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(54) **Screen wall system**

(57) A screen wall system is provided, comprising two wall elements (10a, 12a; 10b, 12b) and a linking device (20a, 20b, 30) for linking the wall elements together by connection to an edge portion (14a; 14b) of each wall element. At least one of the wall elements, when connected to the linking device, is tiltable in its principal plane relative to the linking device.

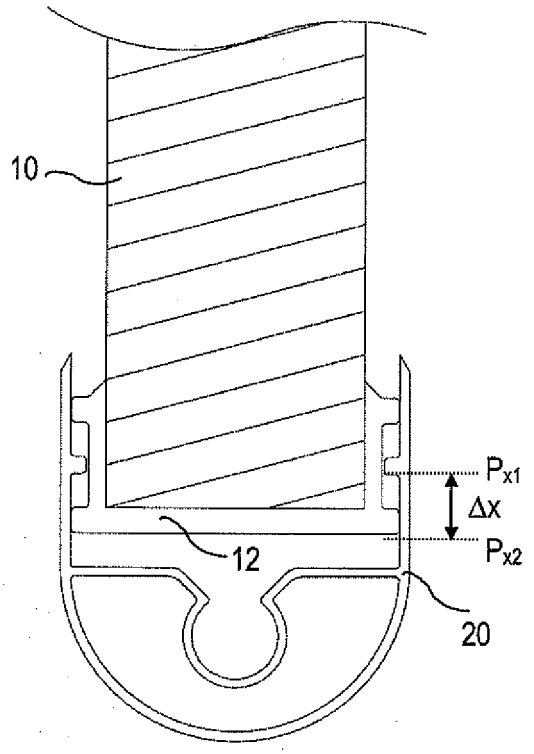

Fig. 4a

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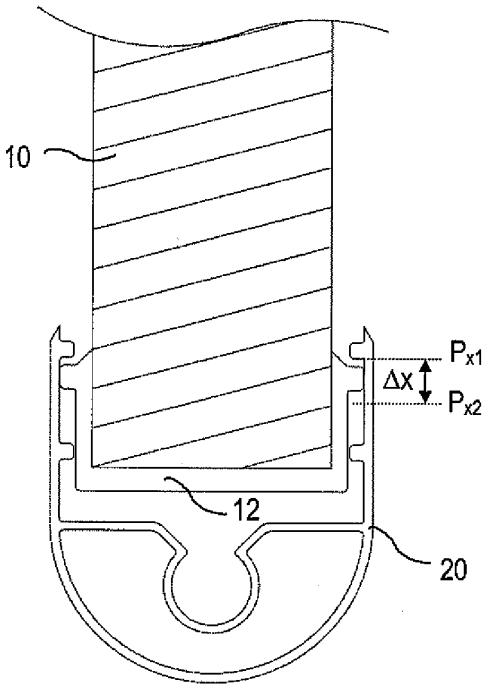

Fig. 4b

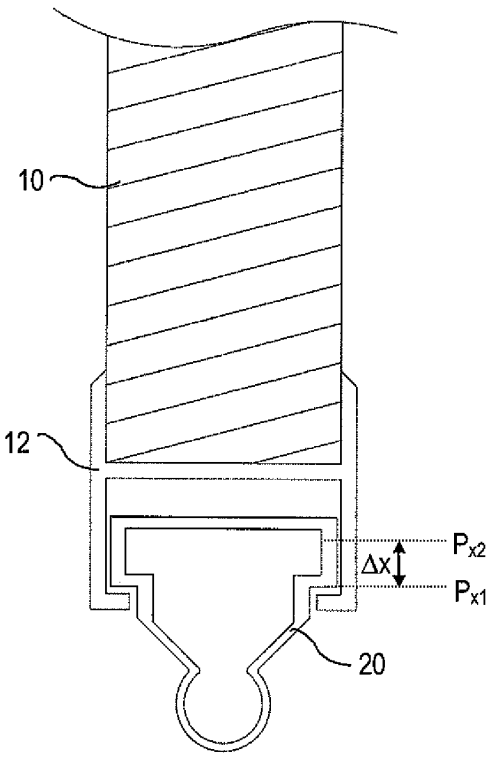

Fig. 4c

Description

Technical field

[0001] The present invention relates generally to a screen wall system comprising at least two wall elements and a linking device for linking the wall elements together by connection to an edge portion of each wall element. It also relates to a wall element, a floor support device and a linking device for use as respective corresponding screen wall system parts.

Technical background

[0002] Exhibition premises use screen walls for shielding and defining exhibitor areas. In general, exhibition premises are spacious with support for a great number of exhibitors and there is a need for an even greater amount of screen wall elements for building the screen walls. When one exhibition is replaced by another, which happen comparatively frequently, the screen walls have to be rearranged and screen wall sections disassembled into the screen wall elements, which then, often at new locations in the premises, are reassembled into new screen wall sections for the new exhibitors. Owing to this it is desirable to be able to swiftly, and in a flexible, time and cost efficient manner, switch from one screen wall configuration to another.

[0003] Additionally, a screen wall for exhibition premises should be simple to adjust under difficult floor conditions since floors in exhibition premises often can be rough, uneven, sloped and non-uniform, in contrast to e.g. conventional office floors. Due to this a wall element sometimes needs to be supported at floor positions of different heights. The screen walls must be able to handle and adapt to such situations, not only in order to accomplish a steady support from the floor when the walls are placed in an upright position, but also in order to present smooth transitions between individual wall elements, without sudden vertical displacements between adjacent wall elements. Such displacements, especially along an upper edge of a screen wall, is eye-catching and gives a shoddy impression.

[0004] A predominating type of a screen wall element used in exhibition premises comprises a wooden frame with wood boards nailed to the frame so that each board forms a principal surface of the wall element. This simple construction allows for repairs and modifications by simple means, such as a hammer and nails. A broken, or damaged part of the frame or the boards can easily be replaced, and the material and means used are relatively cheap. After a person has learned how to nail these wall elements together, the simple means and brute method for assembly/disassembly allow for great flexibility and adjustability, and wall elements can be connected quite rapidly. Hence, this type of screen walls meet many of the desirable properties.

[0005] However, when these wall elements are to be connected, it is often required that two persons are involved; one for adjusting and holding the wall element in position while the other person makes the actual connection and adjustments using hammer and nails. Further, each wall element of this kind is relatively heavy, which makes it cumbersome to move and position the wall elements. It can be noted that the weight may give rise to an additional problem in the near future since it, at least within the EU, are plans to stipulate by legislation that a single worker is allowed to carry or move objects of about 15 kg at maximum.

[0006] Moreover, the method of making the connection by hammer and nails is destructive, give rise to waste, requires frequent repairs of the wall elements and involves consumption of material, such as nails and material for the repairs.

[0007] Alternative known screen wall solutions, e.g. such used in offices, do not offer the same quick and simple way of assembly and adjustability as the above described type of screen walls and are in general more expensive.

Summary of the invention

[0008] Hence, in view of the above, it is an object of the present invention to overcome or at least alleviate problems in the prior art and/or to provide an alternative screen wall system. A specific object is to provide a screen wall system that conveniently can be adapted to and be used on uneven floor surfaces.

[0009] The invention is defined by the appended independent claims. Preferred embodiments are set forth in the dependent claims and in the following description and drawings.

[0010] Hence, according to one aspect, the above-mentioned and other objects that will be evident from the following description, are achieved by a screen wall system comprising two wall elements and a linking device for linking the wall elements together by connection to an edge portion of each wall element. At least one of the wall elements, when connected to the linking device, is tiltable in its principal plane relative to the linking device.

[0011] Hence, when placed on a floor the wall element can be tilted in its principal plane in relation to the linking device so as to adapt to an uneven. e.g. sloped, floor surface, whereby the distance between the lower edge of the wall element and the floor can be kept small. In a wall section comprising multiple wall elements and linking devices, all linking devices can be placed vertically while the wall elements placed over a sloped surface can be tilted in-plane to adapt to the floor level change. Sudden vertical displacements of consecutive wall elements can be avoided and there is no need forwall element supports that must be able to compensate for the entire floor level variation.

[0012] The linking device may have an edge portion extending in a first direction, which edge portion, when the wall element is connected to the linking device, may

be interlocked in a second direction with an edge portion of the wall element, said second direction being substantially parallel to the principal plane of the wall element and substantially perpendicular to the first direction, wherein the interlock may involve a play and the wall element tiltable within the play.

[0013] By "interlock involves a play" is understood that the interlock admits some relative movement of the parts being interlocked in the interlock direction.

[0014] By "tiltable within a play" is meant that the wall element can be tilted in relation to the locking device in such way that portions of the wall element that move when the wall element is tilted are movable between two lock positions that are spaced apart by the play.

[0015] Connection by interlocking with a play has the advantage that it allow for a tiltable wall element using a comparatively simple and robust connection mechanism, where the parts can be connected and the wall element be tiltable without the need of additional parts.

[0016] The wall element may further be displaceable within the play.

[0017] By "displaceable within the play" means that the wall element taken as a whole can be displaced a distance corresponding to the play in relation to the linking device.

[0018] The play can be at least 0.3 cm, 0.5 cm, 0.7 cm, 1 cm, 3 cm or 5 cm.

[0019] The edge portion of the wall element may be provided with a wall locking element and the edge portion of the linking device may be provided with a link locking element, wherein the wall locking element and the link locking element may present lock surfaces facing each other in the second direction such that any tilt and/or displacement of the wall element away from the linking device in the second direction results in that the surfaces engage with each other at a first relative lock position.

[0020] The locking elements may be resilient relative to each other in a third direction which is substantially perpendicular to the principal plane of the wall element.

[0021] The interlock in combination with the resilient elements enable snap connection of the linking device and the wall element. The linking device and the wall element may be moved together in the second direction until the wall locking element pass the first relative position whereby the locking elements and respective lock surfaces "snap" into place and accomplish the interlock. The snap connection allows for easy connection of parts and assembly of a wall section. Starting from an upright positioned wall element or linking device, further parts can be added and connected so as to assemble, or disassemble, a wall section, without the need of moving or lifting large and potentially heavy structures.

[0022] The linking device edge portion may extend over opposite principal surfaces of the wall element when the wall element and the linking device are connected. This way a tilted wall element edge portion and/or any space between the edges of the wall element and the linking device can be hidden and the wall section present a more uniform surface.

[0023] The linking device may comprise two interconnectable link parts, each for the connection to one wall element. The link parts, when interconnected, may be parallel and turnable in relation to each other about a parallel axis. When connected to the respective wall element each link part may extend between opposite edges of the wall element, wherein the link parts may be interconnectable by means of a link member that is connectable to adjacent end portions of the link parts.

[0024] Interconnecting the link parts at an upper and/or lower end, as e.g. is the case when one link part is connected to a upright positioned wall element, allow for a stable yet simple interconnection and facilitate for addition of one part at a time to an already upright positioned wall section. Access for connection of the link member to a lower end facing the floor can be accomplished by tilting the wall element in relation to a distal linking device already connected to the wall element.

[0025] The system may further comprise a wall element locking means which, when the wall element is connected to the linking device, restricts movement of the wall element in the first direction.

[0026] Restriction of movement in the first direction. i.e. the vertical direction when the wall section is in upright position on a floor, allows the wall element and the linking device to maintain the same relative vertical position during use, irrespective if the wall element is tilted or not. By fixing the locking means to only one of the wall element and locking device, preferably one having floor support, the other part can be suspended using the locking means and may thus not require its own floor support.

[0027] The wall element locking means may comprise an elongated member and a recess which cooperates to restrict the movement, wherein the recess preferably is part of either the wall element or the linking device, and the elongated member preferably is a separate part or integrated with the part not comprising the recess.

[0028] A locking means of this kind is i.a. simple and robust and allows for cost efficient manufacturing.

[0029] When the wall element and the linking device are connected, the elongated member may extend between opposing edge surfaces of the linking device and the wall element.

[0030] An advantage with this is that the elongated member before engaging with the recess can serve as a guide member, slidable over an edge surface, and when the elongated member finds and engages with the recess a correct alignment has been provided. When the linking device and the wall element are snap connectable, the length of the elongated member and the depth of the recess may be selected in relation to the play of the interlock so that snap connection and interlock only is enabled when the elongated member finds and engages with the recess.

[0031] The system may further comprise a floor support device being attachable to an edge portion of the wall element and/or the linking device, wherein said floor

support device, when attached to the edge portion, may extend from a wall end to a distal end in a direction that is substantially perpendicular to the principal plane of the wall element.

[0032] The floor support device prevent the wall section to tip and thus enable the wall section to be remain in upright position on a floor Using an attachable floor support means that a floor support can be used and attached only when need arises, and thus, the total number of support devices in the system can be kept low.

[0033] The distal end may be adjustable in a direction that is perpendicular to the edge surface of the edge portion.

[0034] Since the tiltable wall element compensates for longitudinal floor level variations, i.e. in directions along the wall elements, it suffice that the support device as here focus on compensating for traverse variations in order to be supportive for upright positioned linking devices and avoid that the wall section tip over.

[0035] The distal end may be adjustable by means of a wedge that is insertable between the edge portion of the wall element, and/or the edge portion of the linking device, and the wall end of the support device.

[0036] The wedge may comprise lock elements that engage with interrelated lock elements on the wall end of the support device and/or the edge portion of the wall element, and/or the edge portion of the linking device, in such way that the removal of the wedge in the opposite direction of insertion is restricted.

[0037] In other aspects of the invention there is provided a wall element, a floor support device and a linking device, each adapted for use as the respective corresponding wall element, floor support device and linking device in the system. In yet another aspect there is a link part adapted for use as the link part in the linking device.

Brief description of the drawings

[0038] The above, as well as other aspects, objects, features and advantages of the present invention, will be better understood through the following illustrative and non-limiting detailed description, with reference to the appended schematic drawings.

[0039] Fig. 1a shows, in perspective, a wall section comprising four connected wall elements.

[0040] Fig. 1b is a partial perspective view showing how the wall elements of Fig. 1a can be connected by means of a linking device.

[0041] Fig. 1c shows, in traverse cross-section, two linking parts of the linking device in Fig. 1b.

[0042] Fig. 1d is a partial perspective view illustrating how support legs of the wall section of Fig. 1a can be assembled.

[0043] Fig. 2 illustrates, in traverse cross-section, how a linking part of the linking device is connected to and cooperates with a locking element of the wall element.

[0044] Fig. 3 illustrates, in side view, a linking device connected to a tilted wall element.

[0045] Fig. 4a-4c illustrates, in traverse cross-sections, further examples of link parts connected to wall elements.

[0046] Fig. 5a shows, in side-view, a wall section having a tilted wall element adjusting to an uneven, sloped floor.

[0047] Fig. 5b shows a top view of the wall section of Fig. 5a, where the wall elements are turned in relation to each other.

[0048] Fig. 6a-6c illustrates, in full and partial perspective views, how a wall section having crossed wall elements can be assembled.

[0049] Fig. 7a-7c illustrates, in full and partial perspective views, how a wall section can be assembled.

[0050] In the drawings the same reference numerals are used for similar or corresponding elements, even when these refer to elements in different embodiments.

Detailed description of a preferred embodiment

[0051] Fig. 1a shows, in perspective, a wall section comprising four connected wall elements 10. Vertical edge portions of adjacent wall elements 10 are interconnected using a linking device. For example, the two leftmost wall elements 10a, 10b in Fig. 1a are interconnected by a linking device comprising two link parts 20a, 20b and a link member 30 interconnecting the link parts.

[0052] Each link part 20 preferably extend along the entire wall element edge portion 14, as shown in the present embodiment. However, in other embodiments one, or many link parts 20 may extend only partly along the edge portion 14.

[0053] There is a single link part 20 connected to each of the outer edge portions 14 of the two outer wall elements in Fig. 1a. Such a link part 20, i.e. one that is not being part of a linking device, may be connected to an outer edge portion in order to provide a uniform appearance, to protect the edge portion and/or to provide a site for attaching further devices that are not wall elements. Further, in Fig. 1a, each outer link part is, at its lower edge portion, provided with a floor support device 40, 42, 44.

[0054] In an alternative embodiment there may be a special kind of link part that is designed especially for connection to outer edge portions that terminate a wall section, or a branch of a wall section. The connection of this link part to a wall element, a support device and/or other functional elements of the wall section per se, is preferably similar to the connection of the ordinary link part being part of the linking device but with different outer appearance and/or connectivity. For example, such a special kind of link part may be designed for connection to various external parts, such as a door or portal for entrance into a wall section confined area.

[0055] The linking device and the support device are preferably made of a light-weight, durable material that can be cost efficiently manufactured. Aluminium is one example of such a material. Hard-plastics is another ex-

ample.

[0056] Also the wall element 10 is preferably based on a light weight material that can be cost efficiently produced. Preferably the wall element is based on a sheet of a cardboard material, such as Re-board® as manufactured by the present applicant, which has high specific strength, is comparatively durable, is recyclable and can be cost efficiently and environmentally friendly produced. For example, a 22 mm Re-board® can be comparable to a 16 mm particleboard in bending stiffness and strength but has only 1/3 of the weight of the particle board. By use of large-area printing technology during manufacturing of Re-boards, a wall-section, or wall element can easily be made with almost any wall surface appearance, for example in order to adapt to specific exhibit premises, to a specific exhibit type and/or to a specific exhibitor.

[0057] Dimensioning of parts constituting the wall section is preferably made in view of the choice of material. Preferably no single piece that is to be connected to a wall section being assembled in situ, should weigh more than about 15 kg. This way heavy lifts can be avoided and assembly of a wall section by a single person is facilitated.

[0058] Fig. 1b is a partial perspective view showing the linking device of Fig. 1a in some detail and how it can link the wall elements together. The link parts are shown in parallel, extending in a z-direction, which, when the wall section is placed on a floor, preferably is vertical. An x-direction is perpendicular to the z-direction, and the principal planes of the wall elements are in a z-x plane. A y-direction is perpendicular, i.e. the normal, to the principal plane. "

[0059] It should be understood that "direction", as in e.g. x-direction, will generally refer to any such direction, i.e. can be a positive and/or negative direction along the x-axis, "left and/or right" etc, and not necessary e.g. only the positive x-direction or "right" in relation to the x-direction indicated in the figures. When a specific direction along e.g. the x-axis is meant, this will be explicitly indicated.

[0060] In Fig. 1b only the upper end of the linking device is shown, however, the linking device is in the present embodiment symmetric in the z-direction, and thus the opposite end, i.e. here the lower end, looks similar to the shown end.

[0061] Each link part 20a, 20b, is preferably removably connectable to the edge portion of the respective wall element 10a, 10b, and the link member 30 is preferably removably connectable to the link parts. In Fig. 1b the link parts are shown in a connected state. However, for the sake of clearness, the link member 30 is shown in a non-connected state.

[0062] The link parts 20a, 20b are preferably interchangeable and have the same design, this in order to reduce the total number of different components in the system, to facilitate manufacturing of the parts and assembly of the wall section.

[0063] In the example of Fig.1b, the link member 30 has a U- or C-shape formed by two connectors 32a, 32b extending from a main body. The connectors may be form fitted with recesses 21a, 21b in a end portion of each link part, which recesses receives and engage with the connectors when the link member 30 is connected.

[0064] The connectors 32a, 32b preferably have circular cross-sections, so that the link parts 20a, 20b, when interconnected by the link member 30, are hinged and turnable about an axis parallel to the z-direction.

[0065] The width of the link member 30 is preferably greater than the thickness, or width, of the respective link part 20a, 20b, and is preferably so much wider that a groove 34 running along an edge of the link member 30 will be positioned at a distance from the edge surface of the link parts 14 when the link member 30 is connected to the link parts 20a, 20b. This allow for simple access to the grove 34 for attachment of additional parts, such as a support device or additional wall elements.

[0066] Fig. 1c shows, in traverse cross-section, in greater detail the two link parts of the linking device in Fig. 1b. In the example of Fig. 1c it can be seen that each link part 20a, 20b is a thin walled structure with wall thickness t. Such thin walled structures, or profiles, can be rigid and light weight at the same time, and are advantageously made of aluminium. The thickness t can be as small as only one or a few millimetres.

[0067] Each wall element 10 is in Fig. 1c furnished with a U-shaped profile 12 that receives the edge and is attached to the edge portion 14 of the wall element 10. The wall thickness of the profile 12 is about the same as for the link part profile. The profile 12 extends over the wall element edge surface and partly over opposite principal surfaces of the wall element. Although not shown, the profile 12 is secured to the edge surface by means of screws. Other means for fastening can also or alternatively be used, e.g. glue, nails etc. Note that some types of wall element material may require special types of fastening means. Such means are known by the skilled person and can typically be provided from the manufacturer or distributor of the material.

[0068] The profile 12 is an example of a wall locking element, which when mounted to the wall element 10 is used for interlocking the wall element 10 with the link part 20. Due to that the link locking element will cooperate with the link part and preferably also should protect the edge portion of the wall element, the link locking member 12 is preferably of a material that is more durable and resistant to wear than the wall element material. Preferably the wall locking member is of the same material as the link part.

[0069] The wall locking element 12 may remain attached to the wall element 10 during assembly/disassembly of the wall section and hence the link locking member may but do not generally have to be removably connected to the wall element, at least not in a way that facilitate assembly/disassembly.

[0070] For the purpose of locking and connecting to

the link part 20, it is typically sufficient that the wall locking element 12 is arranged at locations where such cooperation can occur and/or is desirable, e.g. for the purpose of providing a strong and stable connection. However, preferably the link lock member 12 extends along the entire wall element 10 edge portion 14. This may be especially desirable when the link lock member 12 is a separate part having also protective purposes.

[0071] A wall locking element 12 and/or link part 20 which extends only partly along the edge portion 14, may be used in alternative embodiments, e.g. in order to reduce material and keep the weight low.

[0072] A wall element 10 may be provided with wall locking elements 12 in connection with manufacturing. In situations where a wall locking element is of a more expensive and/or more durable material than the wall element, the locking element may be reused with a new wall element when the original wall element is discarded.

[0073] In the exemplifying view of Fig. 1c, each link part 20a, 20b is interlocked in the x-direction with the respective wall element 10a, 10b via wall locking element 12a, 12b. There is a play Δxa, Δxb in each interlock, which enables some movement of the respective wall element and link part relative to each other within the interlock. The interlock and the play will be discussed further in connection with Fig. 2 and 3.

[0074] Still referring to Fig. 1c, a lock pin 23 is secured to each link part. When the link part 20 is connected, i.e. here interlocked, with the wall element 10, the lock pin 23 cooperates with a recess (not shown) in the edge surface of the wall element. In the present embodiment the recess pass through the edge surface of the wall locking element 12. The lock pin 23 is shown as a separate part, but may be formed integrally with the link part.

[0075] In an alternative embodiment the lock pin 23 is secured to the wall element and/or the wall locking element, or is formed integrally with any of these parts, and the recess is instead in the link part.

[0076] The lock pin 23 and the recess (not shown) is an example of a wall locking means, which upon connection of the link part and the wall element, restricts relative movement of the wall element 10 and the link part in the z-direction, i.e. up/down when the linking device and link parts 20 are placed upright on a floor.

[0077] It is understood that the lock pin 23 may be replaced by other types of elongated members cooperating with an interrelated recess.

[0078] The wall locking means 23 may at the same time serve as a wall suspension means. When the linking devices on each side of a wall element 10, 12 are floor supported, e.g. via a support device attached to the floor end of each linking device, a wall element being interlocked with the respective linking device is pulled downwards, i.e. along the z-direction, towards the floor by gravitational forces. However, when the locking means prevents downward movement, the result is that the wall element will be suspended using the locking means 23. For a balanced suspension, the locking means is preferably placed at the same level as the centre of mass of a vertically arranged wall element 10, 12, i.e. typically at half the height.

[0079] Further, the locking means is preferably arranged so that the wall element become locked relative to the linking device at a position where the upper edges of the wall element and the linking device are aligned.

[0080] Fig. 1d is a partial perspective view illustrating the floor support device of Fig. 1a in some detail. The main purpose of the support device is to provide support for vertical positioning of the wall section and prevent that the wall section tip over. The support device comprises a support fastening member 40, support members 42, and an adjustment wedge 44. The support fastening member correspond to the link member 30, but has only one connector 32 (not shown in Fig. 1d). The reason for this is that the support device in Fig. 1a is attached to a link part or at an outer edge portion of the wall section and there is thus no need for the second connector of the ordinary link member 30. However, in cases where the support device is attached to a linking device between two wall elements, the ordinary link member 30 may replace the support fastening member 40 in the support device.

[0081] A ridge formed on each support member 42 is here form fitted with a groove in the fastening member 40, corresponding to the groove 34. The ridge may be inserted into the groove by sliding it into the groove along the x-direction, whereby the support member 42 become interlocked with the fastening member 40 in the z- and y-directions. A support member 42 is thus attachable to a link part 20 via the fastening member 40 or a link member 30. A support member 42 being attached to a link part 20 in an upright position extends out from the link part in the y-direction, typically a distance in the range 5-30 cm, along the floor surface, with the support member being in contact with the floor at the distal end. The interlock with the groove may be designed with respect to the choice of material of the support device in such way that the distal end is allowed to flex in the z-direction. However, movement of the distal end upwards from the floor can be restricted by inserting the wedge 44 between the surface of the link part and a support member surface which faces the link part surface and is part of a portion of the support member 42 extending from the portion being attached to the link part 20 and upwards. By the degree of insertion of the wedge 44, the level at which the distal end become supportive can be adjusted.

[0082] The support device may be attached to an already upright positioned wall section and the adjustment using the wedge 44 is advantageously made in situ, i.e. when the link part is positioned at a desired "final" floor location. A link part 20 with an attached support device having attached one or two support members 42 may be held in a desired position, typically upright, and then the wedge(s) may be inserted until the distal end(s) of the support member(s) make contact with the floor surface. This is a very quick and efficient way of accomplishing a

floor adapted support for the link part, or linking device comprising the link part.

[0083] In order to prevent an inserted wedge 44 to dislodge or move out of position, the wedge and one or two of the surfaces it faces (the link part surface and the support member surface) may be provided with interrelated lock patterns, such as ridges/grooves that cooperates and restrict movement of the wedge in the z-direction. The ridges/grooves may be fluked so as to facilitate insertion of the wedge in one direction (down) while restricting removal in the opposite direction (up).

[0084] By use of the wedge 44, the support members 42 can be adjusted to provide stable support for a vertically positioned wall section even when there may be traverse floor level differences.

[0085] Fig. 2 illustrates, in traverse cross-section, how one link part 20 of a linking device may be connected to and may cooperate with the wall element's 10 locking element 12. For the sake of clearness the wall element 10 on which locking element 12 is mounted has been left out in the figure.

[0086] In the present embodiment the link part's 20edge portion 22, which extends over opposite principal surfaces of the wall element's 10 edge portion 14, comprises, on each principle surface side, a first and a second link locking element 26, 24. The link locking elements are here protrusions, or ridges 26, 24, that run along the entire length of the link part 20, and are in the y-direction facing the wall element 10 and wall locking element 12, i.e. are here facing inwards.

[0087] In the x-direction the first link locking element 24 presents a lock surface 25 facing a lock surface 15 of the locking element 12, and the second link locking element 26 presents a lock surface 27 facing a lock surface 17 of the locking element 12.

[0088] When the connected wall element, and hence the wall locking element 12, is being moved away from the link part 20 in the x-direction, the lock surfaces 24, 15 engage at a first position Px1 in relation to the link part, and further movement apart is prevented.

[0089] When the connected wall element, and hence the wall locking element 12, is being moved towards the link part 20 in the x-direction, the lock surfaces 27, 17 will engage and further movement is prevented. When these lock surfaces engage, the lock surface 15 has moved away from the lock surface 25 a distance Δx, and is positioned at a second position Px2 in relation to the link part 20.

[0090] Hence, in the example the link part 20 and the locking element 12 (including the wall element 10), are interlocked in the x-direction, both towards and apart from each other. The distance Δx represent a play in the interlock.

[0091] It may be noted that the link part 20 and the wall element 10 are interlocked also in the traverse y-direction, but without any significant play, which in this case may give rise to noise if e.g. vibrations causes an upright wall element to move back and forth within the play and/or may cause an undesired tilt of the wall element in the y-direction. The interlock in the y-direction may thus advantageously be tight.

[0092] To connect the wall element and the link part, the wall element(or the link part) may be slided in the z-direction into the interlocked position. However, upon assembly of an upright positioned wall section, this may require that a link part, or even a wall element to which the link part is already connected, may need to be lifted above an upper edge of the wall section. One remedy to this may be to connect the link parts 20 to the wall elements 10 in a non-upright position, e.g. when the wall elements 20 are placed flat on the floor or a table. However, yet another option for connection exists when the locking elements are flexible in relation to each other in the y-direction. In such cases the interlock can be accomplished by snap connection, i.e. the link part and the wall element 10 and the link part 20 can be moved together in the x-direction whereby the locking elements flex outward and/or respectively inwardto allow passage, and when the lock position Px1 has been passed the locking elements flex back and snap into an interlocked position. Such snap connection is possible in the present embodiment, for example with reference to Fig. 3, where the arms of the link part 20, which extend over the principal surfaces of the wall element 10 and of which the locking elements 24, 27 are part of, are flexible outwards.

[0093] Not taking the previously discussed lock pin 23 into consideration, and which may be absent in some embodiments, the interlock with the play Δx allows for displacement of the wall element 10 in relation to the link part 20, but also for tilt of the wall element 10 in its principal plane. When the wall element 10 is tilted, the positions of the lock surfaces 15, 17 of the wall locking element 12 in relation to the lock surfaces 25, 27 of the link part 20 will vary along the link part, i.e. in the z-direction. When the lock surfaces engage at some position along the link part, further tilt in that direction is restricted.

[0094] It should be appreciated that the tilt within the interlock is possible without deformation of any of the involved parts, and that before engagement between the lock surfaces, the parts being involved in the interlock may be tilted just as easy independent on the degree of tilt.

[0095] The lock pin 23 and the interrelated recess may prevent or at least restrict displacement of the interlocked parts. In order not to adversely affect the ability to tilt within the play, the recess being cooperative with the lock pin 23 is preferably made with a substantially larger diameter than the lock pin 23, which allow the lock pin to be tilted and still be positioned in the recess. Hence, the interlocked parts can be tilted in relation to each other notwithstanding the presence of the lock pin 23.

[0096] Fig. 3 shows, in side view, the link part 20 connected to a tilted wall element 10.

[0097] The height h of a wall element typically corresponds to the height of a conventional wall and is typically in the range 2-3 m, preferably about 2.40 m, or of any

other "standard" wall height. Of course, in special circumstances, the height may also be outside the mentioned range.

[0098] The length 1 is typically in the range 0.5-4 m, preferably 1-2 m, e.g. 1.5 m, which results in a wall element that can be convenient to handle in practise and that may facilitate assembly/disassembly of wall sections. However, of course also other lengths 1 may be used.

[0099] The width (not shown in Fig. 3), or thickness, of the wall element is typically in the range 1-20 cm, preferably 2-4 cm. A thicker wall element may be e.g. be used for larger area wall elements to increase rigidity, or simply to increase the capability of sound absorption.

[0100] A situation with maximal tilt allowed within the interlock is shown in Fig. 3. The wall element 10 is tiled at an angle α in relation to the link part 20. The maximal tilt corresponds to a Δh change in level at a distal edge of the wall element 10. The following relations can be found in the figure:

(1) $\sin \alpha = \Delta h / 1$
(2) $\sin \alpha = \Delta x / h$
(3) $\Delta h = \Delta x * 1/h$

[0101] Hence, in a situation where a wall element has equal height h and length 1, the maximal compensation Δh in height h that can be accomplished is equal to the play Δx. For provision of substantial tiltabilty, the play should at least be about 0.3 cm, but preferably at least about 0.5 cm. A larger play, for example at least 0.7 cm, 1 cm or even more, is of course better in the sense that it allows for a larger degree of tilt, but there may be other reasons, e.g. design reasons, that still makes it desirable to use a smaller play. The play may also be defined in relation to the height or length of the wall element. With respect to the above relationships, the play may thus be defined as at least 0.5 % or 1 % of the length or height of the wall element.

However, it should be noted that the above relations only are valid when interlocking is taking part along the entire height of the wall element. For example, if interlocking is taking part only along a fraction of the height, say along a distance dh, it is understood that h in relation 2 and 3 above should be replaced by dh.

[0102] Fig. 4a-4c illustrates, in traverse cross-sections, further alternatives of link parts interlocked with wall elements.

[0103] In Fig. 4a it is shown an alternative where the wall locking element 12 have two protrusions, or ridges, and the link part has only one protrusion which during interlock is positioned between the two protrusions of the wall locking element 12.

[0104] In fig 4b it is shown an alternative that is pretty much the opposite of the one in Fig. 4a and which is similar to the example of Fig. 2. However, in comparison with the example of Fig. 2, here none of the two protrusions of the link part 20 engages with the edge surface of the wall locking element 12. I fact, in Fig. 4b the lower protrusion is not actually a locking element, since at the second lock position Px2 it is the edge surface of the wall locking element that engages with an inner edge surface of the link part, which thus are to be considered the lock surfaces resulting in the second lock position.

[0105] In the example of Fig. 4c it is not he link part 20 that, when there is an interlock, extends over opposite principal sides of the wall element 10 and the wall locking element 12, instead the wall locking element 12 extends over opposite surfaces of the link part 20.

[0106] In all of the examples so far a separate wall locking element, albeit secured to the wall element 20, has been used. However, in an alternative embodiment a link locking element may comprise or constitute a ridge or a groove in the wall element per se. In another embodiment the ridge is constituted by a hardened strip of glue bonding to and extending along the edge portion.

[0107] Fig. 5a shows, in side-view, a wall section having a tilted wall element in a situation where it adjusts to an uneven, sloped floor surface. A middle wall element 10 pass over the sloped part and adapt to this situation accordingly by tilting in relation to the linking devices on each side. The outer wall elements are not tilted, neither are any of the linking devices, which are all parallel and vertically positioned. It can be noted that the upper and lower ends of all link parts are aligned with upper and lower ends of the linking parts they are connected to. Owing to the tilted wall element the wall section is able to present a smooth discrete transition from the higher to the lower floor level.

[0108] Fig. 5b shows a top view of the wall section of Fig. 5a, where the wall elements have been turned in relation to each other about a vertical axis. This has been enabled by that the linking devices are hinged components, which result from that the link parts 20 of a linking device are turnable in relation to each other when interconnected using a link member 30.

[0109] In addition to support devices comprising double, opposite support members, that are attached to a respective single link part 20', 20'" at each of the outer wall section edges, there is in Fig. 5b also shown a support device comprising a single support member attached to a linking device between two wall elements, which device only comprises one support member. In general, to straighten up and accomplish a vertically positioned wall section, a support device may be attached where appropriate. Note that one or more of the wall elements may tilt in-plane even in an upright, vertically positioned wall section, i.e. where all linking devices and wall elements are vertically positioned.

[0110] Fig. 6a-6c illustrates, in full and partial perspective views, how a wall section having crossed wall elements can be provided, and is one example of the versatility of the system. A groove 34 of a link member 30 is here used for attaching further wall elements 10 to a wall section so as to accomplish a crossing of wall elements. Since a crossing is stable per se, there is of less

interest to attach a support device via the link member at the crossing. For the connection of the additional wall elements, first a sheet shaped add-on link member 50 having a ridge that fit into the groove 34 is provided. The add-on link member 50 is further furnished with a through hole 54, which when the add-on member is attached to the link member, can be placed concentrically with an upper end recesses 21 (not shown in Fig. 6) of a link part 20 of the additional wall element. A separate connector 60, which is similar to a link member connector 32, is inserted in the concentrically arranged hole and recess so as to connect the additional wall element to the existing wall section. A similar additional wall element may be connected to the opposite side of the original wall section, which is illustrated in Fig. 6.

[0111] Fig. 7a-7c illustrates, in full and partial perspective views, how a wall section can be assembled. The illustrated way of assembly can advantageously be employed at an initial assembly stage when there is yet no wall section part that is upright positioned and to which further parts can be connected.

[0112] It should be understood that the symmetry possessed by many of the herein described parts, are mainly for facilitating manufacturing, reducing the total number of parts required to assemble the wall sections and for accomplishing a symmetric, discrete and appealing appearance, but that the purpose and function of many parts as well can be achieved by more asymmetric parts.

[0113] Any illustration and description in the drawings and in the foregoing description are to be considered exemplary and not restrictive. The invention is not limited to the disclosed embodiments.

[0114] The present invention is defined by the claims and variations to the disclosed embodiments can be understood and effected by the person skilled in the art in practicing the claimed invention, for example by studying the drawings, the disclosure, and the claims. Use of the word "comprising" in the claims does not exclude other elements or steps, and use of the article "a" or "an" does not exclude a plurality. Occurrence of features in different dependent claims does not per se exclude a combination of these features. Any reference signs in the claims are for increasing intelligibility and shall not be construed as limiting the scope of the claims.

Claims

1. A screen wall system comprising:

two wall elements (10a, 12a; 10b, 12b); and
a linking device (20a, 20b, 30) for linking the wall elements together by connection to an edge portion (14a; 14b) of each wall element,

characterized in that at least one of the wall elements, when connected to the linking device, is tiltable in its principal plane relative to the linking device.

2. The system as claimed in claim 1, wherein the linking device has an edge portion extending in a first direction (z), which edge portion, when the wall element (10a, 12a) is connected to the linking device, is interlocked in a second direction (x) with an edge portion (14a) of the wall element, said second direction (x) being substantially parallel to the principal plane (x-z) of the wall element and substantially perpendicular to the first direction (z), wherein the interlock involves a play and the wall element is tiltable within the play (Δx).

3. The system as claimed in claim 2, wherein the wall element (10a, 12a) is displaceable within the play (Δx).

4. The system as claimed in any one of claims 2-3, wherein the play (Δx) is at least 0.3 cm, 0.5 cm, 0.7 cm, 1 cm, 3 cm or 5 cm.

5. The system as claimed in any one of claims 2-4, wherein the edge portion (14a) of the wall element (10a, 12a) is provided with a wall locking element (12a) and the edge portion (22a) of the linking device is provided with a link locking element (24a), wherein the wall locking element (12a) and the link locking element (24a) present lock surfaces (15a, 25a) facing each other in the second direction (x) such that any tilt and/or displacement of the wall element away from the linking device in the second direction (x) results in that the surfaces engage with each other at a first relative lock position (Px1).

6. The system as claimed in claim 5, wherein the locking elements (12a, 24a) are resilient relative to each other in a third direction (y) which is substantially perpendicular to the principal plane (x-z) of the wall element.

7. The system as claimed in any one of the preceding claims, wherein the linking device edge portion (22a) extend over opposite principal surfaces of the wall element when the wall element and the linking device are connected.

8. The system as claimed in any one of the preceding claims, wherein the linking device (20a, 20b, 30) comprises two interconnectable link parts (20a, 20b), each for the connection to one wall element (10a, 12a; 10b, 12b).

9. The system as claimed in claim 8, wherein the link parts (20a, 20b), when interconnected, are parallel and turnable in relation to each other about a parallel axis.

10. The system as claimed in claim 8 or 9, wherein each link part (20a, 20b), when connected to the respec-

tive wall element, extends between opposite edges of the wall element, wherein the link parts are interconnectable by means of a link member (30) that is connectable to adjacent end portions of the link parts.

11. The system as claimed in any one of the claims 2-10, wherein the system further comprises a wall element locking means (23a) which, when the wall element (10a, 12a) is connected to the linking device, restricts movement of the wall element in the first direction (z).

12. The system as claimed in claim 11, wherein the wall element locking means (23) comprises an elongated member and a recess which cooperates to restrict the movement, wherein the recess preferably is part of either the wall element or the linking device, and the elongated member preferably is a separate part or integrated with the part not comprising the recess.

13. The system as claimed in claim 11 or 12, wherein the elongated member, when the wall element (10, 12) and the linking device (20) are connected, extends between opposing edge surfaces of the linking device and the wall element.

14. The system as claimed in any one of the preceding claims, wherein the system further comprises a floor support device (40, 42, 44) being attachable to an edge portion of the wall element (10, 12) and/or the linking device (20), wherein said floor support device, when attached to the edge portion, extends from a wall end to a distal end in a direction (y) which is substantially perpendicular to the principal plane (x-z) of the wall element.

15. The system as claimed in claim 14, wherein the distal end is adjustable in a direction (z) that is perpendicular to the edge surface of the edge portion.

16. The system as claimed in claim 14 or 15, wherein the distal end is adjustable by means of a wedge (44) that is insertable between the edge portion of the wall element, and/or the edge portion of the linking device, and the wall end of the support device.

17. The system as claimed in claim 16, wherein the wedge comprises lock elements that engage with interrelated lock elements on the wall end of the support device and/or the edge portion of the wall element, and/or the edge portion of the linking device, in such way that the removal of the wedge in the opposite direction of insertion is restricted.

18. A wall element (10, 12) for use as the wall element in the system as claimed in any one of the preceding claims, wherein
the wall element is connectable to the linking device (20a, 20b, 30) in such way that the wall element, when connected to the linking device, is tiltable in its principal plane (x-z) relative to the linking device.

19. A floor support device (40, 42, 44) for use as the floor support device in the system as claimed in any one of claims 14-17, wherein the device is attachable to an edge portion of the wall element (10, 12) and/or the linking device (20), wherein said floor support device, when attached to the edge portion, extends from a wall end to a distal end in a direction (y) which is substantially perpendicular to the principal plane (x-z) of the wall element.

20. A linking device (20a, 20b, 30) for use as the linking device in the system as claimed in any one of claims 1-17, wherein the linking device is connectable to an edge portion of the at least one wall element (10a, 12a; 10b, 12b) in such way that the wall element, when connected to the linking device, is tiltable in its principal plane relative to the linking device.

21. A link part for use as the link part in system as claimed in any one of claims 8-10, wherein the link part (20a) is connectable to a similar link part (20b) forming part of the linking device, and to the wall element (10, 12).

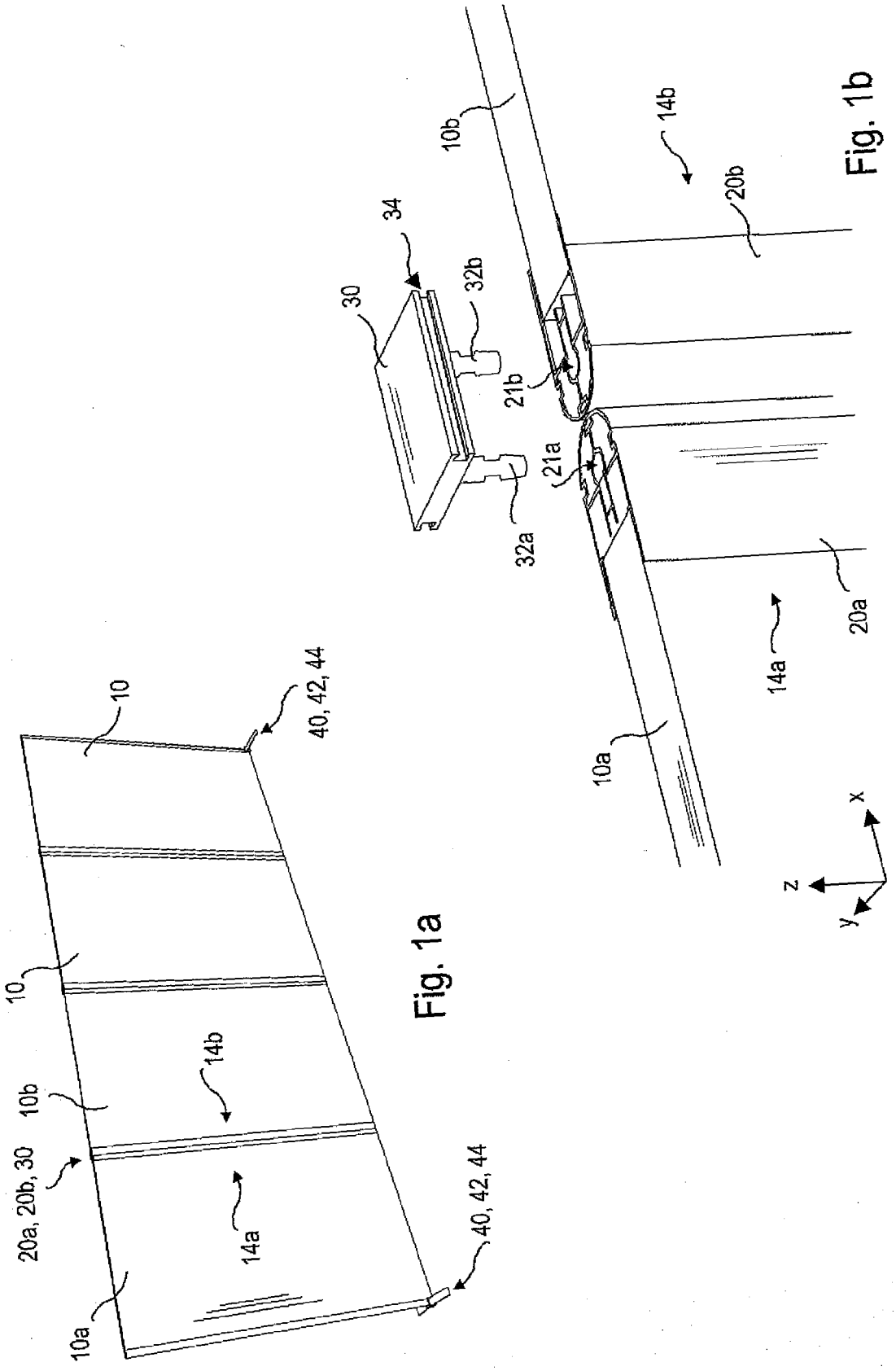
10
40, 42, 44
10
14b
10b
20a, 20b, 30
14a
40, 42, 44
10a
x
z
y
10b
14b
20b
34
30
32b
21b
21a
32a
20a
14a
10a

Fig. 1a

Fig. 1b

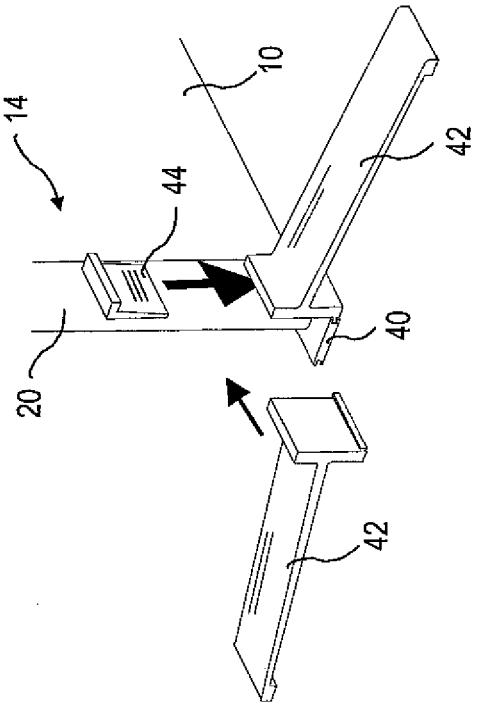
14
10
42
44
40
20
42

Fig. 1d

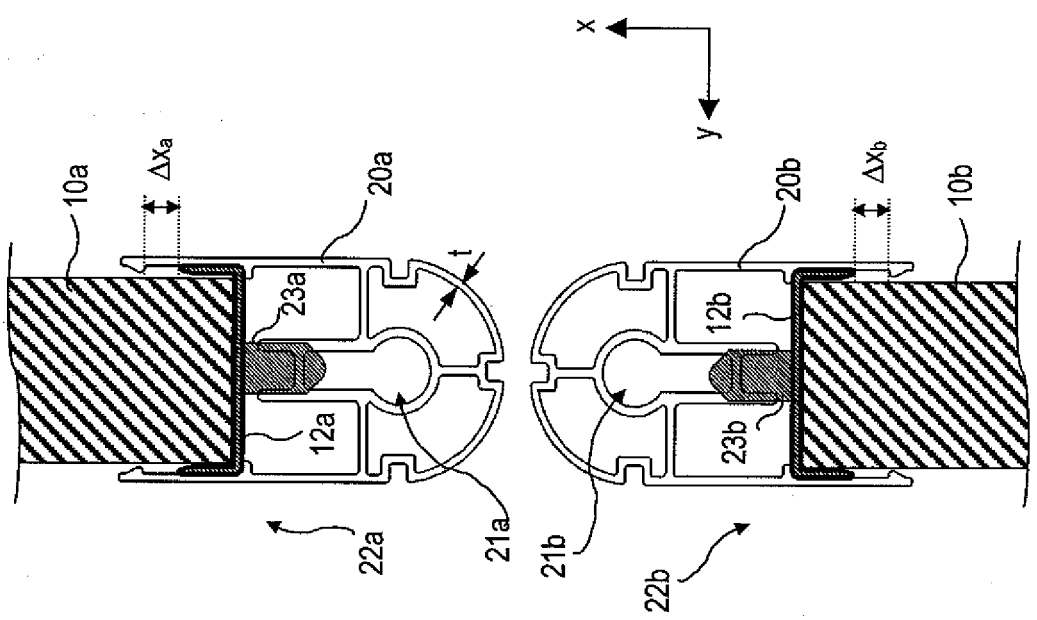
x
y
10a
Δxa
20a
t
23a
12a
22a
21a
21b
22b
20b
Δxb
10b
12b
23b

Fig. 1c

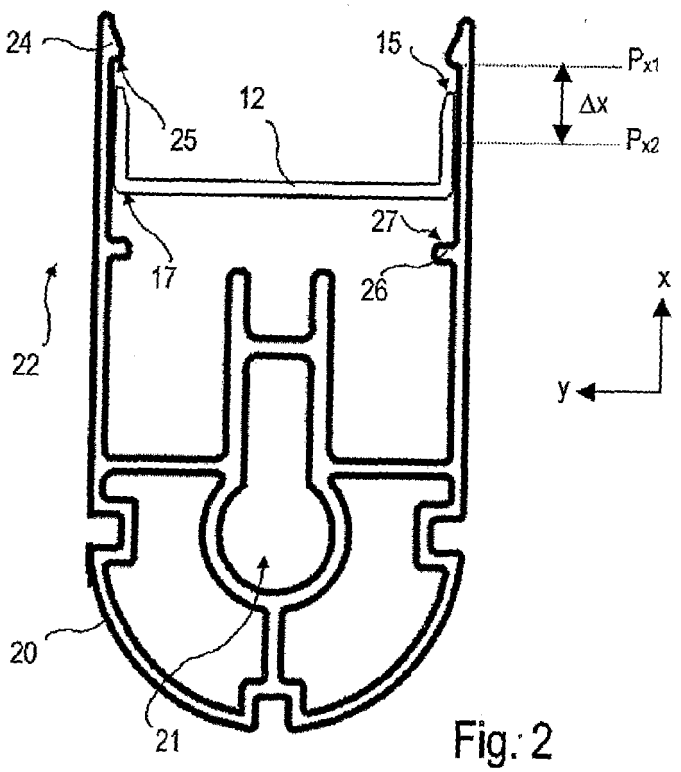
24
15
P_{x1}
Δx
P_{x2}
12
25
27
17
26
22
x
y
20
21

Fig. 2

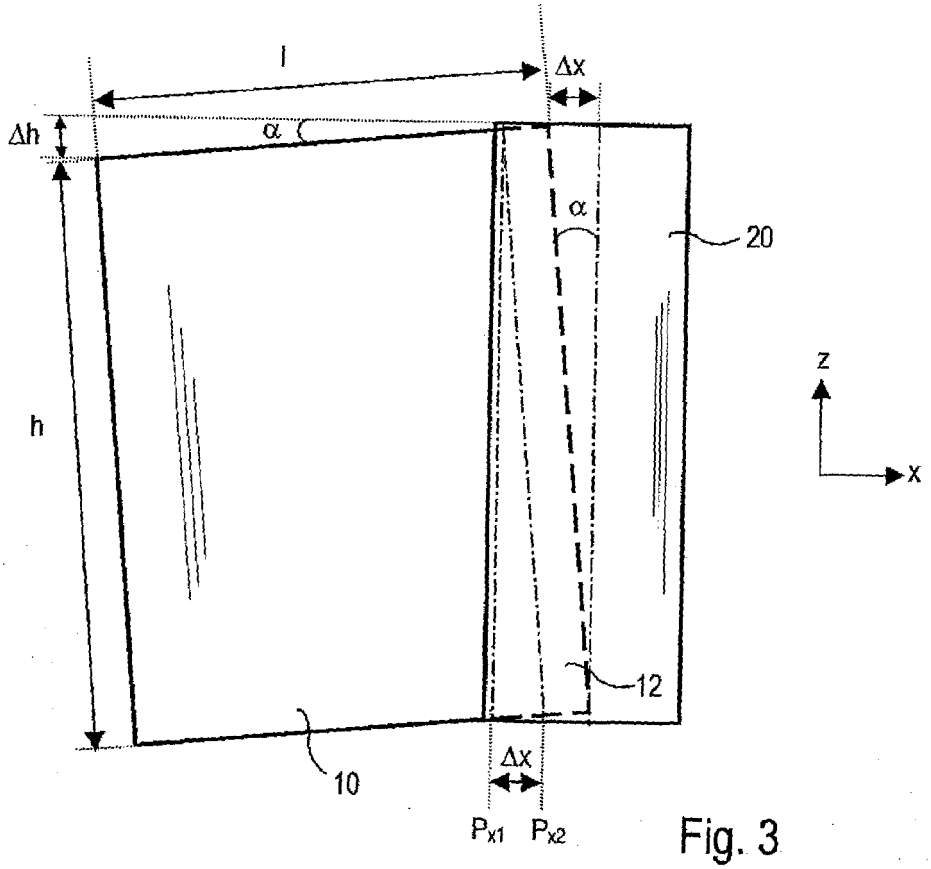
l
Δx
Δh
α
α
20
z
x
h
12
10
Δx
P_{x1}
P_{x2}

Fig. 3

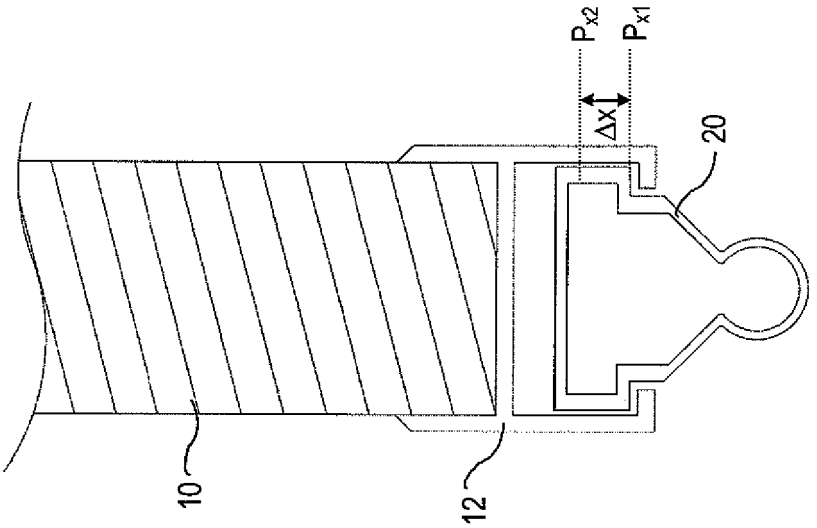

Fig. 4c

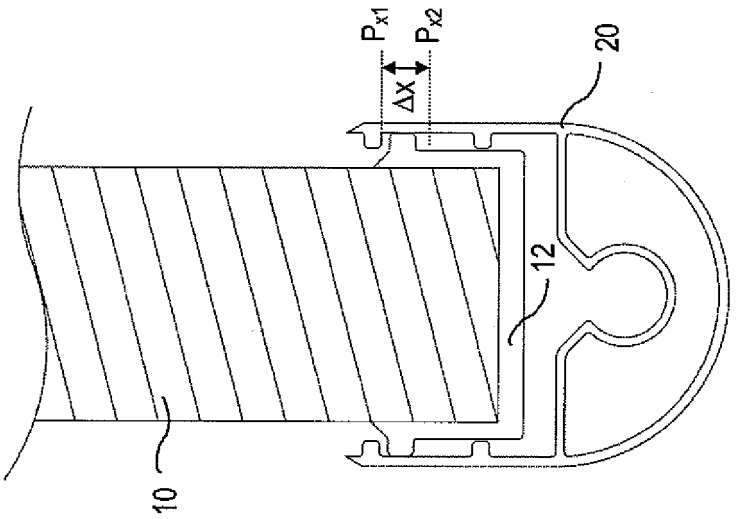

Fig. 4b

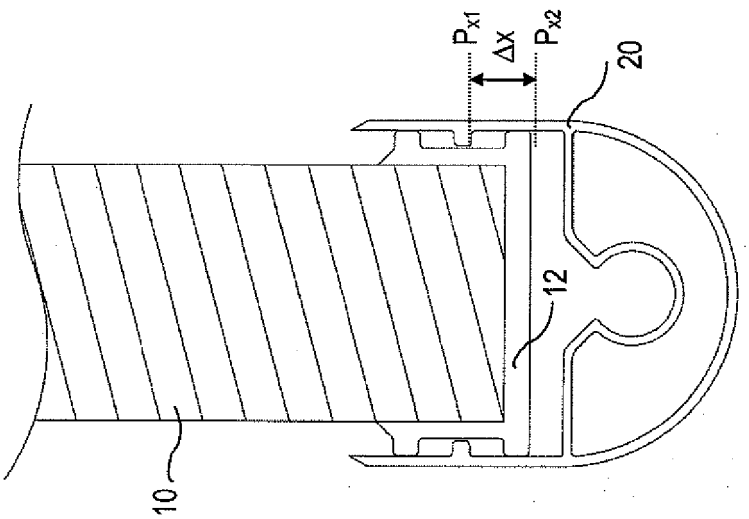

Fig. 4a

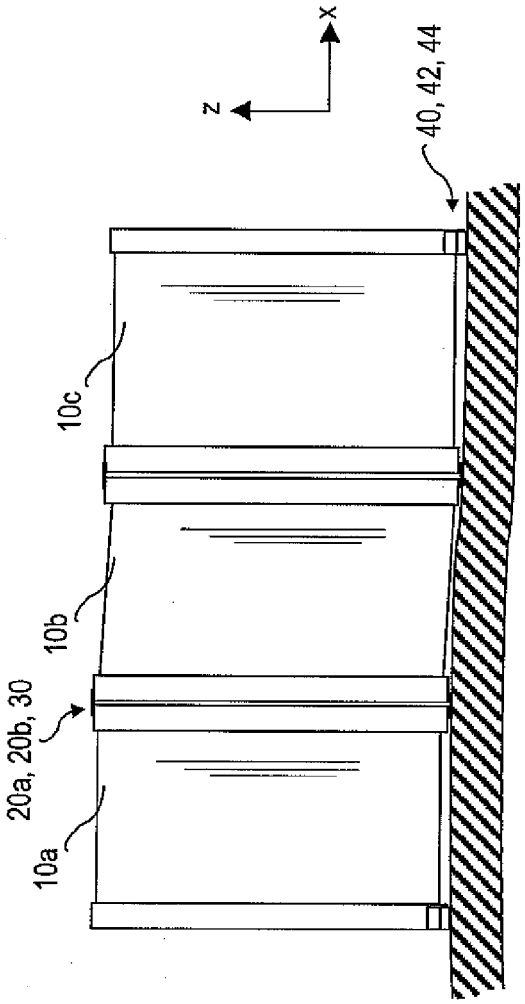
x
z
40, 42, 44
10c
10b
20a, 20b, 30
10a

Fig. 5a

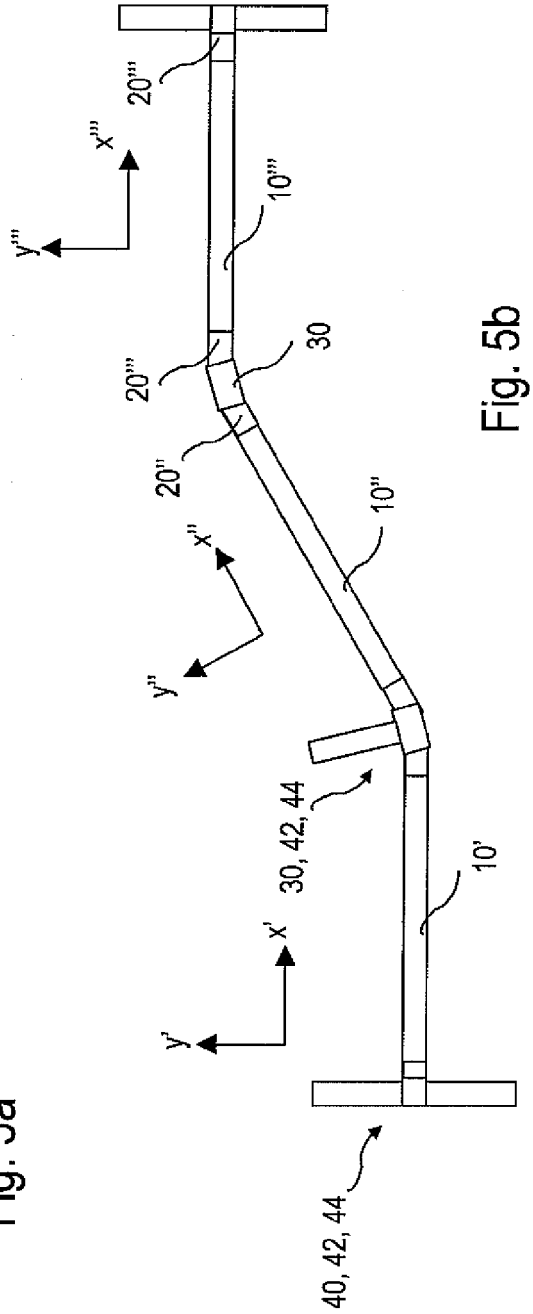
20'''
x'''
y'''
10'''
30
20'''
20''
10''
x''
y''
30, 42, 44
10'
x'
y'
40, 42, 44

Fig. 5b

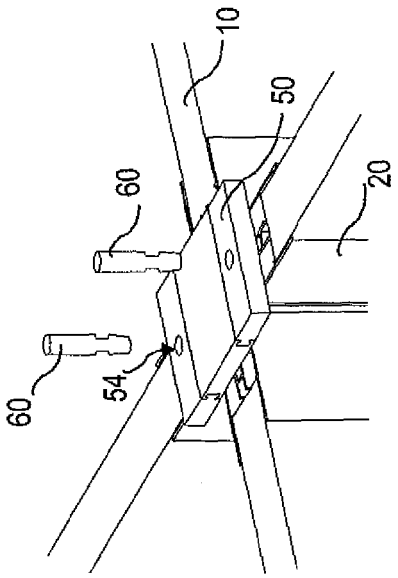

Fig. 6b

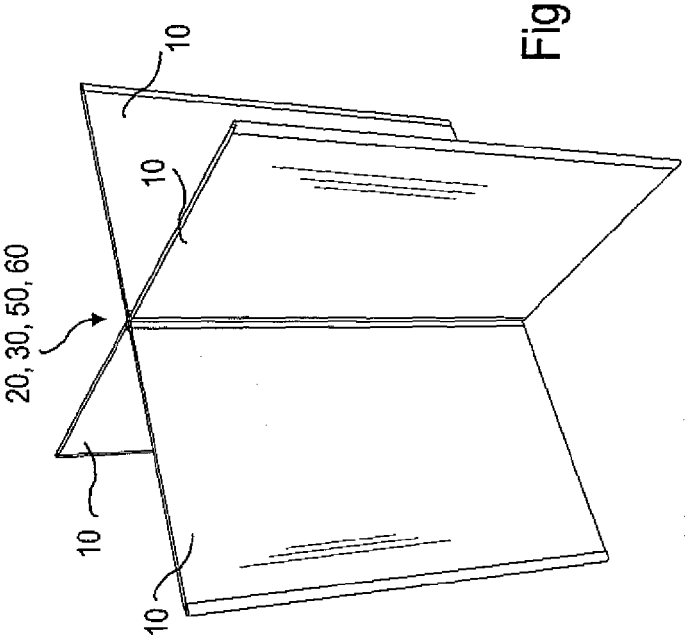

Fig. 6c

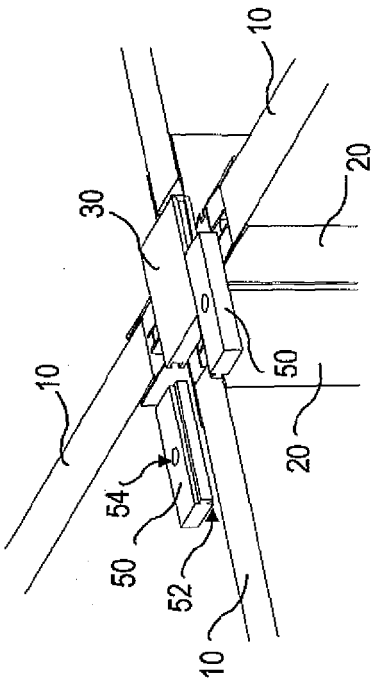

Fig. 6a

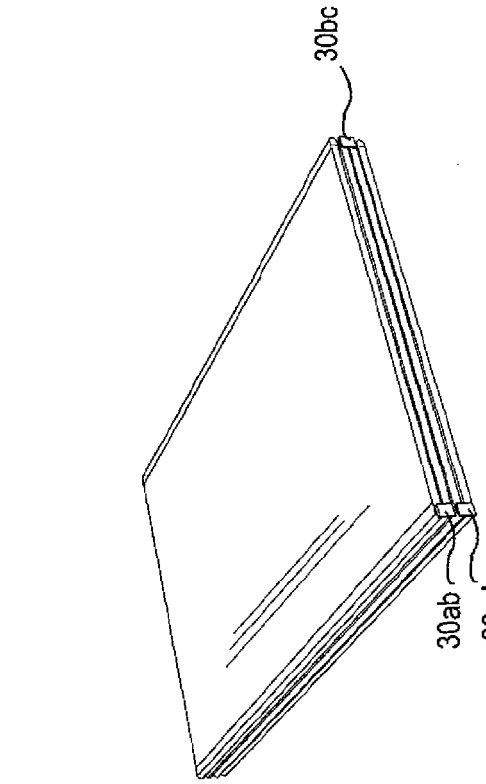

Fig. 7b

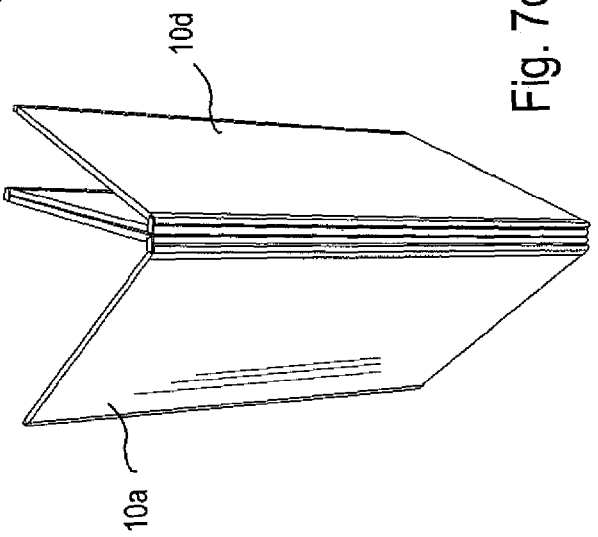

Fig. 7c

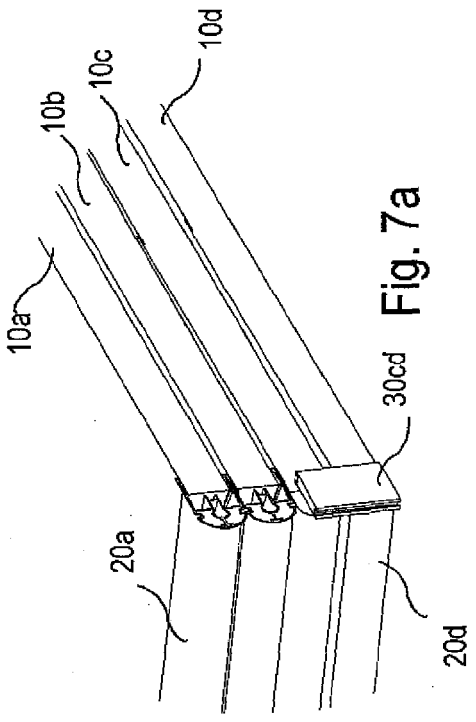

Fig. 7a

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 07 10 3259

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X Y	US 5 852 904 A (YU X SHAWN [US] ET AL) 29 December 1998 (1998-12-29) * column 14, lines 30-39; figures 3,4 * -----	1,8,18, 20,21 14-16	INV. E04B2/74
X Y	US 5 931 429 A (HELLWIG JOHN [CA] ET AL) 3 August 1999 (1999-08-03) * figures 6,7 * -----	19 14-16	
A	US 5 486 391 A (TYNER JEFFREY D [US]) 23 January 1996 (1996-01-23) * figures 1,2a * -----	1-21	

TECHNICAL FIELDS SEARCHED (IPC)

E04B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	18 July 2007	Rosborough, John

CATEGORY OF CITED DOCUMENTS

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 07 10 3259

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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18-07-2007

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5852904 A	29-12-1998	NONE	
US 5931429 A	03-08-1999	CA 2199315 A1	06-09-1998
US 5486391 A	23-01-1996	NONE	

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82