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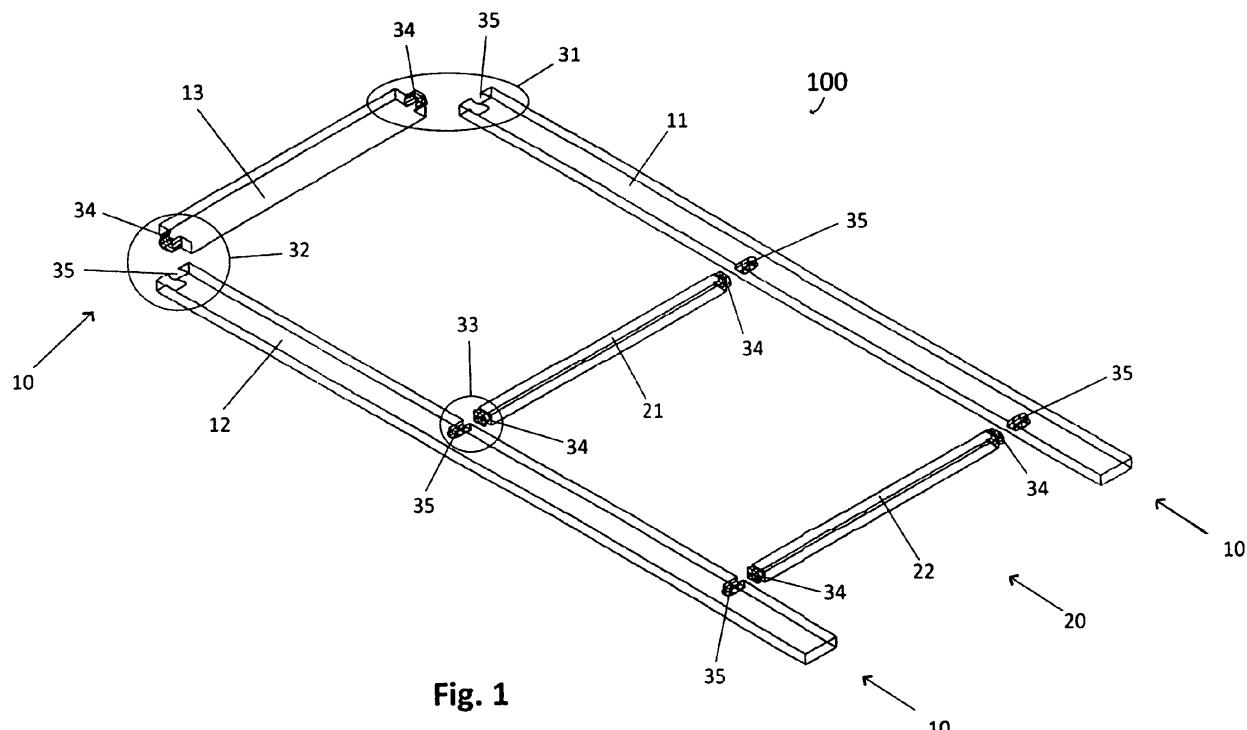
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(54) Frame assembly kit and method for manufacturing and mounting a frame assembly kit

(57) The present invention relates to a frame assembly kit 100 for construction work, to a fixation device 40 mountable on the frame assembly kit 100, to a method for manufacturing and for mounting a frame assembly kit. The frame assembly kit 100 comprises a permanent frame section 10 and a temporary frame section 20. The

temporary frame section is utilized for stabilizing the permanent frame section 10 in an operating mode of the frame assembly kit 100. The frame assembly kit 100 comprises at least three outer members 11, 12, 13, forming a frame and at least one inner member 21, 22 stabilizing the frame. All members are connected to each other via plug connections 31, 32, 33.



EP 2 607 597 A1

Description

[0001] The present invention relates to a frame assembly kit for construction work, to a fixation device mountable on the frame assembly kit, to a method for manufacturing and for mounting a frame assembly kit.

[0002] For construction work there are known frames for supporting wall openings or frames for mounting windows or doors. Conventional frames are pre-assembled in factory by a skilled worker and afterwards are transported to the site where they are installed and fixed for supporting wall openings. The installation on site may need further tools, such as a hammer and nails or a screw driver and screws for fixing the pre-assembled frame to a wall opening.

[0003] Often the pre-assembled frames have a size that two person may carry it in order to prevent damages to the surrounding and to the frame itself. Therefore each frame may be carried separately.

[0004] Moreover, a pre-assembled frame may need space during transportation in a transportation vehicle. A conventional frame for a door with standard dimensions of 2100 x 820 x 100 millimeters may require a volume for transporting or storing of about 0,1722 cubic meters.

[0005] KR 101024267 B1 describes a prefabricated timber window frame and door frame using an edge connection member. A vertical member and a horizontal member are cut in a desired length. The edge connector is fixed to the four corners of the vertical member and horizontal member. The edge connector is integrally fixed to the vertical member and horizontal member by using a plurality of screw nails.

[0006] There may be a need to provide a frame assembly which may be built up on site without using additional tools for building up.

[0007] This problem is solved by a frame assembly kit for construction work according to claim 1. Moreover, the problem is solved by a fixation device for a frame assembly kit according to claim 13. Furthermore, there is provided a method for manufacturing a frame assembly kit according to claim 14 and a method for mounting a frame assembly kit according to claim 15 in order to provide a solution for the given problem.

[0008] According to an exemplary embodiment of the present invention there may be provided a frame assembly kit for construction work comprising a permanent frame section and a temporary frame section for stabilizing the permanent frame section in an operating mode of the frame assembly kit. The permanent frame section may comprise a first supporting member, a second supporting member and an attachment member. Moreover, the attachment member may be connected with the first supporting member via a first plug connection in the operating mode and the attachment member may be connected with the second supporting member via a second plug connection in the operating mode. The temporary frame section may comprise at last one stabilization member, wherein the first supporting member, the sec-

ond supporting member and the attachment member are building a frame and the stabilization member may be surrounded by the frame. Furthermore, the temporary frame section may be connected with the permanent frame section via a plurality of third plug connections in the operating mode.

[0009] In other words, the invention relates to a frame assembly kit for construction work comprising a permanent frame section and a temporary frame section. The temporary frame section is utilized for stabilizing the permanent frame section in an operating mode of the frame assembly kit. The frame assembly kit comprises at least three outer members forming a frame and at least one inner member stabilizing the frame. All members are connected to each other via plug connections.

[0010] The frame assembly kit according to exemplary embodiments of the present invention may be transported and stored in a disassembled mode and may be mounted on site or at a place of installation being in operating mode. For installation there may be no need of any tools, which may reduce the risk of injuries for a craftsman. The installation time for the frame including the permanent section and the temporary frame section may be less than five minutes, in average two minutes. The assembling may be performed on site, which may reduce costs of skilled labor for mounting.

[0011] The frame assembly kit is easy to transport, since only one person may be needed for transporting and mounting. In the disassembled transporting mode the individual parts of the frame assembly kit can be stacked on each other and also the frame assembly kit may be stackable on a further frame assembly kit. In relation to the stackable characteristic the frame assembly kit may comprise profiles.

[0012] The frame assembly kit may be utilized to support door frames or window frames. The frame assembly kit may allow mounting of firm structures and may be attached permanently to vertical faces by fixation elements. Furthermore it is also possible to use the frame assembly kit for different kind of construction work, for example for supporting tunnel constructions in mining or for similar fields of application.

[0013] By providing a frame comprising a permanent section and a temporary section it is possible to adapt each section to its individual requirements. For example, the permanent section can be made of particularly robust material for properly supporting masonry and the temporary section can be made of material, which is easily to work with, to adapt to changing requirements. Because of the variable sections, the individual parts can be chosen.

[0014] According to an exemplary embodiment of the present invention, at least one third plug connection connecting the permanent frame section and the temporary frame section may comprise a male geometry and a female geometry, wherein the male geometry may be located at the temporary frame section and the female geometry may be located at the permanent frame section.

[0015] A similar to plug and socket geometry may be utilized for connecting parts of the temporary frame section with parts of the permanent frame section. For example the male geometry may be a pin, whereas a female geometry may be a recess. Plug and socket geometries have the advantage that the plugging may be connected and disconnected in a fast manner without any need of a tool. Thus, a simple, fast and accurate connection method is provided.

[0016] Female parts of the connection may be located at the permanent frame section while male parts of the connection may be located at the temporary frame section. This configuration may have the advantage, that in a disassembled mode, the frame assembly kit is reduced in size, since no male connection appears at an outer surface of the supporting member when stacked. The male connection may be located at one or at both ends of a stabilization element and thus extending in length of the member and not on a side surface of a member.

[0017] It is of advantage to provide the female part at the permanent frame. In case the temporary frame section is removed and the permanent frame section stays installed, no further part of the permanent frame may need space into the inner of the permanent frame and therefore avoiding hurting passing persons and goods through the frame. In case of using the permanent frame as a pre-frame for further installation, the female parts may be covered by other parts to be mounted on the permanent frame, such as a window frame or a door frame without any need to remove parts of the permanent frame.

[0018] Moreover, it is possible to split the permanent section and the temporary section after the surrounding of the permanent frame section is in its final status, for example after a wall is dried. The permanent frame section could stay installed and could serve for further installation, while the temporary frame section could be removed in order to provide an opening in the wall. In such a case the permanent frame may be utilized as a pre-frame for mounting a window, a door or a decoration on it. In addition during construction work of a surrounding wall the temporary frame section could be temporarily removed for passing through the permanent frame section, for example when a craftsman may need to go through inner of the permanent frame section for leaving the site.

[0019] According to an embodiment of the invention, at least one third plug connection connecting the permanent frame section and the temporary frame section may be a dovetail connection.

[0020] A dovetail connection is a special geometry of a male and female geometry. A dovetail connection is easy to manufacture. Female parts of the dovetail connection may be located at the permanent frame section while male parts of the dovetail connection may be located at the temporary frame section.

[0021] According to an exemplary embodiment of the present invention, the frame assembly kit may comprise

a first volume in the operating mode and may comprise a second volume in a non-operating mode, wherein the second volume in the non-operating mode is about nine times smaller compared to the first volume in the operating mode.

[0022] The frame assembly kit may be packable in a compact manner in the non-operating mode for transport and storage of the frame assembly kit. In the non-operating mode the assembly kit may have an ashlar-formed geometry. A small volume of the frame assembly kit in the non-operating mode is advantageous for storing or transporting the frame assembly kit. The reduced volume in the non-operating mode has the advantage that damages to the frame assembly kit, damages to parts of a surrounding or a transport vehicle may be reduced as well as possible injuries to a person handling the frame assembly kit.

[0023] It may not be necessary to mount the frame assembly kit in factory as a pre-assembly. Therefore, the capacity for frame transportation may be increased compared to pre-assembled frames. A conventional door frame or the frame assembly kit in the operating mode may have for example dimensions of 2100 x 820 x 100 millimeters, which may result in a volume of about 0,1722 cubic meters in the operating mode. The same frame assembly kit may have a volume of about 0,0189 cubic meters in the non-operating mode or disassembled mode for storing or transporting.

[0024] According to an exemplary embodiment of the present invention, the attachment member may comprise a shape which is one of the group of shapes consisting of an arc, a half cycle, a section of a cycle, a half ellipse, a section of a half ellipse, a horizontal line, a pointed shape, a pointed shape combined with an arched form, a pointed shape combined with a straight line, a straight line, and combinations thereof.

[0025] The attachment member may be exchangeable. The frame assembly kit may be utilized for different shapes of openings. The geometrical form of the permanent frame section may be easily adapted by changing the attachment member while using unchanged supporting members.

[0026] There may be provided different kinds of geometrical forms for the attachment member, such as an arched form, which may be used for window frames, a straight form, like a conventional rectangular window frame or door frame, a semicircular form, a form having a quadrant rounding at the corners of the attachment member, a pointed form with straight sides or a pointed form with circular sides. Depending on the style of the building or the requirements to the form of the window or door to be mounted afterwards, it may be understood to use additional geometrical forms for the attachment member.

[0027] According to an embodiment of the invention, the frame assembly kit may made of wood or of material partly comprising wood.

[0028] Wood is a material, which is easy to handle, not

only during manufacturing of the frame assembly kit, but also on site. During transportation wood is light in weight compared to metal. Different kinds of wood may be suitable for the manufacture of the frame assembly kit.

[0029] It is possible that a different kind of woods may be utilized for the permanent frame section and for the temporary frame section, respectively. It may also be possible, that other material than wood may be utilized, such as metal or plastic, for example for at least some parts of the frame assembly kit, for example for the stabilization elements. A material partly consisting of wood would also be suitable for manufacturing the different members of the frame assembly kit. Thus, material derived from wood may be utilized.

[0030] According to an exemplary embodiment of the present invention a member of the permanent frame section may comprise a first height, wherein the stabilization member of the temporary frame section may comprise a second height. It may be foreseen that the second height is smaller than the first height.

[0031] The members of the permanent frame section may have a squared cross section while the members of the temporary frame section may have a rectangular cross section. This is of advantage to reduce weight without limiting the stability of the assembled frame assembly kit. Moreover, a different height in relation to the cross section of the members is advantageous when building the plug connection between the permanent frame section and the temporary frame section. The plug and socket connection may comprise a body stop integrated inside a recess in order to stop the insertion movement during mounting and avoiding slipping of the male part through the recess of the plug and socket connection. Thus the male part has a predefined position within the female part of the plug and socket connection.

[0032] According to an exemplary embodiment of the present invention the frame assembly kit may comprise a fixation device for fixing the frame assembly kit to a surrounding in the operating mode, wherein the fixation device comprises a two-dimensional geometry in a first position and a three dimensional geometry in a second position.

[0033] The first position may be a position for preparing the mounting of the frame assembly kit. The first position of the fixation device may be present during transportation, during plugging the permanent frame section and connecting the temporary frame section with the permanent frame section. After building up a frame comprising at least the permanent frame section the fixation device may be utilized in a second position in order to fix the permanent frame section onto a wall or surrounding.

[0034] The fixation device may have a flat geometry in the first position, which is understood as a two dimensional geometry. A geometry which is not flat, for example a U-shape or a V-shape is understood as a three dimensional geometry. In case the fixation device comprises a fastening element, such as a screw or a nail, which may be located nearby the surface of the fixation element with

one of its end, then the geometry is also understood as two-dimensional as long as further parts of the fixation device do not provide any peaks in relation to the surface of the fixation device.

[0035] According to an exemplary embodiment of the present invention the fixation device may comprise a fixation element and a fastening element, wherein fixation element may comprise a longitudinal axis and a center part. Moreover, the fixation element may be rotatable

10 mounted at the center part by the fastening element. In the first position the longitudinal axis of the fixation element may be in parallel to a longitudinal extension of the member of the permanent frame section at the location where the fixation element is installed. In the second position the longitudinal axis of the fixation element may be approximately orthogonal to the longitudinal extension of the member of the permanent frame section at the location where the fixation element is installed.

[0036] According to an exemplary embodiment of the 20 present invention the three-dimensional geometry of the fixation device in the first position may be provided by the fixation element, wherein an angle of about 5 to about 90 degrees, preferably 45 degrees, may be present between the longitudinal axis of the fixation element and a surface of the permanent frame section.

[0037] According to an exemplary embodiment of the 30 present invention the fixation device may be completely embedded in a longitudinal groove of the permanent frame section in the first position, and the fixation device may be partly embedded in the longitudinal groove of the permanent frame section in the second position.

[0038] It may be foreseen that the groove in which the fixation device is installed may be a longitudinal groove, which may extend over the whole length of a member of the permanent frame section or only over a part of the length of the frame surface of a member. Advantageously at least the supporting members comprise a groove extending over the whole length of the outer frame surface. Therefore, it would be possible to select flexibly at which 40 positions the fixation device may be mounted inside the groove.

[0039] A two dimensional geometry of the fixation device may save space during a transportation of the frame profile assembly kit. A two dimensional geometry may 45 be understood as a geometry which is a flat geometry. The fixation device may be for example a metal plate which is bendable from a two dimensional geometry into a three dimensional geometry, for example a V-shape geometry.

[0040] Moreover, the fixation element may be a clamping plate, which may be adapted to serve in the operating mode by providing a clamping pressure at the edges of a longitudinal groove at the frame surface. In operating mode the part of the fixation element, with which the fastening element is engaged, may be embedded in the groove and the other part of the fixation element, which is rotated over the edge of the frame surface to the groove, is sticking out of the groove and is clamped be-

cause of the mechanical tension of the fixation element to the edge of the frame surface to the groove. Without the use of force to the fixation element in a direction of rotation, the fixation element may be clamped in operating mode so that the fixation element may not switch to non-operating mode by itself.

[0041] The different levels of the outer frame surface and of a ground surface of the groove allow, that the fixation element may be bended in that direction, which would be necessary for the fixation element to stick out of the groove. As a consequence the fixation element may touch the edge of the frame surface on its way out of the groove. Moreover, the fixation element may be a clamping plate, made of bendable metal comprising at least one circular recess for attaching the fastening element. Other materials may also be suitable, such as synthetic material, rubber material or constructions made of bendable wood.

[0042] According to an exemplary embodiment of the present invention the fixation device may comprise a fixation element with a first end and a second end, wherein at least the first end or the second end of the fixation element comprises a fork like manner geometry.

[0043] A fork like manner geometry may be of advantage for fixation, since a fork like manner geometry comprises at least two end parts, which may be available for fixing the permanent frame section onto a surrounding.

[0044] Using a fixation element with a fork like manner geometry is of advantage, since the frame assembly kit may be mounted without any use of a tool, such as a hammer and without any need of mounting nails to the frame surface of the supporting members or the attachment element. The fixation element may be completely embedded in the groove during a non-operating mode of the frame assembly kit. Thus the risk of injuries may be reduced, because it may not be possible to come unintentionally in contact with sharp edges of the fixation element.

[0045] According to an exemplary embodiment of the present invention the fixation device may comprise a fixation element and a fastening element, wherein fixation element may comprise a longitudinal axis and a center part. Moreover, the fixation element may be rotatable mounted at the center part by the fastening element. The fixation element may comprise a two-dimensional geometry in a first position and a three dimensional geometry in a second position, wherein the first position is a position of preparing a fixation and the second position is a position of fixing the fixation element to a surrounding.

[0046] According to an exemplary embodiment of the present invention there is provided a method for manufacturing a frame assembly kit. The method comprises manufacturing a first supporting member comprising a first part of a first plug connection, manufacturing a second supporting member comprising a first part of a second plug connection, manufacturing an attachment member, comprising a second part of the first plug connection and comprising a second part of the second plug

connection, manufacturing a stabilization member, comprising a first part of a third plug connection and comprising a first part of a fourth plug connection, manufacturing a second part of the third plug connection at the first supporting member, and manufacturing a second part of the fourth plug connection at the second supporting member or at the attachment member.

[0047] The manufacturing of the frame assembly kit may be uncomplicated since several parts of the frame assembly kit may comprise an identical connecting geometry and identical dimensions in length, width and height. In case the supporting members are manufactured in three parts then gluing together or clamping together may be performed in addition.

[0048] According to an exemplary embodiment of the present invention there is provided a method for mounting a frame assembly kit. The method may comprise providing a first supporting member, providing a second supporting member, providing an attachment member, providing a stabilization member, building up a permanent frame section by connecting the first supporting member with the attachment member via a first plug connection, connecting the first supporting member with the attachment member via a plug connection, building up a temporary frame section by connecting the stabilization member with the first supporting member via a third plug connection, connecting the stabilization member with the second supporting member or with the attachment member via a fourth plug connection and fixing the permanent frame section to a surrounding.

[0049] The method may be performed at the place of installation of the frame assembly kit into a frame. The plurality of members may be transported in a stacked way and may be mounted by plug connections without any need of further tools. A fixation device may be installed at members of the permanent frame section in advance before stacking the frame assembly kit into a small unit and before transporting.

[0050] Due to a quick mounting of the frame profile assembly kit, for example in less than five minutes, only one person may be needed to mount the assembly kit. Using the frame profile assembly kit a person may save time and consequently reducing the costs during manufacturing a wall opening.

[0051] Exemplary embodiments of the present invention are described below with reference to the accompanying drawings, which are not necessarily drawn in scale. The drawings illustrate:

50 Fig.1 a first exemplary embodiment of a frame assembly kit before mounting;

Fig.2 the frame assembly kit of Fig. 1 in an operating mode;

55 Fig. 3 a connecting geometry as dovetail connection;

Fig. 4 an exemplary embodiment of a dovetail connection;

Fig. 5 a second exemplary embodiment of a frame assembly kit comprising a plurality of fixation devices;

Fig. 6 a third exemplary embodiment of a frame assembly kit comprising a plurality of fixation devices;

Fig. 7 a first exemplary embodiment of an installed fixation device in a non-operating mode;

Fig. 8 the fixation device of Fig. 7 in an operating mode;

Fig. 9 a second exemplary embodiment of a installed fixation device in a non operating mode;

Fig. 10 the fixation device of Fig. 9 in an operating mode;

Fig. 11 a first exemplary embodiment of a permanent frame section;

Fig. 12 a second exemplary embodiment of a permanent frame section;

Fig. 13 a third exemplary embodiment of a permanent frame section;

Fig. 14 a fourth exemplary embodiment of a permanent frame section;

Fig. 15 an exemplary embodiment of a plug connection connecting an supporting member and an attachment member of a permanent frame section; and

Fig. 16 exemplary embodiments of stabilization members connected with a supporting member and an attachment member of a permanent frame section.

[0052] Fig. 1 illustrates an exemplary embodiment of a frame assembly kit 100 in a disassembled mode before mounting the frame assembly kit 100. The frame assembly kit 100 of Fig. 1 comprises a permanent frame section 10 and a temporary frame section 20 for stabilizing the permanent frame section 10 in an operating mode, shown in Fig. 2. The permanent frame section 10 comprises a first supporting member 11, a second supporting member 12 and an attachment member 13 of a straight form. The attachment member 13 may be mounted on top of the frame assembly kit and may be connected with the first supporting member 11 via a first plug connection

31 and with the second supporting member 12 via a second plug connection 32, wherein the supporting members may be mounted in a vertical direction.

[0053] In Fig. 1 the first supporting member 11, the second supporting member 12 and the attachment member 13 are arranged to build a U-shape as a permanent frame section with orthogonal angles at the plug connections 31, 32. The first plug connection 31 and the second plug connection 32 comprise a male part 34 and a female part 35. The attachment member 13 comprises a first end and a second end for plugging, wherein the attachment member 13 comprises at each end a male part for connecting with the first supporting 11 member and the second supporting member 12, respectively. The first supporting member 11 and the second supporting member comprise a female part for connecting with the attachment member 13, respectively.

[0054] In Fig. 1 the temporary frame section 20 comprises a first stabilization member 21 and a second stabilization member 22. The first stabilization member 21 and the second stabilization member 22 may be connected via a third plug connection 33 with the permanent frame section 10, respectively as shown in Fig. 2. The third plug connection 33 is a dovetail connection 36, wherein a female part 35 of the dovetail connection 36 is present at the supporting members 11, 12 and a male part 34 of the dovetail connection 36 is present at the stabilization members 21, 22 of the permanent frame. Thus, the four dovetail connections 36 may connect the temporary frame section 20 with the permanent frame section 10, as shown in Fig. 2.

[0055] Fig. 2 illustrates the frame assembly kit 100 of Fig. 1 in an assembled mode forming an assembled frame 10, 20 comprising the permanent frame section 10 and the temporary frame section 20 connected to each other. The first supporting member 11, the second supporting member 12 and the attachment member 13 are forming the permanent frame section 10. The first stabilization member 21 and the second stabilization member 22 are located in the inner of the permanent frame section 10 and are surrounded by the first supporting member 11, the second supporting member 12 and the attachment member 13, respectively.

[0056] In Fig. 2 the first supporting member 11 and the attachment member 13 are forming an orthogonal angle at a first corner of the assembled frame 10, 20, wherein the second supporting member 12 and the attachment member 13 are forming a second orthogonal angle at a second corner of the assembled frame 10, 20. The first supporting member 11, the second supporting member 12 and the attachment member 13 are building a frame which surrounds the first stabilization member 21 and the second stabilization member 22.

[0057] Fig. 3 illustrates the frame assembly kit 100 of Fig. 1 and Fig. 2 in a disassembled non-operating mode. In the non-operating mode the frame assembly kit 100 may be stored or transported. In the non-operating mode the frame assembly kit 100 is compact and comprises a

small volume in comparison to the frame assembly kit 100 in the operating mode or compared to a conventional frame profile. The volume of the frame assembly kit 100 results from multiplying length 51, width 52 and height 53, which are indicated in Fig. 3 and Fig 1 for a disassembled mode or non-operating mode and for an assembled mode or operating mode.

[0058] In Fig. 3 the two supporting members 11, 12 are stacked one up each other as a first and a second layer. The attachment member 13 is stacked above the first supporting members 11, 12 at one side of the upper surface of the stacked outer supporting members 11, 12. The two stabilization members 21, 22 are stacked next to each other upon another side of the upper surface of the stacked outer supporting members 11, 12. The female part of the dovetail connection 30 and the male part of the dovetail connection 30 are mounted to the outer supporting members 11, 12, the stabilization members 21, 22 and the attachment member 13.

[0059] Fig. 4 illustrates an exemplary embodiment of a dovetail connection 36. The dovetail connection 36 may be used for connecting the supporting member 11 with the stabilization member 21. The stabilization member 21 comprises a male part 34 which fits into a female part 35 present at the supporting member 11. The stabilization member 21 has a thickness, which may be half of the thickness of the supporting member 11. The different thicknesses create a body stop at the female part 35. The body stop has the effect that the stabilization member 21 is fixed without any need of further preparations, since the body stop may stop the stabilization member 21 during plugging in the direction of insertion, wherein the insertion may be performed from a surface of the supporting member 11 in orthogonal direction of longitudinal elongation of the supporting member 11.

[0060] In Fig. 4 the supporting member 11 of the permanent frame section 10 comprises a first height 58 and the stabilization member 21 of the temporary frame section 20 comprises a second height 59, wherein the second height 59 is smaller than the first height 58. For example the second height 34 is half of the first height 58. A different height may provide a body stop in the inner part of the recess 35. The body stop is formed by a surface inside the female part 35 and may support a fixing of the stabilization member 21 onto the first supporting member 11.

[0061] It may be foreseen that all dovetail connections 36 utilized for the frame kit assembly 100 are provided with a body stop and are providing a same insertion direction in relation to the assembled frame assembly kit 100. This would have the advantage, that all members 21, 22, 23, 24, 25, 26, 27 of the temporary frame section 20 which may be connected all via a dovetail connection 36 may be plugged and unplugged from one front side of the frame assembly kit 100 during mounting and in the operating mode.

[0062] Fig. 5 illustrates a further exemplary embodiment of a frame assembly kit 100 in an operating mode.

The frame assembly kit 100 comprises permanent frame section 10 comprising a first supporting member 11, a second supporting member 12, a first attachment member 13 and a second attachment member 14. The permanent frame 10 has a closed form and may be utilized for example for preparing a window mounting.

[0063] It may be foreseen that the frame assembly kit 100 may be installed in a vertical direction, wherein the first supporting member 11 and the second supporting member 12 are installed vertical in relation to ground. It would also be possible to install the frame assembly kit 100 of Fig. 5 in a horizontal direction due to its closed form, wherein one of the supporting members 11, 12 is mounted at the top of the permanent frame 10 and the both attachment members 13, 14 are mounted in vertical direction in relation to ground.

[0064] In the illustrated Figures a supporting member 11, 12 has a length which is longer than a length of an attachment member 13, 14. However, it may also be possible, that the length of the attachment member 13, 14 is longer compared to the length of the supporting member 11, 12, respectively. Since the lengths of all members of the frame assembly kit 100 are adaptable in relation to the requirements of installation, the length of the supporting member 11, 12 could also be equal to the lengths of the attachment member 13, 14. The members of the frame assembly kit 100 may also vary in cross section whereas for example the members of the permanent frame section 10 may have a squared size and the members of the temporary frame section 20 may have a rectangular size. In this configuration one side of the rectangular may be half of the side of the squared cross section.

[0065] In Fig. 5 the frame assembly kit 100 comprises a temporary frame section comprising a first stabilization member 21, a second stabilization member 22, a third stabilization member 23, a fourth stabilization member 24, a fifth stabilization member 25, a sixth stabilization member 26 and a seventh stabilization member 27. All stabilization members 21, 22, 23, 24, 25, 26, 27 are surrounded by the permanent frame section 10, respectively. The stabilization members 21, 22, 23 are located in parallel to each other and in parallel to both attachment members 13, 14. The stabilization members 21, 22, 23 are connected between the first and second supporting members 11, 12, respectively. The further stabilization members 24, 25, 26, 27 are located in a corner of the permanent frame section 10 and are connected between one of the supporting members 11, 12 and one of the attachment members 13, 14, respectively. The stabilization members 24, 25, 26, 27 are installed in an angle of 45 degrees between the supporting members 11, 12 and the attachment members 13, 14, respectively.

[0066] In Fig. 5 three stabilization members 21, 22, 23 are mounted orthogonal to the first supporting member 11 and the second supporting members 12 within the permanent section 10. Further four stabilization members 51, 52, 53, 54 are mounted in nearby corners of two orthogonal supporting members 11, 12, 13, 14 or in the

corners of a supporting member 11, 12 and the attachment member 13, wherein the attachment member 13 is orthogonal to the first supporting member and the second supporting member 12.

[0067] In Fig. 5 and Fig. 6 the assembled frame assembly kit 100 comprises a plurality of fixation devices 40 which are installed at an outer surface 15 of the permanent frame 10, especially at an outer surface of a supporting member 11, 12, which may be vertically arranged at the installation location. The fixation device 40 is illustrated in more detail in Fig. 7 and Fig. 8. The fixation device 40 comprises a fixation element 41 with a body having a longitudinal axis and a fastening element 42. The fastening element 42 is located in a center area of the fixation element 41, whereas the fixation element 41 is rotational movable in relation to the fixation element 41 as a rotation center. The fixation device 40 is installed in a groove 43 of the permanent frame section 10.

[0068] The groove 43 may be a longitudinal groove which may extend from a first end of a member 11, 12, 13, 14 to a second end of the member 11, 12, 13, 14 at the outer side of the permanent frame section 10 as shown in Fig. 5 and Fig. 6. Several fixation devices 40 may be installed within one groove 43 at an outer surface of the permanent frame section 10, for example in a distance of fifty centimeters to each other or other intervals.

[0069] Fig. 7 illustrates a fixation device 40 in a non-operating mode of the fixation device 40. Fig. 8 illustrates the fixation device 40 of Fig. 7 in an operating mode of the fixation device 40 for fixing the permanent frame 10 into a surrounding.

[0070] Fig. 7 illustrates an exemplary embodiment of a fixation device 40 in a first position. The fixation device 40 comprises a fixation element 41, which is mounted at an outer frame surface of a member 11, 12, 13, 14 of the permanent frame section 10. The fixation element 41 is fixed by a fastening element 42 in a longitudinal groove 43 of the permanent frame section 10. The fixation element 41 has five openings 44, for example bore holes, wherein a fastening element 42 is mounted at a center opening 44 in a central part 47 of the fixation element 41. The fastening element 42 provides fixing the fixation device 40 rotatable inside the groove 43 in a rotation direction 55. The fastening element 42 is mounted symmetrically to the ends of the fixation element 41, thus the fixation element 41 has equal lengths to both sides of the fastening element 42.

[0071] In Fig. 8 the fixation element 41 is rotated by ninety degrees in one of the rotation directions 55, clockwise or counter-clockwise, to a second position. In this position the fastening element 42 is retaining the fixation element 41 partly in the groove 43. The outer part of the fixation element 41, not inside the groove 43 anymore, is sticking out of the groove 43 in an angle 57. In the second position the fixation element 41 is not able to rotate independently back to the non-operating mode of the first position. The prevention of rotation is due to a clamping pressure between the fixation element 41 and

an edge of the groove 43 resulting in a fixing force, which is fixating the fixation element 41 in position and ensures, that the part of the fixation element 41, which is sticking out of the groove 43 and not able to arrive back to a flat form without any further manipulation of a craftsman.

[0072] Fig. 9 and Fig. 10 illustrates a further exemplary embodiment of a fixation device 40, which may be utilized as an alternative of the fixation device 40 of Fig. 7 and Fig. 8. In Fig. 9 the fixation element has a two dimensional shape in a non-operating mode and in Fig. 10 the fixation element 41 has a three dimensional shape in an operating mode.

[0073] In Fig. 9 the fixation device 40 comprises a fixation element 41 having a body with a longitudinal axis. The fixation device 40 comprises a wave like manner geometry 45 at two opposite sides of the body. A plurality of openings 44 is located between the wave like manner lines 45. The fixation device 40 in Fig. 9 comprises five openings 44, wherein in a center opening in the center of the body of the fixation element 41 a fastening element 42 is mounted. The fastening element 42 fixes the fixation device 40 which has a two dimensional shape inside a longitudinal groove 43. The fastening element 41 allows a rotation of the fixation element 41 of at least 90 degrees in case the fixation element 41 is transferred into a three dimensional shape, for example by rotating and bending.

[0074] In Fig. 9 the fixation element 41 comprises a first end and a second end, wherein at both ends the fixation element 41 comprises a fork like manner geometry 46, which may be utilized for mounting and fixing the permanent frame 10 onto a wall or surrounding.

[0075] Fig. 10 shows the fixation device 40 of Fig. 9, whereas Fig. 10 may also be valid for the fixation devices 40 illustrated in Fig. 8 and Fig. 9. In Fig. 10 the fixation device 40 is bended into a three dimensional shape, wherein the fastening element 42 is fixing a center part of the fixation element 41 inside the groove 43. The three dimensional fixation device 40 has a V-like shape form and is bended away from the surface 15 of the supporting member 11, 12. The bending is performed symmetrically in relation to the center of the fixation element 42. Therefore the length and the angle of the bended fixation element 41 are equal, measured from its center part 47. In Fig. 10 the left side with a left leg and the right side with a right leg of the fixation element 41 are of identical shape. The fixation element 41 provides a first angle 56 between the right leg and the left leg. Moreover, a second angle 57 is present between the surface 15 and one leg of the fixation element 41. In Fig. 10 this second angle 57 is about 45 degrees and the first angle is about 90 degrees.

[0076] In Fig. 7, Fig. 8, Fig. 9 and Fig. 10 the fixation elements 41 may be made of metal, for example the fixation elements 41 may be manufactured from galvanized metal plates. The fixation elements 41 may be installed and fixed by the fastening element 42 before the frame assembly kit 100 is transported in a disassembled mode. During transportation the fixation elements 41 may have a two dimensional shape and may be stored and embed-

ded completely inside the groove 43 of a supporting member 11, 12 or of an attachment member 13, 14. During installation on site one or more fixation elements 41 on each member 11, 12, 13, 14 may be bended and turned into a three dimensional shape for fixing the permanent frame section 10 onto a wall or a surrounding. It may be foreseen that at least one fixation element 41 on each supporting member 11, 12 may be utilized for fixation.

[0077] Fig. 11 to Fig. 14 illustrates two dimensional views of exemplary embodiments of permanent frame sections 10 with different kind of attachment member 13. The different shapes of attachment members 13 may be attached to the first supporting member 11 and the second supporting member 12, respectively. The attachment members 13 in Fig. 11 to 14 may have a similar connecting geometry as shown for the attachment member 13 in Fig. 1 and Fig. 14. Due to the assembly character of the frame assembly kit 100 the attachment member 13 may be interchangeable. Therefore, it is possible to adapt the permanent frame section 10 according to construction requirements and sizes of openings to be supported by the assembled frame 10, 20. Thus, any kind of opening may be supported by the frame assembly kit 100 in order to suit for any form of door, window or opening. The different forms of the attachment members 13, 14 in all Figures including a straight form in Fig. 1 to 3 may be manufactured of one part or may be combined by two or more parts.

[0078] In Fig. 11 the attachment member 13 has an arched form. The arched form may be a section of a circular ring or a section of an ellipse.

[0079] In Fig. 12 the attachment member 13 has a curved form comprising a horizontal section in the center part of the attachment member 13 which horizontal section is curved in the direction towards the attached supporting members 11, 12, respectively, in order to provide a vertical interface geometry to be connected via a plug connection with the supporting members 11, 12 on each end of the attachment member 13. Thus, the attachment member 13 has a straight form with circular quadrants at the corners towards the supporting members 11, 12.

[0080] In Fig. 13 the attachment member 13 comprises a pointed form with a peak in the middle and two sections on both sides comprising a form of a cycle section or comprising at least partly circular sides attached to the supporting members 11, 12, respectively.

[0081] Fig. 14 illustrates an attachment device 13 which has a semicircular form.

[0082] The geometries illustrated in Fig. 11 to 14 may be attached to a temporary frame section 20 in a similar or identical manner as shown and described in relation to further embodiments of the present invention.

[0083] Fig. 15 illustrates an exemplary embodiment of a first or second supporting member 11, 12. In all embodiments in relation to the present invention the supporting members 11, 12 may be manufactured of one piece of material or may be manufactured of a plurality

of pieces. The material is utilized for manufacturing is preferably wood or material comprising wood components, such as ply wood.

[0084] In Fig. 15 the supporting member 11, 12 is manufactured of three parts or three elements 16, 17, 18, which are attached to each other for example by adhering or by clamping. A supporting member consisting of more than one piece may be easy to manufacture. Firstly, the shape of the female part 35 may be manufactured at all three pieces and afterwards all pieces 16, 17, 18 are connected to each other. This provides an easy manufacturing due to uncomplicated cutting steps. For example the middle part 17 may be cut only in length without any need for further shaping, since the female part 35 may comprise a horizontal line at the bottom of the opening. Moreover, the second part 17 in the middle of the supporting member 11, 12 may be of reduced height in comparison to the first part 16 and third part 18. This may be of advantage when providing a groove 43, which may be created by choosing different heights of the parts 16, 17, 18 without any need of further manufacturing, such as cutting.

[0085] In Fig. 15 a female part 35 is provided on the top of the supporting member 11, 12 in order to receive a male part 34 of an attachment member 13, 14 of a plug connection 31, 32. It may also be foreseen to provide a female part 35 on the bottom of a supporting member 11, 12 in order to enable a plugging of two supporting parts to each other on one vertical side of the assembled permanent frame section 10. This may be of advantage in case large sizes of openings are under construction work.

[0086] In Fig. 15 the male part 34 of the plug connection 31, 32 has a corresponding geometry in order to fit into the female part 35. The male part 34 may be inserted from a horizontal direction into one of the vertical mounted supporting members 11, 12. The female part 34 of the plug connection 31, 32 may comprise a geometry which prevents disconnecting the male part 35 by lifting or by moving the male part 35 in a vertical direction. This kind of geometry may prevent unintended dismounting of the permanent frame section 10 when pressing the assembled frame assembly kit into the opening of a wall. Thus, the plug connection 31, 32 comprises a securing mechanism without any need of further elements or tools.

[0087] Fig. 16 illustrates a plurality of plug connections 33 between the permanent frame section 10 and the temporary frame section 20. A first stabilization member 21 and a second stabilization member 22 are mountable to the second supporting member 12. The two straight stabilization members 21, 22 differ in their connection geometry. However, it may be foreseen that all plug connections 33 connecting the permanent frame section 10 and the temporary frame section 20 are of identical shape and size. This has the advantage that the temporary frame section 20 may be fixed in a flexible way without exchanging part of the permanent frame section 10. A third stabilization member 25 extending over a corner of

the permanent frame section 10 has a connecting geometry which fits in the same recesses 35 of the permanent frame section 10 as the straight formed stabilization member 21 comprising a dovetail connection 36, respectively.	100	frame assembly kit
	10	permanent section
	5 11, 12	supporting member
	13, 14	attachment member
	10 15	surface
	16, 17, 18	element
	20	temporary frame section
	15 21 - 27	stabilization member
	30	connection geometry
	20 31	first plug connection
	32	second plug connection
	33	third plug connection
	25 34	male part
	35	female part
	30 36	dovetail connection
	40	fixation device
	41	fixation element
	35 42	fastening element
	43	groove
	40 44	opening
	45	wave like manner geometry
	46	fork like manner geometry
	45 47	central part
	51	length of the frame assembly kit
	52	width of the frame assembly kit
	50 53	height of the frame assembly kit
	54	longitudinal axis
	55 55	rotation direction
	56	first angle

Reference list

[0093]

57	second angle
58	first height of the permanent frame section
59	second height of the temporary frame section

Claims

- Frame assembly kit (100) for construction work comprising a permanent frame section (10) and a temporary frame section (20) for stabilizing the permanent frame section (10) in an operating mode of the frame assembly kit (100),
wherein the permanent frame section (10) comprises a first supporting member (11), a second supporting member (12) and an attachment member (13),
wherein the attachment member (13) is connected with the first supporting member (11) via a first plug connection (31) in the operating mode, wherein the attachment member (13) is connected with the second supporting member (12) via a second plug connection (32) in the operating mode, wherein the temporary frame section (20) comprises a stabilization member (21), wherein the first supporting member (11), the second supporting member (12) and the attachment member (13) are building a frame and the stabilization member (21) is surrounded by the frame, wherein the temporary frame section (20) is connected with the permanent frame section (10) via a plurality of third plug connections (33) in the operating mode.
- Frame assembly kit (100) according to claim 1, wherein at least one third plug connection (33) connecting the permanent frame section (10) and the temporary frame section (20) comprises a male geometry (34) and a female geometry (35), wherein the male geometry (34) is located at the temporary frame section (20) and the female geometry (35) is located at the permanent frame section (10).
- Frame assembly kit according to claim 1 or claim 2, wherein at least one third plug connection (33) connecting the permanent frame section (10) and the temporary frame section (20) is a dovetail connection (36).
- Frame assembly kit (100) according to one of the claims 1 to 3, wherein the frame assembly kit (100) comprises a first volume in the operating mode, wherein the frame assembly kit (100) comprises a second volume in a

non-operating mode,
wherein the second volume in the non-operating mode is about nine times smaller compared to the first volume in the operating mode.

- Frame assembly kit (100) according to one of the claims 1 to 4, wherein the attachment member (13) comprises a shape which is one of the group of shapes consisting of an arc, a half cycle, a section of a cycle, a half ellipse, a section of a half ellipse, a horizontal line, a pointed shape, a pointed shape combined with an arched form, a pointed shape combined with a straight line, a straight line, and combinations thereof.
- Frame assembly kit (100) according to one of the claims 1 to 5, wherein the frame assembly kit (100) is made of wood or of material partly comprising wood.
- Frame assembly kit (100) according to one of the claims 1 to 6, wherein a member (11, 12, 13, 14) of the permanent frame section (10) comprises a first height (58), wherein the stabilization member (21) of the temporary frame section (20) comprises a second height (59), wherein the second height (59) is smaller than the first height (58).
- Frame assembly kit (100) according to one of the claims 1 to 7, wherein the frame assembly kit (100) comprises a fixation device (40) for fixing the frame assembly kit (100) to a surrounding in the operating mode, wherein the fixation device (40) comprises a two-dimensional geometry in a first position and a three dimensional geometry in a second position.
- Frame assembly kit (100) according to claim 8, wherein the fixation device (40) comprises a fixation element (41) and a fastening element (42), wherein fixation element (41) comprises a longitudinal axis (54) and a center part (47), wherein the fixation element (41) is rotatable mounted at the center part (47) by the fastening element (42), wherein in the first position the longitudinal axis (54) of the fixation element (41) is in parallel to a longitudinal extension of the member (11, 12, 13, 14) of the permanent frame section (10) at the location where the fixation element (41) is installed, and wherein in the second position the longitudinal axis (54) of the fixation element (41) is approximately orthogonal to the longitudinal extension of the member (11, 12, 13, 14) of the permanent frame section (10) at the location where the fixation element (41) is in-

stalled.

10. Frame assembly kit (100) according to claim 8 or claim 9,
wherein the three-dimensional geometry of the fixation device (40) in the first position is provided by the fixation element (41),
wherein an angle (57) of about 5 to about 90 degrees, preferably 45 degrees, is present between the longitudinal axis (54) of the fixation element (41) and a surface (15) of the permanent frame section (10). 5

11. Frame assembly kit (100) according to one of the claims 8 to 10,
wherein the fixation device (40) is completely embedded in a longitudinal groove (43) of the permanent frame section (10) in the first position, and
wherein the fixation device (40) is partly embedded in the longitudinal groove (43) of the permanent frame section (10) in the second position. 15 20

12. Frame assembly kit (100) according to one of the claims 8 to 11,
wherein the fixation device (40) comprises a fixation element (41) with a first end and a second end,
wherein at least the first end or the second end of the fixation element (41) comprises a fork like manner geometry (46). 25

13. Fixation device (40) for a frame assembly kit (100) according to one of the claims 1 to 12, the fixation device (40) comprising:
a fixation element (41) and
a fastening element (42),
wherein fixation element (41) comprises a longitudinal axis (54) and a center part (47),
wherein the fixation element (41) is rotatable mountable at the center part (47) by the fastening element (42),
wherein the fixation element (41) comprises a two-dimensional geometry in a first position and a three dimensional geometry in a second position,
wherein the first position is a position of preparing a fixation and the second position is a position of fixing the fixation element (41) to a surrounding. 30 35 40 45

14. Method for mounting a frame assembly kit (100) according to one of the claims 1 to 12, the method comprising:
providing a first supporting member (11),
providing a second supporting member (12),
providing an attachment member (13),
providing a stabilization member (21),
building up a permanent frame section (10) by 50 55

connecting the first supporting member (11) with the attachment member (13) via a first plug connection (31),
connecting the first supporting member (11) with the attachment member (13) via a plug connection (32),
building up a temporary frame section (20) by connecting the stabilization member (21) with the first supporting member (11) via a third plug connection (33),
connecting the stabilization member (21) with the second supporting member (12) or with the attachment member (13) via a fourth plug connection (33), and
fixing the permanent frame section (10) to a surrounding. 10 15 20 25 30 35 40 45

15. Method for manufacturing a frame assembly kit (100) according to one of the claims 1 to 12, the method comprising:
manufacturing a first supporting member (11) comprising a first part (35) of a first plug connection (31),
manufacturing a second supporting member (12) comprising a first part (35) of a second plug connection (32),
manufacturing an attachment member (13), comprising a second part (34) of the first plug connection (31) and comprising a second part (34) of the second plug connection (32),
manufacturing a stabilization member (21), comprising a first part (34) of a third plug connection (33) and comprising a first part (34) of a fourth plug connection (33),
manufacturing a second part (35) of the third plug connection (33) at the first supporting member (11), and
manufacturing a second part (35) of the fourth plug connection (33) at the second supporting member (12) or at the attachment member (13). 50 55

Amended claims in accordance with Rule 137(2) EPC.

1. Frame assembly kit (100) for construction work comprising
a permanent frame section (10) and
a temporary frame section (20) for stabilizing the permanent frame section (10) in an operating mode of the frame assembly kit (100), wherein the permanent frame section (10) comprises
a first supporting member (11),
a second supporting member (12) and
an attachment member (13), 12

wherein the attachment member (13) is connected with the first supporting member (11) via a first plug connection (31) in the operating mode, 5
 wherein the attachment member (13) is connected with the second supporting member (12) via a second plug connection (32) in the operating mode, 10
 wherein the temporary frame section (20) comprises a stabilization member (21), 15
 wherein the first supporting member (11), the second supporting member (12) and the attachment member (13) are building a frame and the stabilization member (21) is surrounded by the frame, 20
 wherein the temporary frame section (20) is connected with the permanent frame section (10) via a plurality of third plug connections (33) in the operating mode, 25
characterized in that
 the frame assembly kit (100) comprises a fixation device (40) for fixing the frame assembly kit (100) to a surrounding in the operating mode, 30
 wherein the fixation device (40) comprises a two-dimensional geometry in a first position and a three dimensional geometry in a second position, 35
 wherein the fixation device (40) is completely embedded in a longitudinal groove (43) of the permanent frame section (10) in the first position, and
 wherein the fixation device (40) is partly embedded in the longitudinal groove (43) of the permanent frame section (10) in the second position.

2. Frame assembly kit (100) according to claim 1, 40
 wherein at least one third plug connection (33) connecting the permanent frame section (10) and the temporary frame section (20) comprises a male geometry (34) and a female geometry (35),
 wherein the male geometry (34) is located at the temporary frame section (20) and the female geometry (35) is located at the permanent frame section (10). 45

3. Frame assembly kit according to claim 1 or claim 2, 50
 wherein at least one third plug connection (33) connecting the permanent frame section (10) and the temporary frame section (20) is a dovetail connection (36). 55

4. Frame assembly kit (100) according to one of the claims 1 to 3, 55
 wherein the frame assembly kit (100) comprises a first volume in the operating mode,
 wherein the frame assembly kit (100) comprises a second volume in a non-operating mode, 60
 wherein the second volume in the non-operating mode is about nine times smaller compared to the first volume in the operating mode.

5. Frame assembly kit (100) according to one of the claims 1 to 4, 65
 wherein the attachment member (13) comprises a shape which is one of the group of shapes consisting of an arc, a half cycle, a section of a cycle, a half ellipse, a section of a half ellipse, a horizontal line, a pointed shape, a pointed shape combined with an arched form, a pointed shape combined with a straight line, a straight line, and combinations thereof.

6. Frame assembly kit (100) according to one of the claims 1 to 5, 70
 wherein the frame assembly kit (100) is made of wood or of material partly comprising wood.

7. Frame assembly kit (100) according to one of the claims 1 to 6, 75
 wherein a member (11, 12, 13, 14) of the permanent frame section (10) comprises a first height (58),
 wherein the stabilization member (21) of the temporary frame section (20) comprises a second height (59),
 wherein the second height (59) is smaller than the first height (58).

8. Frame assembly kit (100) according to claims 1 to 7, 80
 wherein the fixation device (40) comprises a fixation element (41) and
 a fastening element (42), 85
 wherein fixation element (41) comprises a longitudinal axis (54) and a center part (47), wherein the fixation element (41) is rotatable mounted at the center part (47) by the fastening element (42),
 wherein in the first position the longitudinal axis (54) of the fixation element (41) is in parallel to a longitudinal extension of the member (11, 12, 13, 14) of the permanent frame section (10) at the location where the fixation element (41) is installed, and
 wherein in the second position the longitudinal axis (54) of the fixation element (41) is approximately orthogonal to the longitudinal extension of the member (11, 12, 13, 14) of the permanent frame section (10) at the location where the fixation element (41) is installed.

9. Frame assembly kit (100) according to claim 1 to 8, 90
 wherein the three-dimensional geometry of the fixation device (40) in the first position is provided by the fixation element (41), 95

wherein an angle (57) of about 5 to about 90 degrees, preferably 45 degrees, is present between the longitudinal axis (54) of the fixation element (41) and a surface (15) of the permanent frame section (10).

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10. Frame assembly kit (100) according to one of the claims 1 to 9, wherein the fixation device (40) comprises a fixation element (41) with a first end and a second end, wherein at least the first end or the second end of the fixation element (41) comprises a fork like manner geometry (46).

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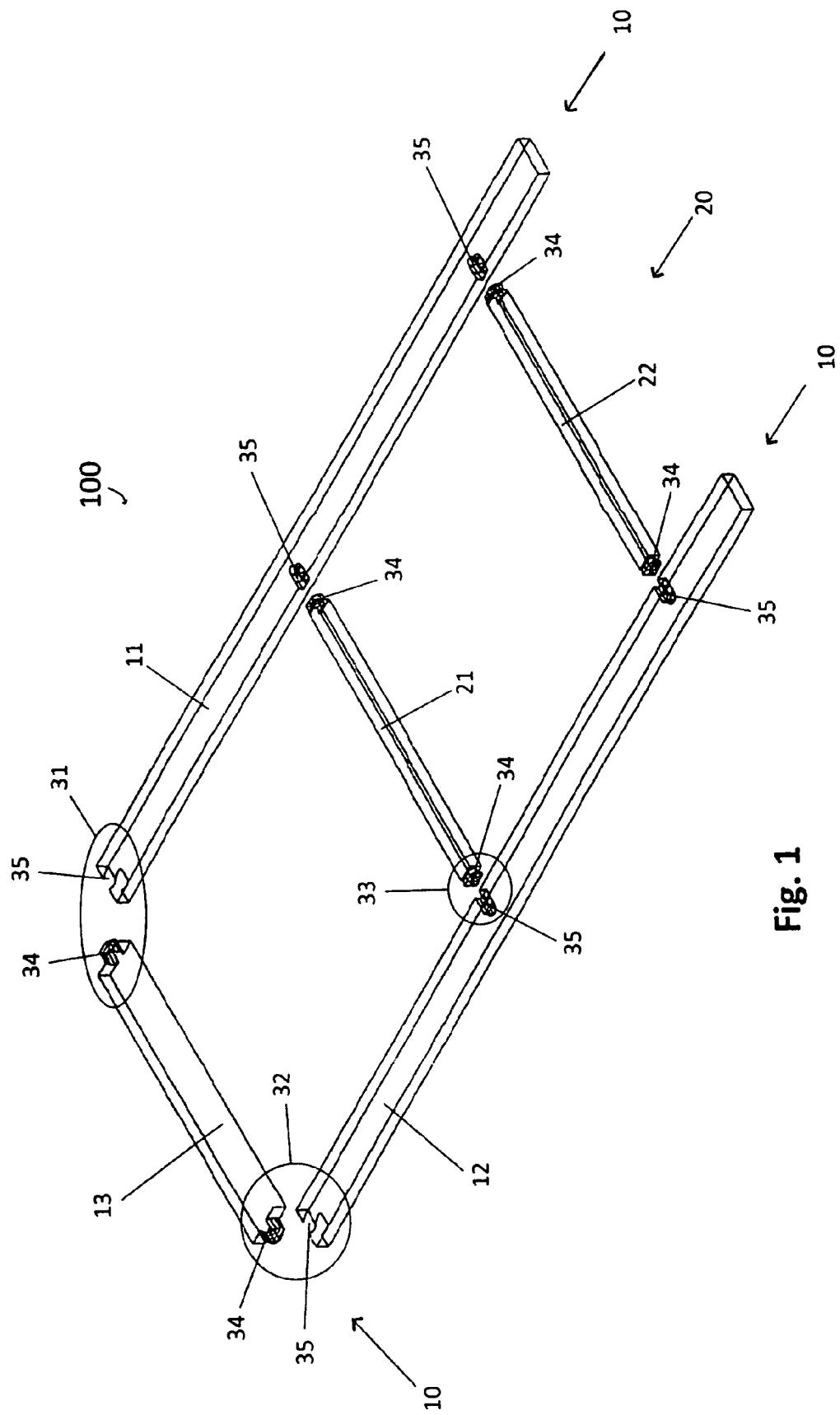


Fig. 1

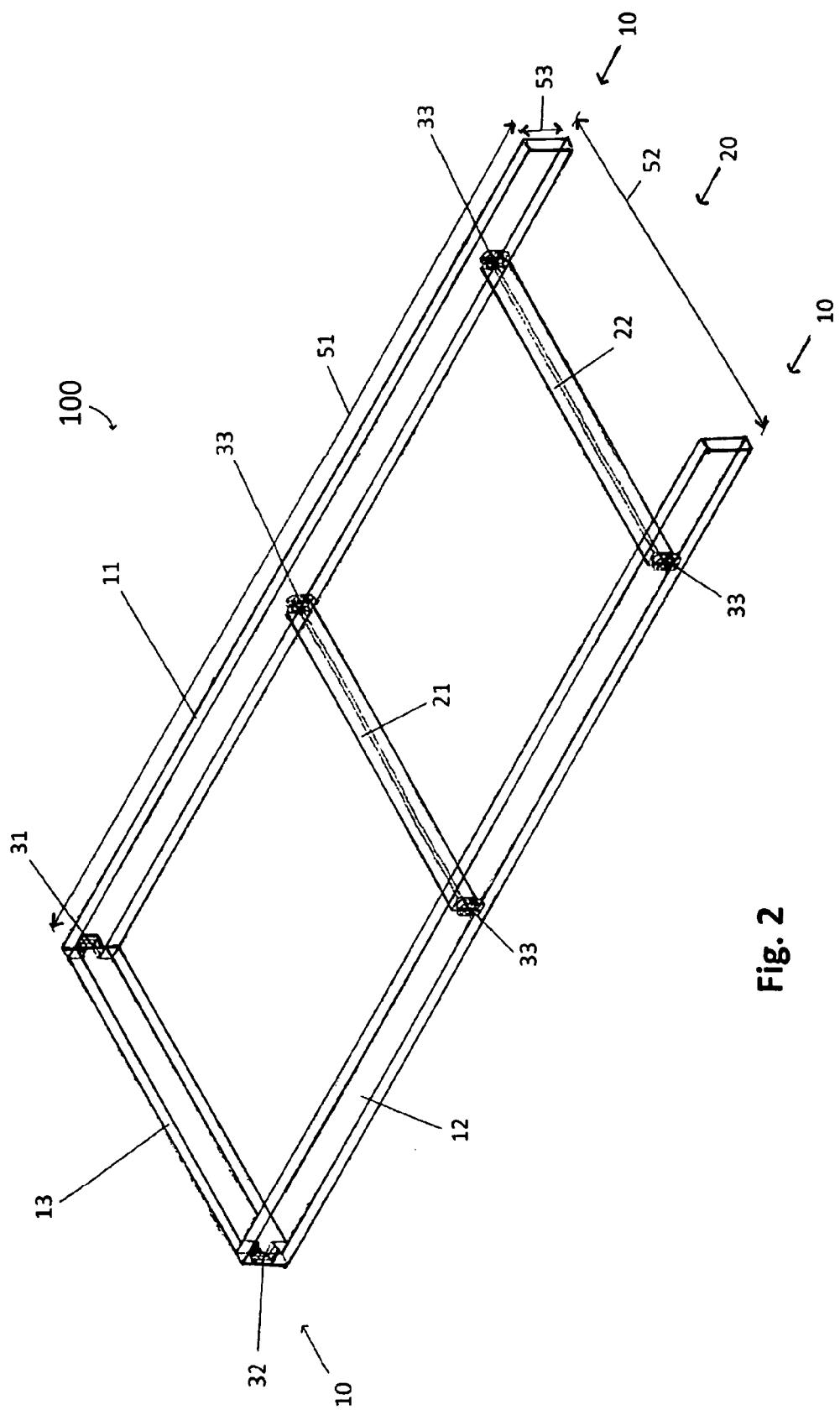


Fig. 2

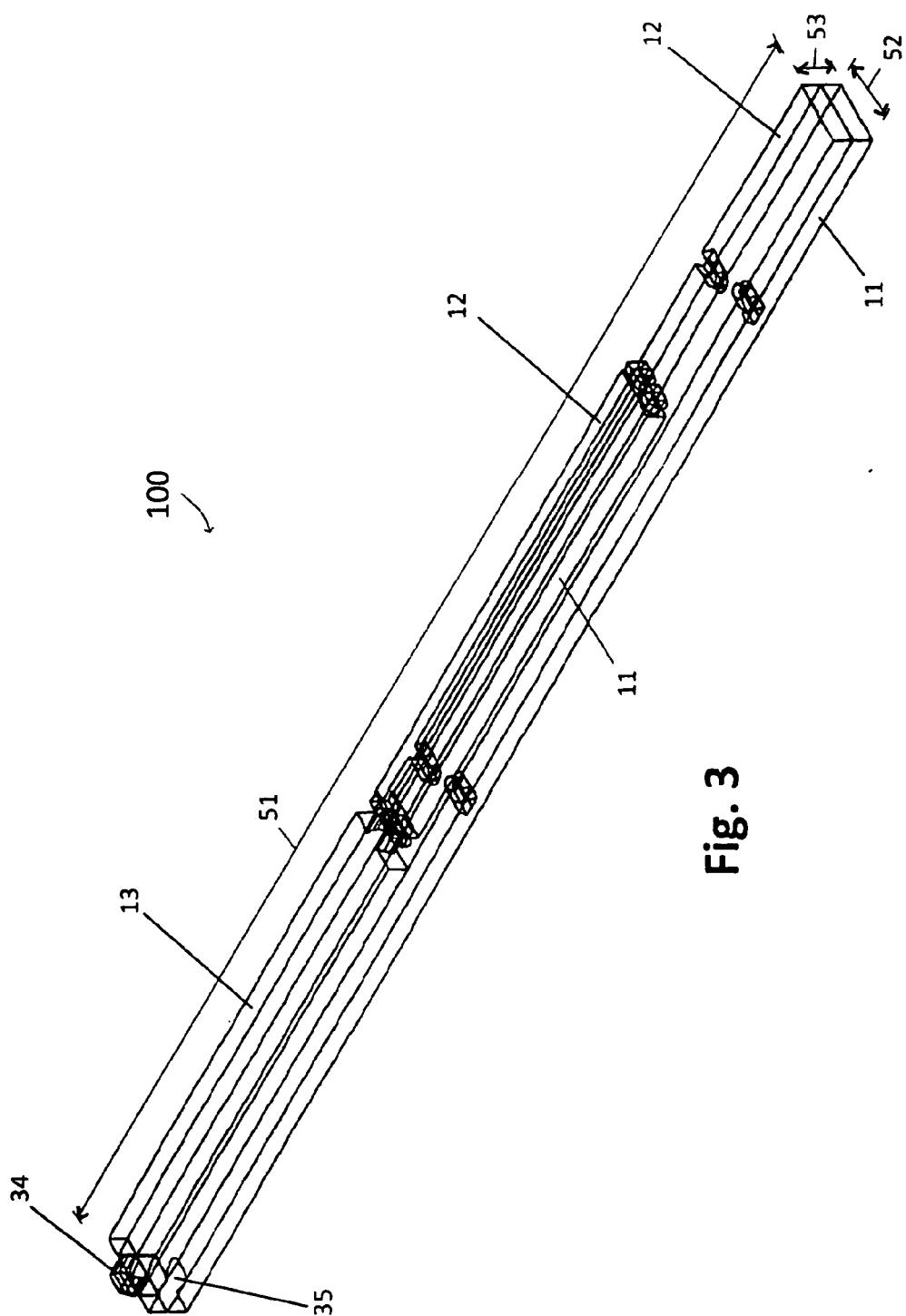


Fig. 3

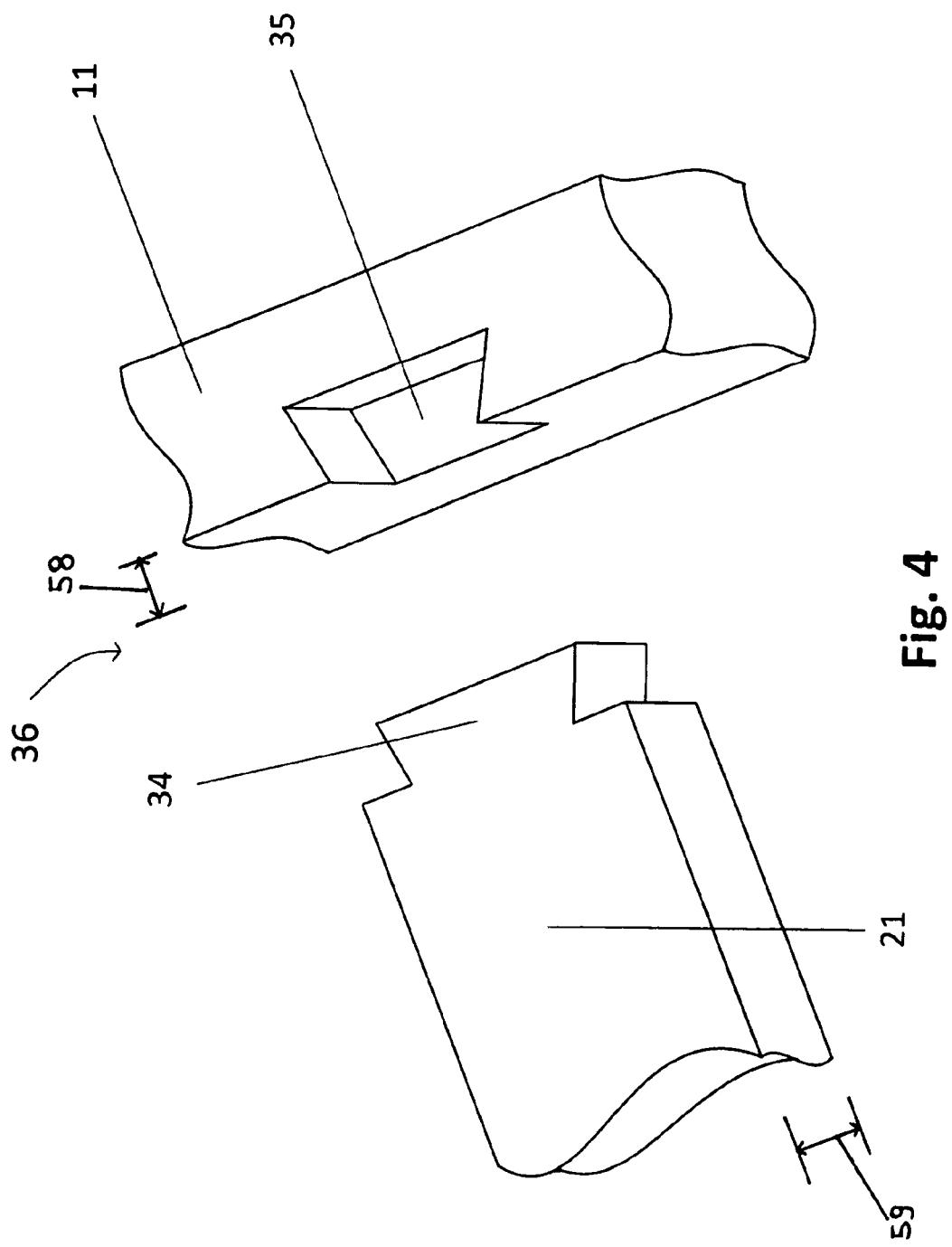


Fig. 4

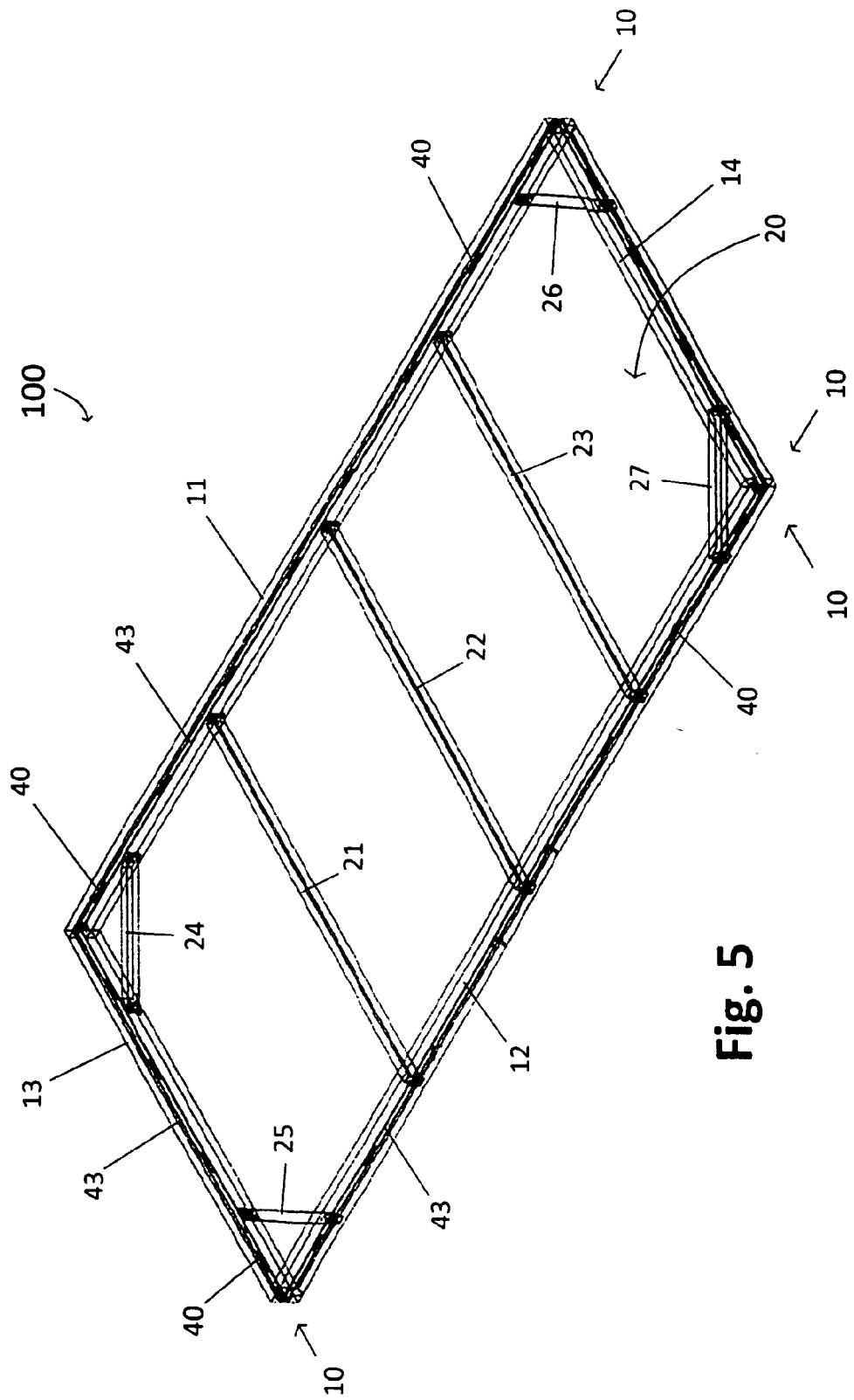


Fig. 5

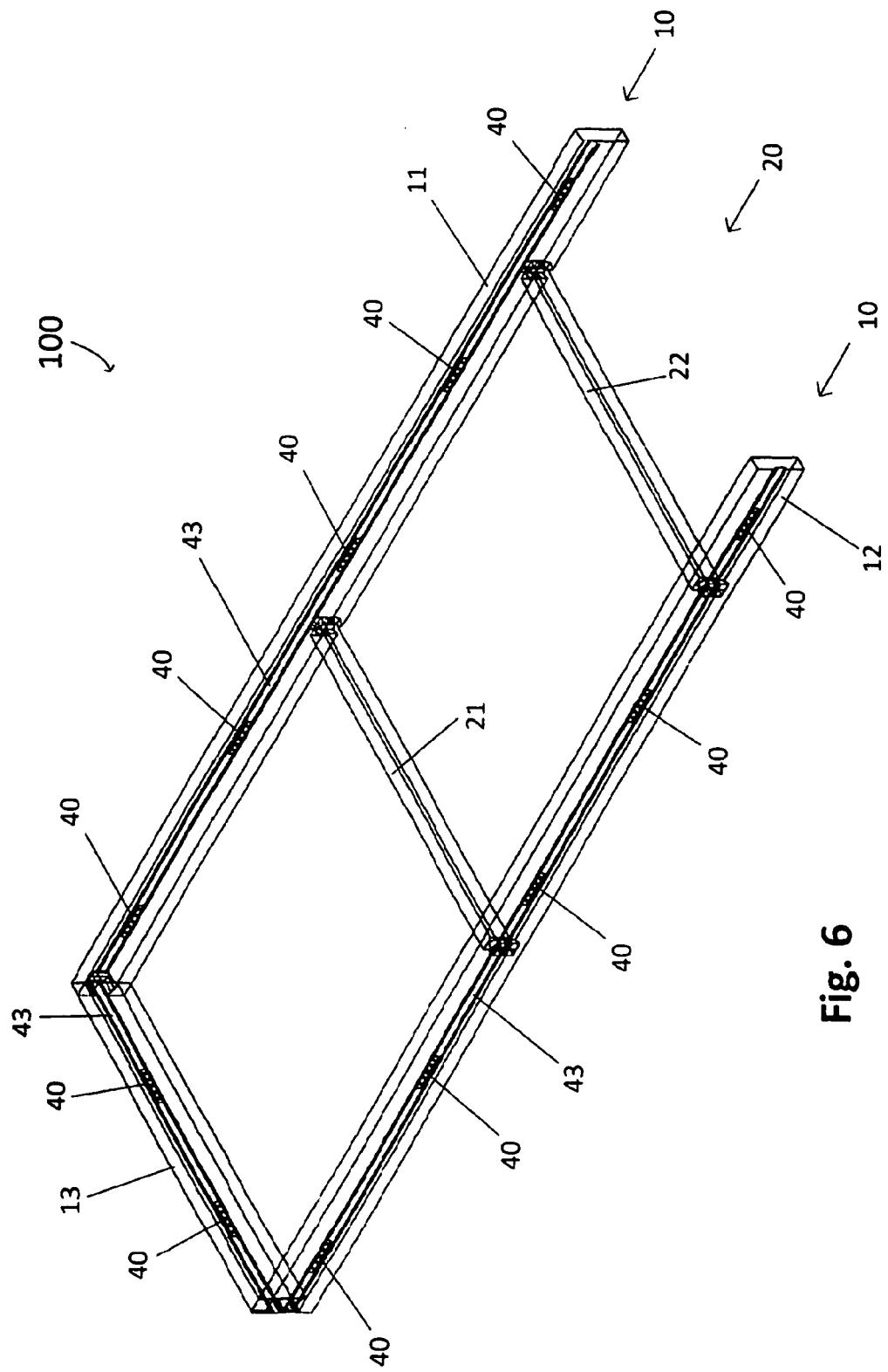


Fig. 6

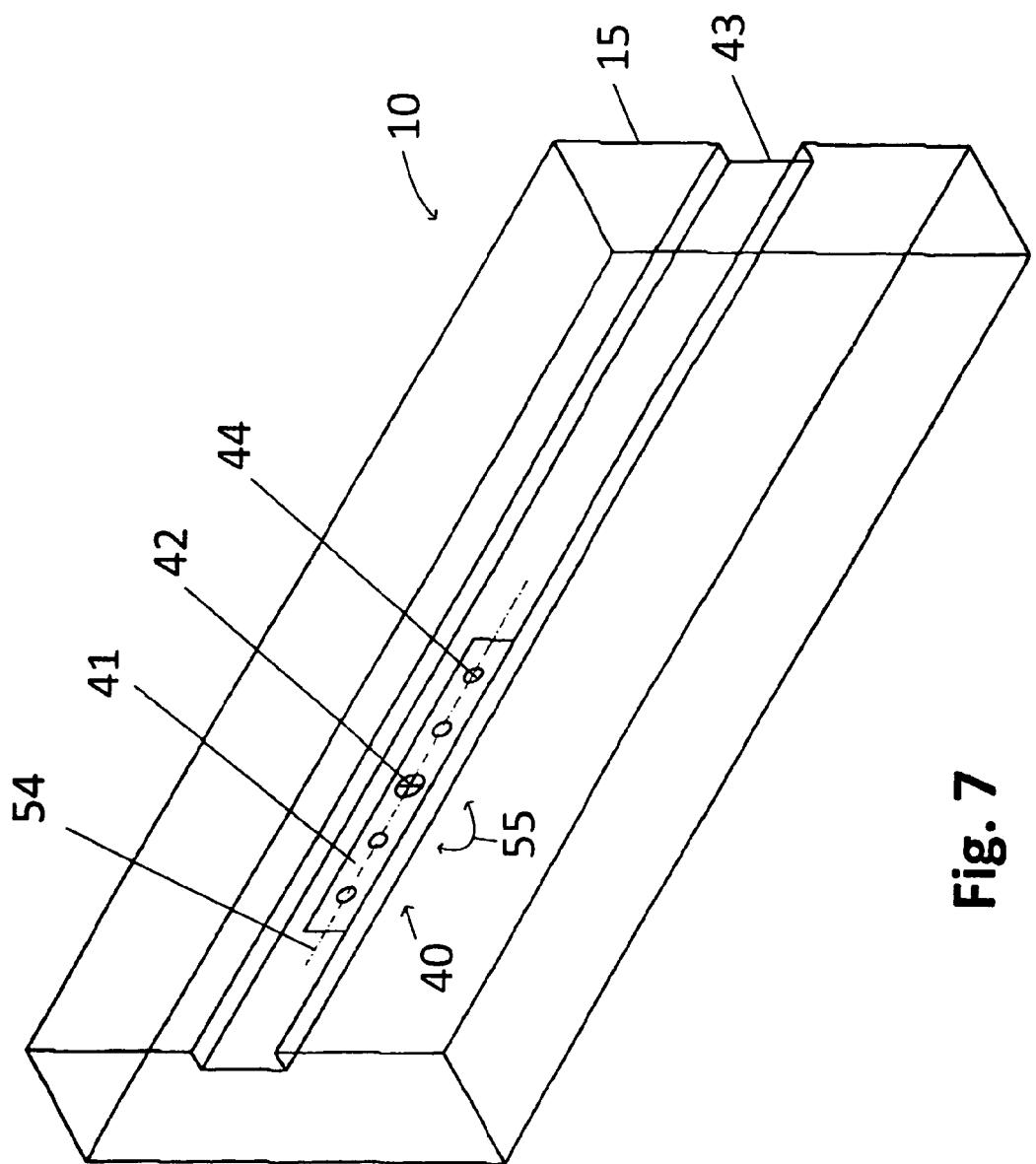


Fig. 7

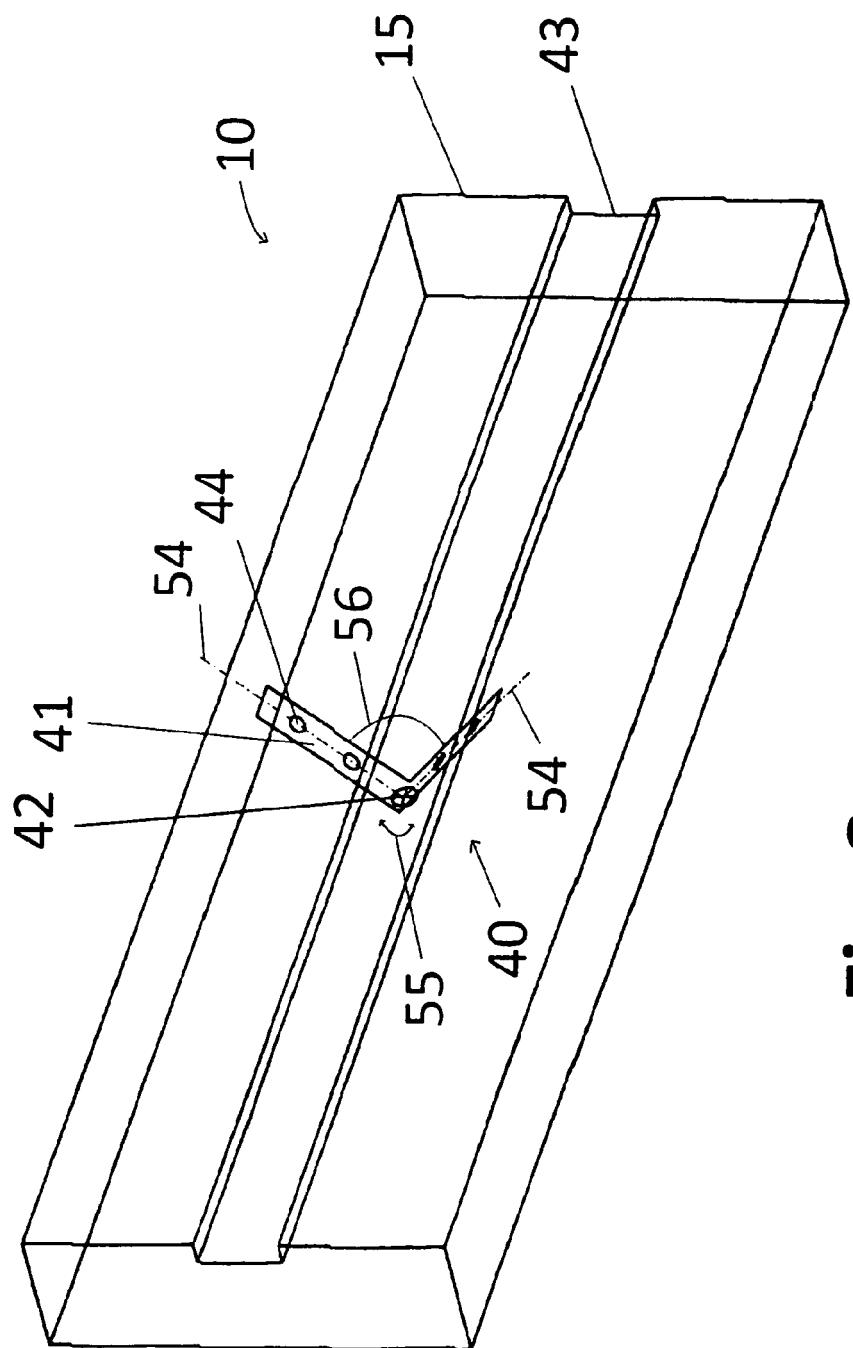


Fig. 8

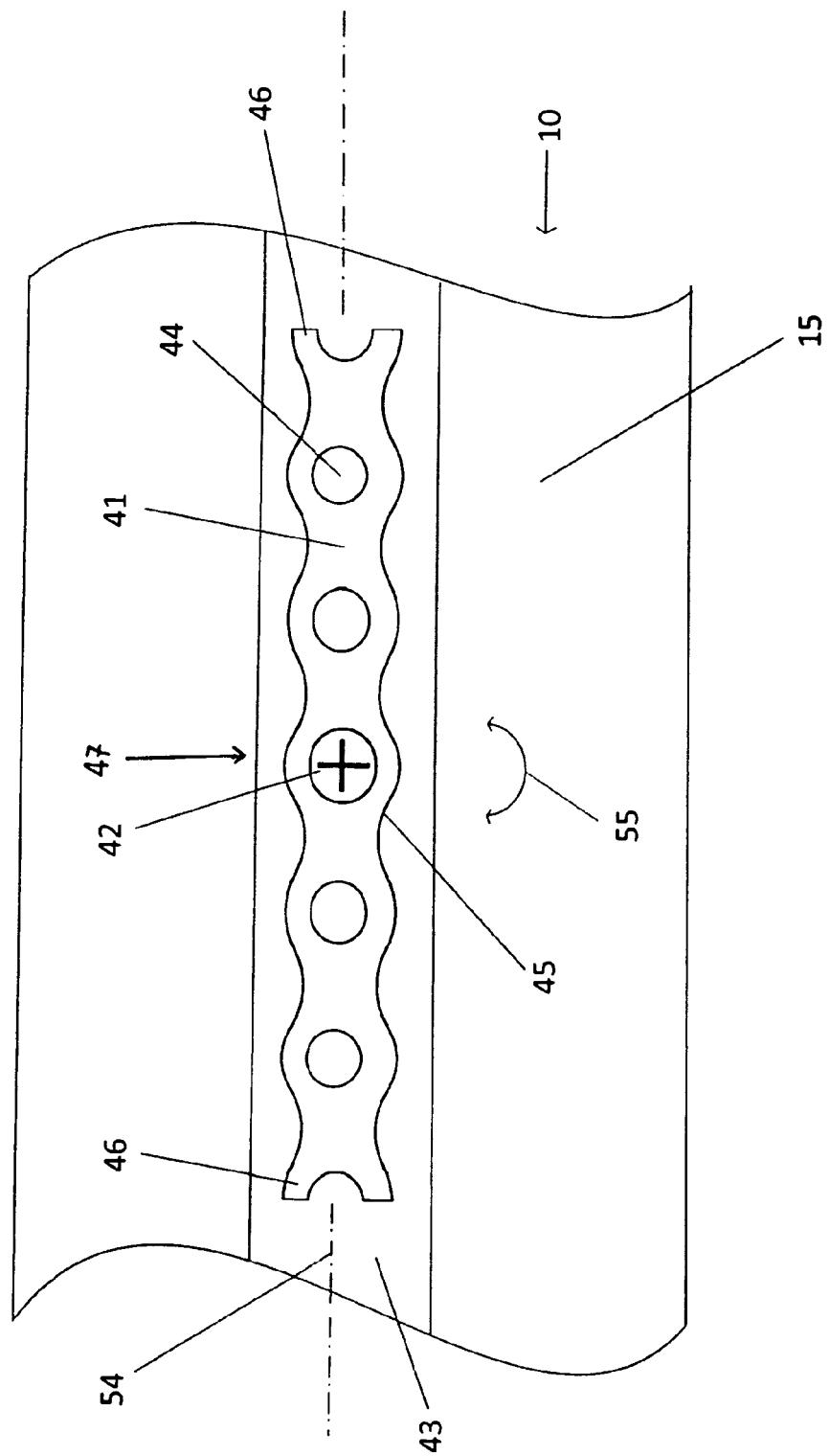


Fig. 9

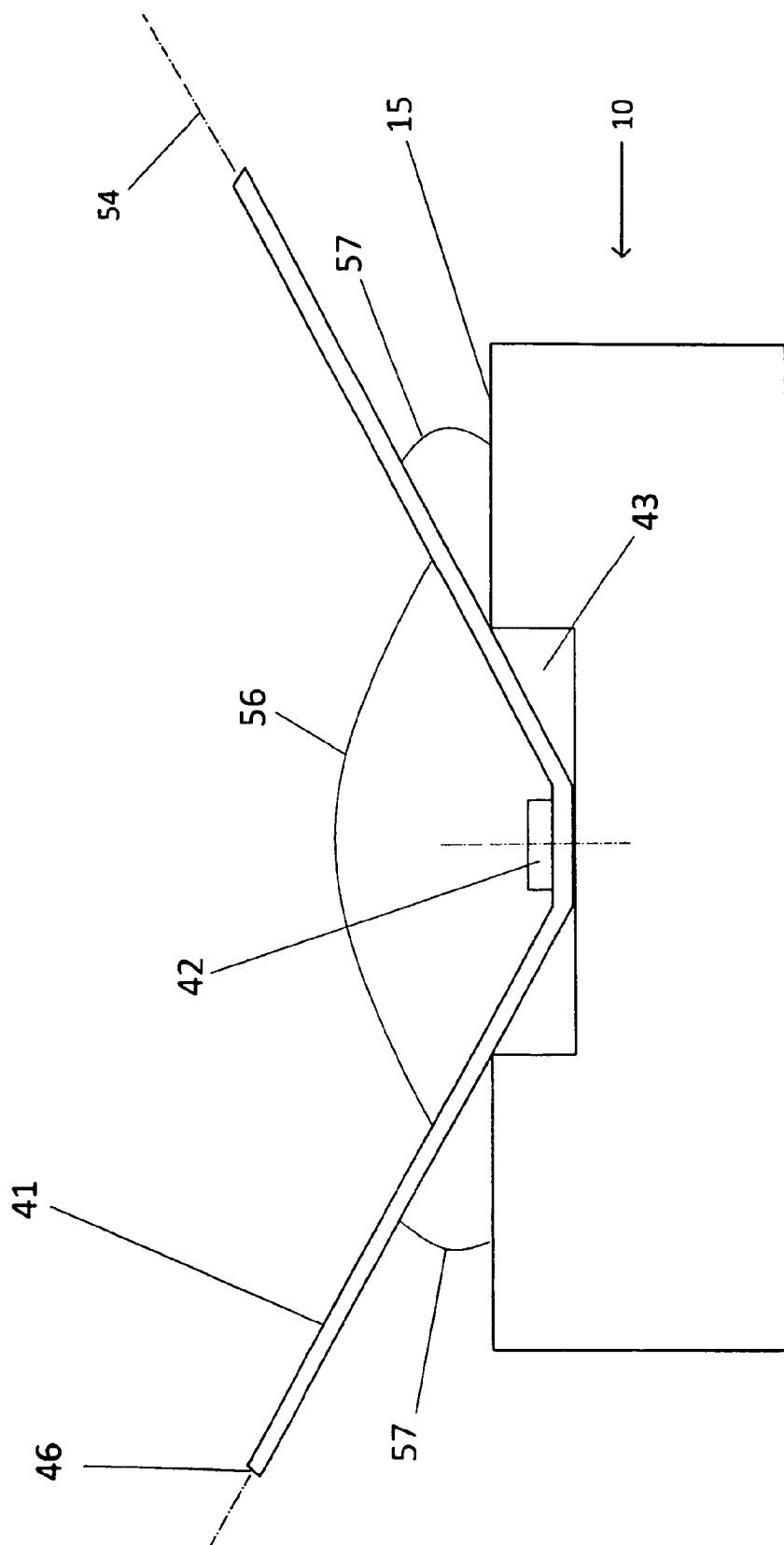


Fig. 10

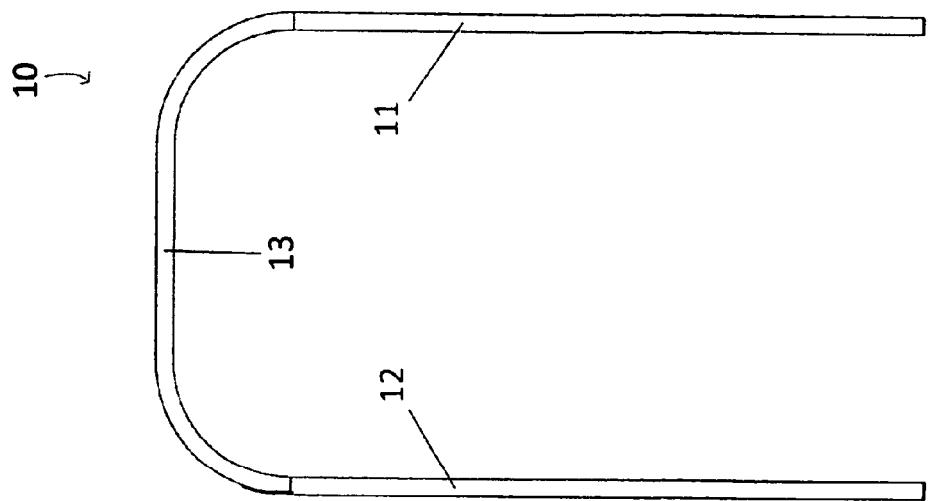


Fig. 12

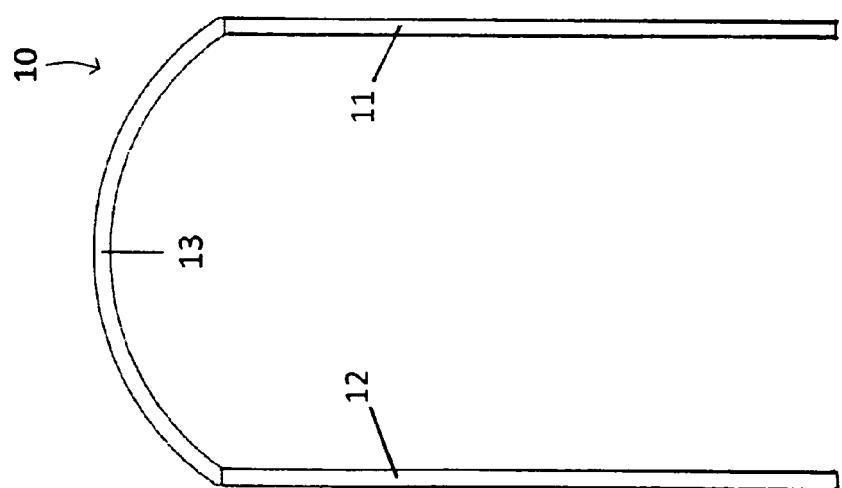


Fig. 11

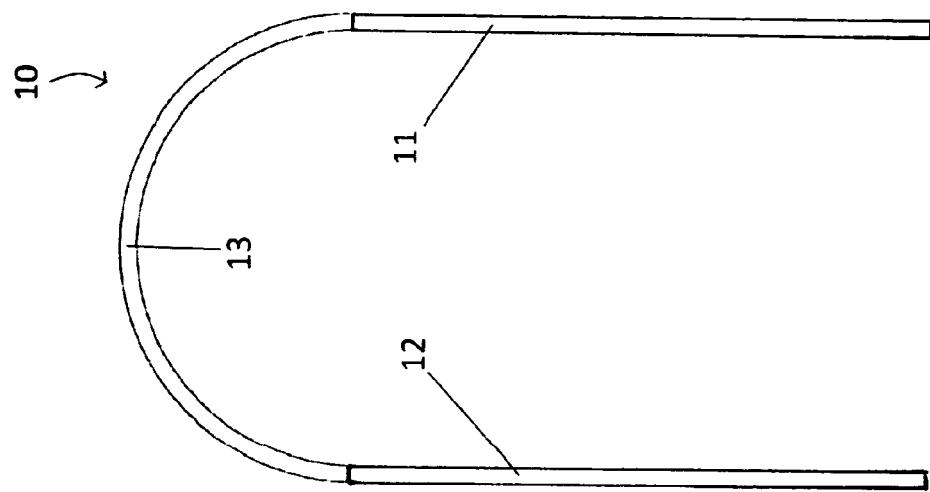


Fig. 14

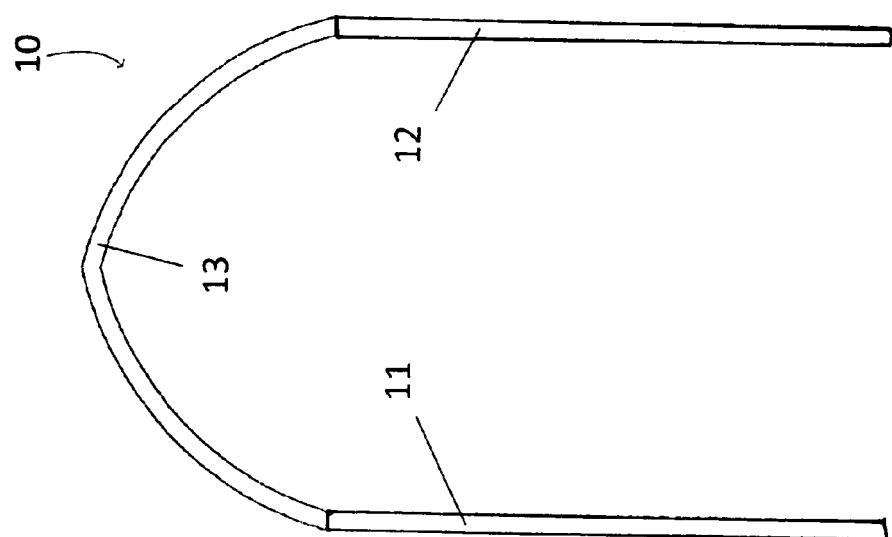


Fig. 13

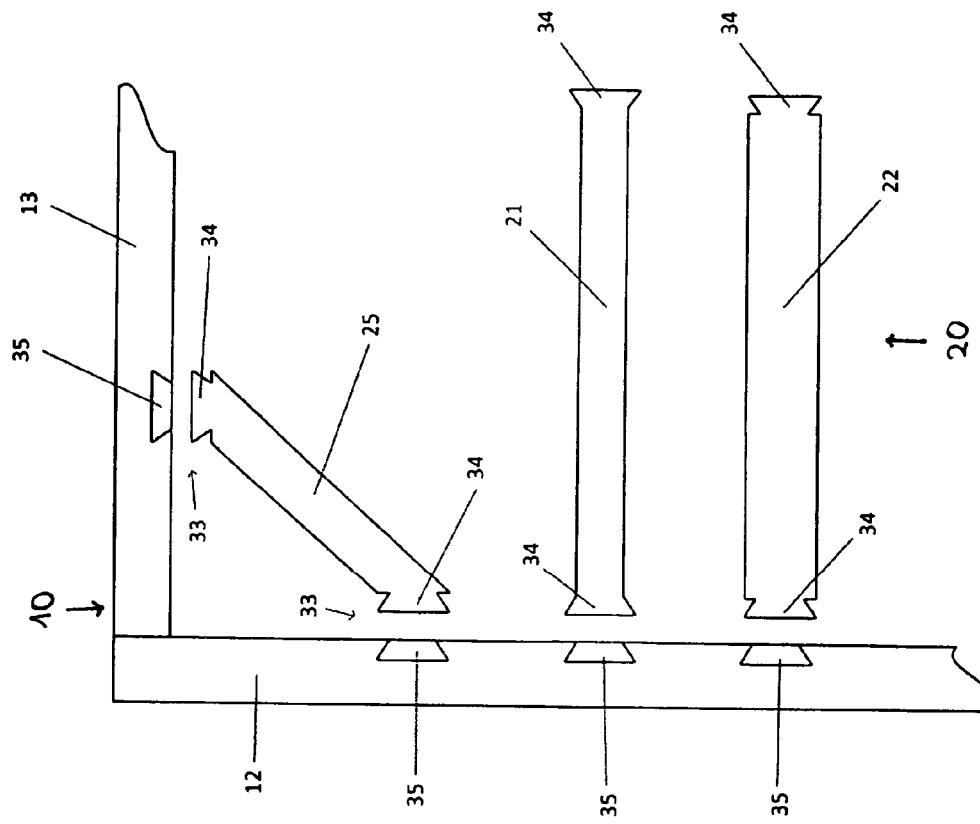


Fig. 16

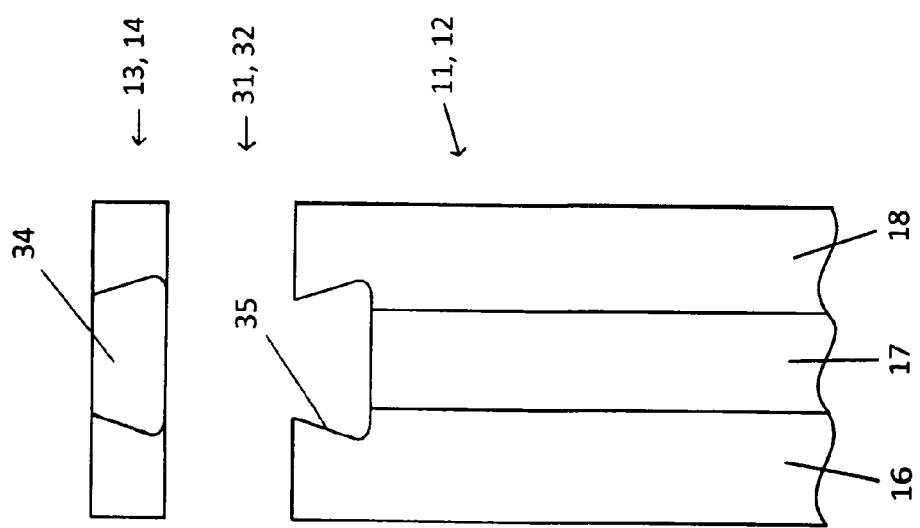


Fig. 15



EUROPEAN SEARCH REPORT

Application Number

EP 11 01 0079

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (IPC)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
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Y		3,6, 8-10,12	
A	-----	11	
X	DE 10 2009 012355 A1 (NOVOFERM RIEXINGER TUERENWERKE [DE]) 16 September 2010 (2010-09-16) * abstract; figure 3 *	13	
Y		8-10,12	
A	-----	11	
X	ES 1 056 692 U (RUBIO CARPINTERIA METALICA Y C [ES]) 16 April 2004 (2004-04-16) * figures 1,2 *	13	
A	-----	8-12	
Y	EP 0 087 848 A1 (VARWIJK HENDRIKUS GERHARDUS) 7 September 1983 (1983-09-07) * abstract * * page 1, line 19 - page 2, line 7; figures 1-7 *	3,6	
A	----- WO 2009/129825 A1 (SYLID SYSTEMLOGISTIK UND INDUS [DE]; NIEMANN HANS DIETER [DE]; WITTE M) 29 October 2009 (2009-10-29) * abstract; figures 1-3 *	5	E06B

The present search report has been drawn up for all claims			
1	Place of search Munich	Date of completion of the search 4 May 2012	Examiner Koulo, G
EPO FORM 1503 03.82 (P04C01) CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			
T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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ON EUROPEAN PATENT APPLICATION NO.

EP 11 01 0079

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04-05-2012

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