portion (35) is directly engaged with end portions of grid elements (21, 22), and wherein the covering portion (36) hides from view parts of end portions of grid elements (21, 22),

characterized in that a direction (13) in which the engagement between the frame element (3) and the end portions of the grid elements (21, 22) has been realized deviates from directions (11, 12) in which the grid elements (21, 22) are extending, and **in that** the parts of end portions of grid elements (21, 22) which, at one side of the grid (1), are hidden from view by the covering portion (36) of the frame element (3) are parts which are extending beyond the connecting portion (35).

10. Grid (1) according to claim 9, wherein the frame element (3) has an L-shaped cross-section, wherein the connecting portion (35) is formed as one of the legs of the L-shape, and wherein the covering portion (36) is shaped as another of the legs of the L-shape.

11. Grid (1) according to claim 9 or 10, **characterized in that** the direction (13) in which the engagement between the frame element (3) and the end portions of the grid elements (21, 22) has been realized is substantially at a right angle to directions (11, 12) in which the grid elements (21, 22) are extending.

12. Grid (1) according to any of claims 9-11, **characterized in that** the direction (13) in which the engagement between the frame element (3) and the end portions of the grid elements (21, 22) has been realized is substantially equal to a direction (13) in which the engagement between the first grid elements (21) and the second grid elements (22) has been realized.

13. Method for assembling a grid (1) according to any of claims 1-12, comprising the following steps:

- manufacturing an inner grid (2) by allowing first grid elements (21) and second grid elements (22) to cross and to engage with each other;
- arranging a frame element (3) around at least a portion of the inner grid (2) by putting the frame element (3) into engagement with end portions of at least a number of the grid elements (21, 22) of the inner grid (2), wherein pressure is exerted for the purpose of realizing a pressed fit at the positions of the engagements, and wherein the engagements are realized in a direction (13) which is substantially at a right angle to directions (11, 12) in which the grid elements (21, 22) are extending.

14. Method according to claim 13, wherein the engagements between the frame element (3) and the end portions of the grid elements (21, 22) are realized in a direction (13) which is substantially equal to a direction (13) in which the engagement between the first grid elements (21) and the second grid elements (22) is realized.

15. Method according to claim 13 or 14, wherein the frame element (3) is arranged in the form of four border elements (31, 32), wherein a first pair of border elements (32) are put into engagement with end portions of grid elements (21) first, at opposite circumferential sides of the inner grid (2), and wherein, subsequently, a second pair of border elements (31) are put into engagement with end portions of grid elements (22), at opposite circumferential sides of the inner grid (2), wherein end portions of the second pair of border elements (31) are also put into engagement with end portions of the first pair of border elements (32).

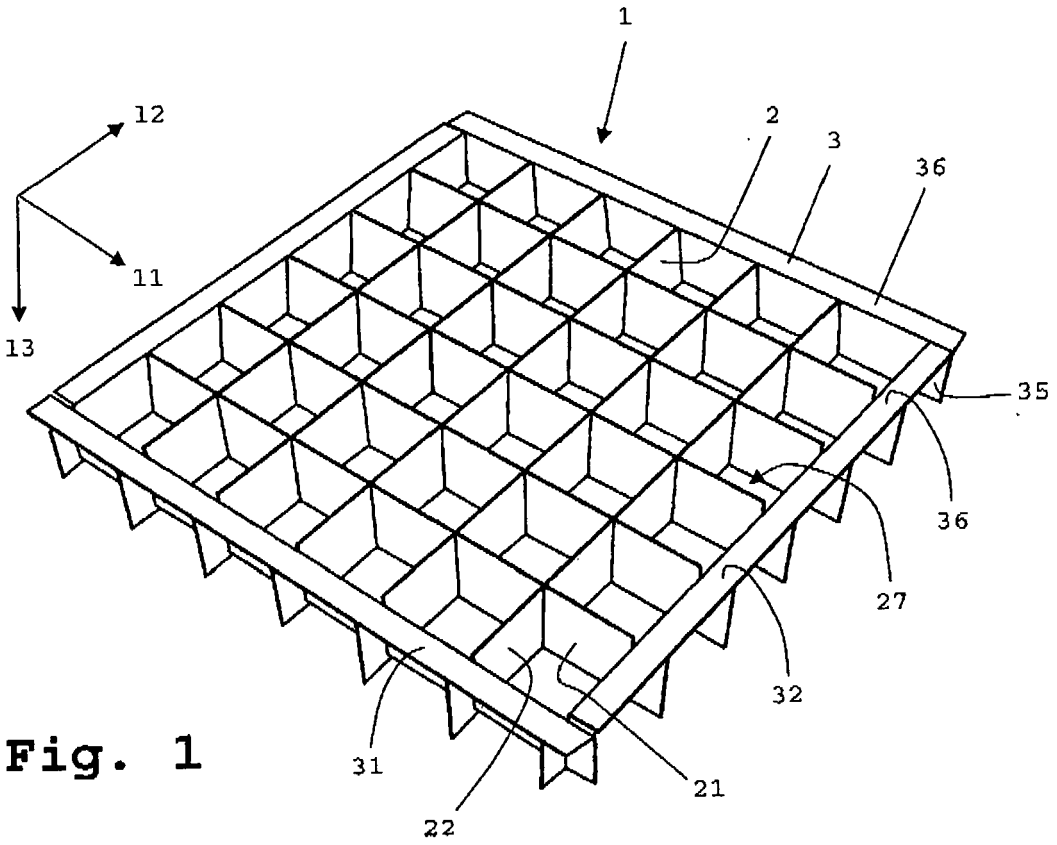


Fig. 1

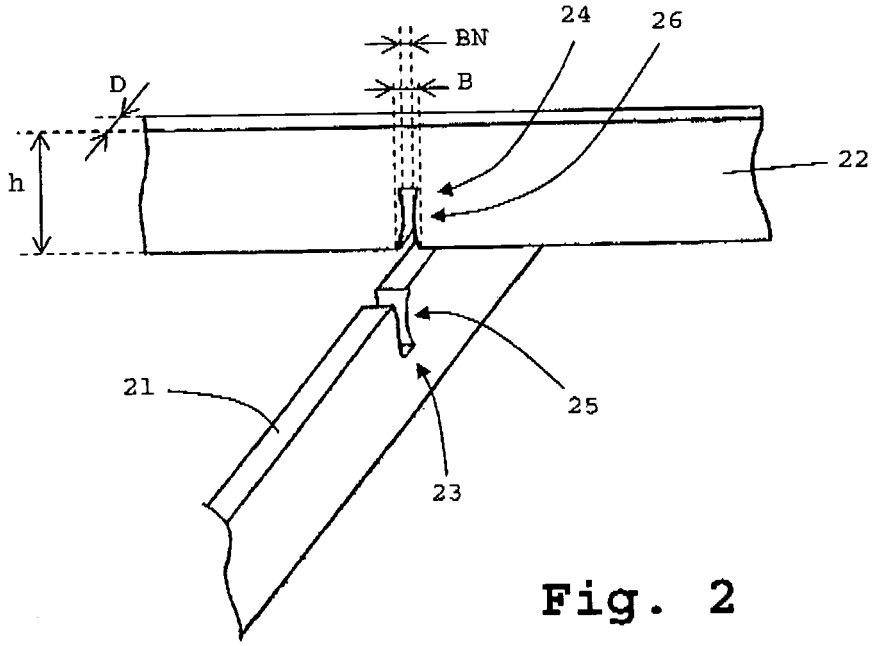
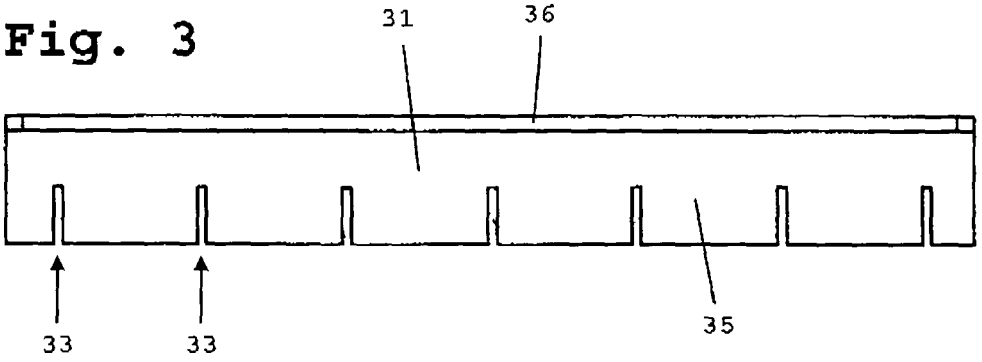


Fig. 2

Fig. 3



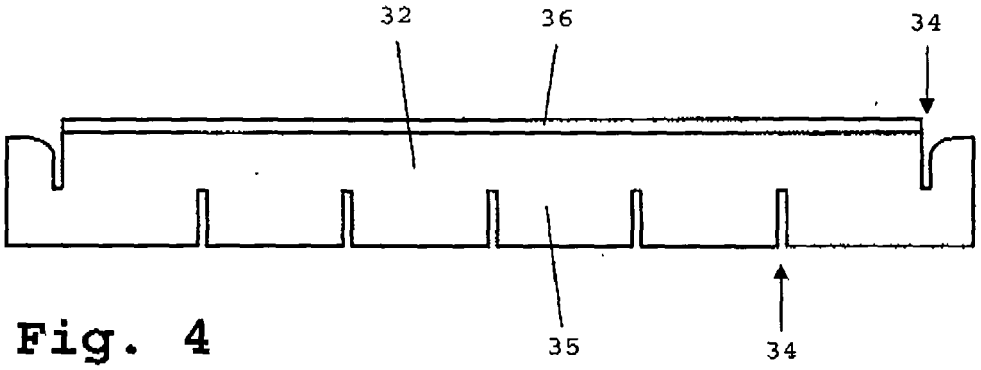


Fig. 4

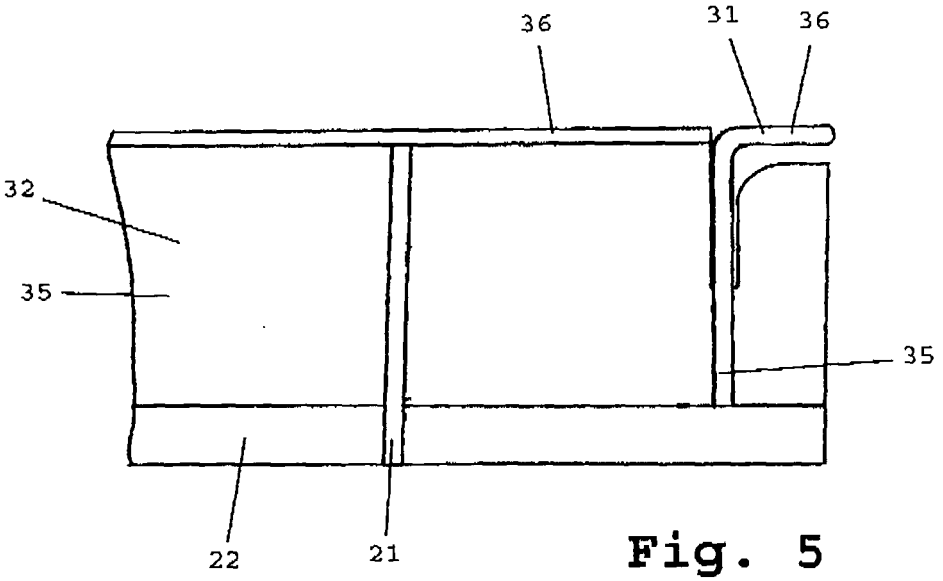


Fig. 5