(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 550 417 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
02.07.2014 Bulletin 2014/27

(21) Application number: **10711661.8**

(22) Date of filing: **26.03.2010**

(51) Int Cl.:
E04G 21/32 *(2006.01)*

(86) International application number:
PCT/EP2010/053980

(87) International publication number:
WO 2011/116829 (29.09.2011 Gazette 2011/39)

(54) **CONSTRUCTION SAFETY SCREEN**

SCHUTZWAND FÜR DEN BAU

ECRAN DE SÉCURITÉ POUR LE BÂTIMENT

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO SE SI SK SM TR

(43) Date of publication of application:
30.01.2013 Bulletin 2013/05

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(56) References cited:
DE-A1- 3 323 878
FR-A- 1 423 879
FR-A- 1 479 930
FR-A- 1 490 572
FR-A- 1 585 600
FR-E- 94 002

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EP 2 550 417 B1

Printed by Jouve, 75001 PARIS (FR)

Description

FIELD OF THE INVENTION

[0001] The present invention relates to a construction safety screen for catching items or persons falling from a building being constructed.

BACKGROUND OF THE INVENTION

[0002] US-2006/0214150 discloses a prior art construction safety screen comprising a plurality of mounting assemblies attaching the construction safety screen to the construction. That prior art also comprises a net which is connected to the mounting assemblies and pivotally moveable between an operative position and a non-operative storing position. That prior art further comprises cables attached with a distal end thereof to the net and with a proximal end thereof to the mounting assemblies for securing the net in an operative position. In order to cover a whole construction a plurality of construction safety screens are mounted adjacent each other. That prior art does, however, have a number of disadvantages. For example, due to its construction, it cannot be mounted with an overlap of the nets. This means, that adjacent nets have to be secured to each other, for example with ropes running through the meshes along adjacent perimeters of the nets in order to prevent persons or items from passing through. Further, mounting assemblies of adjacent construction safety screens have to be attached to the construction immediately next to each other. Depending on the shape of the construction this is not always possible, thus leaving a gap between two adjacent construction safety screens that somehow has to be covered by temporary solutions. Further disclosures can be found in documents FR 94 002 E, FR 1585600, FR 1479930, DE 3323878 and FR 1490572. FR 94 002 E describes a construction safety screen according to the preamble of claims 1 and 2.

SUMMARY OF THE INVENTION

[0003] The present invention in its various aspects is as set out in the appended claims.

[0004] It is an object of the present invention to provide an improved construction safety screen that avoids the above-mentioned drawbacks. This object is achieved by a construction safety screen according to the present invention as defined in claim 1 of the appended claims. This object is also achieved by a construction safety screen according to the present invention as defined in claim 2 of the appended claims.

[0005] Thus, in accordance with a first aspect of the present invention there is provided a construction safety screen, comprising a net structure and an attachment arrangement for supporting a rear edge of the net structure and connecting the construction safety screen to a construction. The construction safety screen also comprises a net support which is connected to the attachment arrangement and to a front edge of the net structure. The net structure comprises a net, a front horizontal tube located at a front edge of the net and a rear horizontal tube located at a rear edge of the net. The attachment arrangement comprises fixing means for mounting the construction safety screen to a construction, for example a concrete floor slab or a façade, and a net hanger connected to said fixing means, wherein said net hanger comprises a U-shaped portion. The rear horizontal tube is accommodated in said U-shaped portion at a distance from a short side of the net structure such that the rear horizontal tube protrudes from both sides of the U-shaped portion. This has the advantage, that any necessary overlap of adjacent net structures easily can be achieved. If, for example, an overlap of one meter is required, the net structure is accommodated in said U-shaped portion at a position located one meter from a short side of the net structure.

[0006] In accordance with a second aspect of the invention, there is provided a construction safety screen, comprising a net structure and an attachment arrangement for supporting a rear edge of the net structure and connecting the construction safety screen to a construction. The construction safety screen also comprises a net support connected to the attachment arrangement and to a front edge of the net structure. The net structure comprises a net, a front horizontal tube located at a front edge of the net and a rear horizontal tube located at a rear edge of the net. The attachment arrangement comprises fixing means for mounting the construction safety screen to a construction and a retaining portion connected to the fixing means. The attachment arrangement further comprises an adjustable net coupling part connected to the retaining portion. The adjustable net coupling part clamps the rear horizontal tube at a distance from a short side of the net structure such that the rear horizontal tube protrudes from both sides of the adjustable net coupling part. As is also the case with the construction safety screen according to the first aspect of the invention, any necessary overlap can easily be achieved with a construction safety screen according to the second aspect of the invention.

[0007] In accordance with the first aspect of the invention, the net hanger is sub-divided into several compartments for accommodating net structures in separate levels.

[0008] In accordance with an embodiment of the construction safety screen of the first aspect of the invention, the net hanger is sub-divided by a bolt extending between a front beam and a rear beam of said U-shaped portion.

[0009] In accordance with an embodiment of the construction safety screen of the first aspect of the invention, the fixing means comprises an elongated plate extending in a rearward manner from the net hanger for attachment to a construction, for example a floor slab.

[0010] In accordance with an embodiment of the construction safety screen of the first aspect of the invention,

the fixing means comprises a beam extending in a vertical manner for attachment to a facade.

[0011] In accordance with an embodiment of the construction safety screen of the first aspect of the invention, the fixing means comprises clamping means for attachment to a scaffolding. Typically, two clamping jaws are used for attachment to a scaffolding pole.

[0012] In accordance with an embodiment of the construction safety screen of the second aspect of the invention, the fixing means comprises a beam having a fastener at one end thereof for attachment to a construction and wherein the retaining portion is connected to the beam by means of a transversal beam.

[0013] In accordance with the second aspect of the invention, the adjustable net coupling part comprises a slider which is adapted to encircle the retaining portion of the attachment arrangement, and is movable in a vertical direction along the retaining portion in a mounted state.

[0014] In accordance with an embodiment of the construction safety screen of the second aspect of the invention, the retaining portion comprises upper and lower limiting means wherein, in a mounted state, the slider is moveable along the retaining portion of the attachment arrangement between these upper and lower limiting means.

[0015] In accordance with an embodiment of the construction safety screen of the first or the second aspect of the invention, the attachment arrangement also comprises an offset beam by means of which the construction safety screen is connectable to a construction in an offset position.

[0016] In accordance with an embodiment of the construction safety screen of the first or the second aspect of the invention, the net support comprises a fundament which extends substantially vertically downwards. The net support also comprises a lever arm, wherein a lower portion of said lever arm is attached to the fundament and an upper portion of said lever arm is attached to the front horizontal tube at a front edge of the net structure.

[0017] In accordance with an embodiment of the construction safety screen of the first or the second aspect of the invention, an adjustable rear support is attached to the fundament in order to provide support for the construction safety screen against the construction.

[0018] In accordance with an embodiment of the construction safety screen of the first or the second aspect of the invention, the adjustable rear support comprises means for clamping the adjustable rear support to the fundament.

[0019] In accordance with an embodiment of the construction safety screen of the first or the second aspect of the invention, an extension member is inserted into the fundament, wherein said extension member is telescopically displaceable with respect to the fundament.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020] The invention will now be described in more detail and with reference to the appended drawings in which:

Fig.1 is a side view of a first embodiment of a construction safety screen of the first aspect of the invention.

Fig.2 is a side view of a first embodiment of a construction safety screen of the second aspect of the invention.

Fig. 2B is a close-up view of a detail of the first embodiment of a construction safety screen of the second aspect of the invention.

Fig.3 is a side view of a second embodiment of a construction safety screen of the first aspect of the invention.

Fig. 4 is a top perspective view of a first embodiment of an attachment arrangement of the construction safety screen of the first aspect of the invention.

Fig. 5 is a top perspective view of a second embodiment of an attachment arrangement of the construction safety screen of the first aspect of the invention.

Fig. 6 is a top perspective view of a third embodiment of an attachment arrangement of the construction safety screen of the first aspect of the invention.

Fig.7 is a top perspective view of a first embodiment of an adjustable net coupling part of the construction safety screen of the second aspect of the invention.

Fig. 8 is a top perspective view of an offset beam of the construction safety screen of the first or the second aspect of the invention.

Fig. 9 is a top perspective view of an adjustable rear support of the construction safety screen of the first or the second aspect of the invention.

Fig. 10 is a perspective view of a third embodiment of a construction safety screen of the first aspect of the invention.

Fig. 11 is a perspective view of a fourth embodiment of a construction safety screen of the first aspect of the invention.

Fig. 12 is top view of the second embodiment of a construction safety screen of the second aspect of the invention.

DESCRIPTION OF PREFERRED EMBODIMENTS

[0021] In a first embodiment of a construction safety screen of the first aspect of the invention, as shown in figure 1, a construction safety screen 100 comprises an attachment arrangement 101, a net support 112, a net structure 102 and an adjustable rear support 109. Referring first to the net structure 102, it comprises a net 103, a rear horizontal tube 104 and a front horizontal tube 105 positioned in a respective rear and front channel in the net 103. The attachment arrangement 101, which will also be further described below, on the one hand attach-

es the construction safety screen to a construction, said construction being shown in figure 1 as a concrete floor slab 120, and on the other hand accommodates and retains the rear horizontal tube 104 of the net structure 102. The attachment arrangement 101 comprises an elongated plate 401 extending in generally horizontal direction for attachment to the construction 120 and a net hanger 403 attached to the elongated plate 401. The net hanger 403 comprises a U-shaped portion defined by a front beam 404, a rear beam 405 and a bottom portion 406. The U-shaped portion accommodates and retains the rear horizontal tube 104 of the net structure 102. The net hanger 403 is sub-divided into two different compartments by bolts 407 and 408 passing through the front beam 404 and being threaded into the rear beam 405. Thanks to the fact that the net hanger 403 is sub-divided into separate compartments, it can be avoided that adjacent net structures 102, mounted with overlap, rub against each other, thereby subjecting the nets to wear. The possibility to mount adjacent net structures 102 with an overlap is necessary to fulfil the safety requirements. Under European standard EN1263-1, for example, at least 1 meter overlap of adjacent safety nets is required. Sometimes it is necessary to remove one of the net structures 102, temporarily or permanently, for example to allow passage for a crane or similar. In this case the subdivided attachment arrangement 101 keeps an underlying, adjacent net structure 102 separated from the net structure 102 to be removed and it is avoided that the net structures 102 get entangled with each other and the associated risk of a net structure getting lost and falling down can be minimized. Also, by using a subdivided attachment arrangement 101 according to the invention, the vertical play of the net structures 102 is reduced compared to a regular attachment arrangement. A reduced play is advantageous since it reduces the size of a possible vertical gap between adjacent net structures 102.

[0022] The net support 112 has a fundament 108 and a lever arm 106. The lever arm 106 and the fundament 108 are pivotally connected to each other at lower portions thereof. The skilled person realizes that the pivotal connection does not necessarily have to be at a lower point of the fundament 108. If suitable, for example to avoid lever arms 106 of excessive lengths, this connection can be made higher up on the fundament 108. Near an upper end of the lever arm 106, clamping means 107 are provided which clamps the front horizontal tube 105 of the net structure 102. The fundament 108 is provided with clamping means similar to those of the lever arm 106 near an upper end of the fundament 108 for attachment to the rear horizontal tube 104 of the net structure 102. Attached to the fundament 108 is an adjustable rear support 109. This adjustable rear support 109 serves the purpose of providing support for the construction safety screen 100 against the construction 120 to which the construction safety screen 100 is attached. The adjustable rear support 109 is provided with two clamping means 110, 111 which allow the adjustable rear support 109 to be continuously adjustable along the fundament 108 such that it can be fitted to constructions of different designs. Commonly, the construction safety screen according to the first aspect of the invention is erected as follows: A plurality of attachment arrangements 101 are attached, for example bolted, to the construction 120. Net structure 102 and net supports 112 are assembled on the ground. Thereafter, the assembled net structure 102 and net supports 112 are lifted and the rear horizontal tube 104 is positioned in two or more attachment arrangements and the net structure 102 and the net supports 112 are suspended from the attachment arrangements 101 such that the net structure 102 protrudes outside of the attachment arrangements 101 thereby rendering it possible to mount adjacent net structures 102 with a suitable amount of overlap. The adjustable rear support 109 can be attached to the fundament either before or after the net structure 102 and the net support 112 have been suspended from the attachments arrangements 101, whichever is more preferable.

[0023] In a first embodiment of a construction safety screen of the second aspect of the invention, as shown in figures 2 and 2B, a construction safety screen 200 comprises an attachment arrangement 201, a net support 212, a net structure 202, an adjustable net coupling part 214 and an adjustable rear support 209. The net structure 202, the net support 212 and the adjustable rear support 209 correspond to those described with respect to figure 1, reference is therefore made to the corresponding portions of the description. The attachment arrangement 201 comprises fixing means in the form of a beam 215 having a fastener 218 in the form of a mounting plate at a lower end thereof for mounting the construction safety screen 200 to a construction 220. The beam 215 is connected at an upper end thereof to a retaining portion 216 by means of a transverse beam 217. The transverse beam 217 can be connected to the beam 215 and the retaining portion 216 by for example welding. The retaining portion 216 comprises a square-section bar, other cross-sections are of course possible, extending downwardly from the transverse beam 217 and retaining the net structure by means of an adjustable net coupling part 214. The adjustable net coupling part 214 comprises, referring also to the description relating to figure 7 and to the close-up view in figure 2B, clamping means 701 for clamping the rear horizontal tube 204 of the net structure, and slider means 702 which is moveable along the retaining portion 216. The slider means 702 can move between an upper limiting means, here constituted by the transverse beam 217, and a lower limiting means, here constituted by the fundament 208 which is attached to a lower region of the retaining portion. This possibility to move the adjustable net coupling part 214 in a vertical direction allows for a high degree of flexibility when it comes to different shapes of the construction 220 where the construction safety screen 200 can be used. To assemble the construction safety screen according to the second aspect of the invention a plurality

of attachment arrangements 201, typically two, are provided for each net structure 202. Adjustable net coupling parts 214 are mounted to the rear horizontal tube 204 of the net structure 202 at positions providing for a necessary overlap. If, for example, 1 meter of overlap between adjacent net structures 202 is required, the adjustable net coupling parts 214 are mounted at least 1 meter from the respective ends of the rear horizontal tube 204 of the net structure 202. Thereafter, the retaining portions 216 of the attachment arrangements 201 are slid from above through the meshes of the net 203 and into the respective adjustable net coupling parts 214. The fundament 208 of the net support 212, which in this second aspect of the invention is hollow and has an inside dimension corresponding to the outside dimension of the retaining portion 216, is slid on to the retaining portion 216 and locked in position by a pin or similar. As described above, the fundament 208, and more particularly the upper end thereof, also acts as a lower limiting means for the adjustable net coupling part 214. The adjustable net coupling part 214 is moveable on the retaining portion 216 between an upper end of the fundament 208 and the transverse beam 217. This provides for flexibility during mounting of the construction safety screen 200 and different shapes of the construction 220 can be compensated for. The front horizontal tube 205 is clamped to the upper portion of the lever arm by clamping means 207. Possibly, the adjustable rear support 209 is clamped to the fundament by clamping means 210, 211 at a lower portion of said fundament 208 so as not to interfere during attachment of the construction safety screen 200 to the construction 220. If found more suitable, the adjustable rear support 209 can be attached to the fundament 208 after the attachment of the rest of the construction safety screen 200 to the construction. When the assembly of the construction safety screen 200 is finished on the ground, it is lifted to its position on the construction 220 and the attachment arrangements 201 are bolted to the construction 220, in this case in a position where the fundament 208 is flush with and abutting an outer perimeter of the construction 220. The adjustable rear support 209 is then positioned to abut the construction 220. However, the construction safety screen 200 does not necessarily have to be mounted with the fundament 208 flush with and abutting an outer perimeter of the construction 220. Due to the fact that the adjustable net coupling part 214 is restrained from sliding further down than to the upper end of the fundament 208, it is also possible to mount the construction safety screen 200 in a cantilevered manner without running the risk that the adjustable net coupling part 214 and the net structure 202 fall down.

[0024] In a second embodiment of a construction safety screen 300 of the first aspect of the invention, as shown in figure 3, an extension 330 is provided extending downwards from the fundament 308. This extension 330 is used as an alternative to or in addition to the adjustable rear support shown in for example figure 2. The extension 330 is inserted into the fundament 308 and locked in position by a pin passing through corresponding holes in the extension 330 and fundament 308. The extension 330 also comprises an abutment member 331 which, in a mounted state of the construction safety screen 300, abuts a subjacent concrete floor slab of the construction 320 in order to obtain a favourable distribution of forces within the construction safety screen 300.

[0025] In a first embodiment of an attachment arrangement of the construction safety screen of the first aspect of the invention, as shown in figure 4, the attachment arrangement 400 comprises an elongated plate 401 extending in a generally horizontal direction. The elongated plate 401 comprises at one end thereof an opening 402, here shown having an oblong cross section but other shapes are also possible, such as circular or square. A net hanger 403 is connected to an underside of the other end of the elongated plate 401. The net hanger 403 has a U-shape defined by a front beam 404, a rear beam 405 and a bottom part 406. The front beam 404 has a cross-section which allows it to pass through a mesh of a net such that the rear horizontal beam 104 of the net structure 102 can be positioned within the net hanger 403. To avoid that water and debris enters, the hollow front beam 404 is provided with a top cap 409. The top cap 409 can be made of e.g. plastics. The net hanger 403 can be subdivided into different compartments by two bolts 407 and 408. Each of the bolts 407 and 408 is provided with a screw head at one end and with a thread at the other. The bolts pass through a respective opening in the front beam 404 and are threaded in a corresponding thread provided at the rear beam 405. The corresponding thread can for example be provided by a nut welded to rear beam 405 or by providing an opening in the rear beam 405 having an inner thread. Due to the fact that the elongated plate 401 is relatively thin, approximately 10 mm thick, the attachment arrangement 400 can even be mounted through a bottom layer of mortar in masonry, thus increasing the flexibility of a construction safety screen using such an attachment arrangement.

[0026] In a second embodiment of an attachment arrangement of the construction safety screen of the first aspect of the invention, as shown in figure 5, the attachment arrangement 500 comprises a beam 501 extending in a vertical manner for attachment to a façade not shown in this figure. The beam 501 is provided with an opening 502 for fastening the attachment arrangement 500 to a façade using a bolt or similar. A lower abutment device 510 in the form of a plate is provided at a lower portion of the beam 501. Forces exerted by the attachment arrangement 500 on the façade will be spread out over a larger surface by the lower abutment device 510, thereby reducing the risk that the attachment arrangement 500 or the façade will be damaged. A net hanger 503 is provided at an upper end of the beam 501. The net hanger 503 is similar to the net hanger described in figure 4 but instead of a rear beam a rear plate 505 is provided. This plate 505 also acts as an upper abutment device, similar to lower abutment device 510.

[0027] In a third embodiment of an attachment arrangement of the construction safety screen of the first aspect of the invention, as shown in figure 6, the attachment arrangement 600 comprises two clamping means 601, 602 attached to a rear plate 604 of a net hanger 603. Apart from the rear plate 604, the net hanger 603 corresponds to the net hanger described in figure 4. By providing the attachment arrangement 600 with clamping means 601, 602, the construction safety screen can be attached to e.g. scaffolding poles.

[0028] In a first embodiment of an adjustable net coupling part of the construction safety screen of the second aspect of the invention, as shown in figure 7, the adjustable net coupling part 700 comprises clamping means 701 and slider means 702. Slider means 702 comprises a hollow profile which can be slid on to a retaining portion of an attachment arrangement having outer dimensions corresponding to, or preferably somewhat smaller than, the inner dimensions of the hollow profile. The slider means 702 is provided with an opening 709 which can be used to temporary hold the adjustable net coupling part 700 in position with a pin or similar during mounting. Clamping means 701 comprises a pivotable jaw 703 and a fixed jaw 704. The fixed jaw 704 is attached to the slider means 702 by e.g. welding, bolting, riveting or similar and to the pivotable jaw 703 by a hinge 705 in lower portions of the respective jaws 703, 704. A threaded pivotable locking bolt 706 is provided in an upper region of fixed jaw 704. Pivotable locking bolt 706 is pivotable between an open position where it extends more or less in parallel with a longitudinal axis of the hollow profile of slider means 701 and a locking position where it extends generally perpendicular to that longitudinal axis. The pivotable jaw 703 comprises a recess 708 in an upper region thereof into which the pivotable locking bolt 706 can be fitted in its locking position. In order to firmly lock the clamping means 701 a nut 707 is provided on the pivotable locking bolt 706.

[0029] In a first embodiment of an offset beam of the construction safety screen according to the first or the second aspect of the invention, as shown in figure 8, the offset beam 800 comprises a beam 801 provided with a rear attachment plate 803 for attachment to a construction, e.g. a concrete slab not shown in the figure, and front attachment plates 804, 805 by means of which an attachment arrangement of a construction safety screen can be attached. The offset beam 800 is used when the design of the construction onto which the construction safety screen is to be mounted renders it impossible to just use the attachment arrangements, for example it is possible that a floor slab construction has a stepped design such that the fundament of the net support cannot extend downwardly. See in this respect also figure 10, where two offset beams 800 are used together with an extension 330. It should be noted though, that the offset beam by no means is limited to the use together with the construction safety screen according to the first aspect of the invention. The offset beam can be used just as fine with the construction safety screen according to the second aspect of the invention. Also, the use of the extension 330 is not essential in this respect, the offset beam can be used together with the adjustable rear support described in relation to figures 1 and 2.

[0030] In a first embodiment of an adjustable rear support of the construction safety screen according to the first or the second aspect of the invention, as shown in figure 9, the adjustable rear support 900 comprises a support beam 901 with an abutment device 902 for abutment against e.g. an underside of a concrete floor slab. The adjustable rear support 900 further comprises cross bar 903 and reinforcement bar 904. Clamping means 905, 906 are attached to ends of support beam 901 and cross bar 903 for clamping of the adjustable rear support 900 to e.g. a fundament of a net structure. The clamping means 905, 906 allow for a stepless adjustment of the height of the adjustable rear support 900. Another possibility is the combination of the adjustable rear support 900 and the extension 330. In cases where the adjustable rear support 900 cannot reach far enough to provide support for the construction safety screen (100, 200) due to for example the shape of the construction (120, 220) to which the construction safety screen (100, 200) is to be attached, an extension 330 can be inserted and fixed into the support beam 901 of the adjustable rear support thereby extending the reach of the adjustable rear support 900.

[0031] From figure 11, it can readily be seen how easy it is to achieve a necessary overlap using construction safety screens of the first aspect of the invention. For the sake of simplicity only a portion of the construction perimeter has been provided with construction safety screens. Four attachment arrangements 101, 101', 101 ", 101"' are mounted to the concrete floor slab. From these four attachment arrangements 101, 101', 101 ", 101"' three net structures 102, 102', 102" with associated net supports 112 and extensions 330 are suspended. The extensions 330 provide support for the construction safety screens against a lower concrete floor slab of the construction 120. Due to the fact that the net supports 112 and the attachment arrangements 101, 101', 101 ", 101"' of the present invention do not have to be positioned at the corners of the net structure 102, as is the case with the prior art construction safety screen, but can be mounted at a suitable distance from the side edges of the net structures, an overlapping mounting of adjacent net structures can easily be achieved. The outer net structures 102, 102" are positioned in the lowermost compartments of the attachment arrangements 101, 101', 101 ", 101"', whereas the middlemost net structure 102' is positioned in the uppermost compartments of the two inner attachment arrangements 101', 101". In this way, a construction safety screen fulfilling the safety requirements can be assembled in a fast and reliable manner. In an alternative embodiment, not shown in the figures, the net structures 102, 102', 102" are simply mounted to the attachment arrangements 101, 101', 101 ", 101"' from one

side to the other. Net structure 102 will be positioned in the lowermost compartments of attachment arrangements 101, 101', then net structure 102' will be positioned in the uppermost compartment of attachment arrangements 101' and in the lowermost compartment of attachment arrangements 101 ", then net structure 102" will be positioned in the uppermost compartment of attachment arrangements 101" and in the lowermost compartment of attachment arrangements 101"' and so on. This has the advantage that the mounting can be done speedily. A drawback of this mounting procedure is that it is not as easy to remove separate net structures as it is with the mode of mounting described above.

[0032] Figure 12 exemplifies a great advantage of the construction safety screen of the second aspect of the invention. Today's architecture is not always only about straight lines and perpendicular angles. On the contrary, buildings often have sweeping lines. This lead to complications when it comes to the mounting of construction safety screens. Normally, construction safety screens require a straight building perimeter in order to function as intended. By using construction safety screens of the second aspect of the invention, however, it is possible to cover also building perimeters having curving or sweeping lines. Since the adjustable net coupling parts are moveable on the retaining portion of the attachment arrangements 201, see in this respect also figures 2 and 7 as well as the portions of the description applying to these figures 2 and 7, the adjustable net coupling parts together with the rear horizontal tubes retained therein are simply lifted up and positioned on the concrete floor slab of the construction. Even if the radius of the curvature of the construction is quite narrow, the construction safety screens of the second aspect of the invention allows for mounting of net structures 202, 202' with an adequate amount of overlap.

Claims

1. A construction safety screen (100), comprising a net structure (102), an attachment arrangement (101, 400) for supporting a rear edge of the net structure (102) and connecting the construction safety screen (100) to a construction, wherein the construction safety screen (100) further comprises a net support (112) connected to said attachment arrangement (101, 400) and to a front edge of the net structure (102), wherein said net structure (102) comprises a net (103), a front horizontal tube (105) located at a front edge of the net (103) and a rear horizontal tube (104) located at a rear edge of the net (103), and wherein the attachment arrangement (101, 400) comprises fixing means for mounting the construction safety screen (100) to a construction (120) and a net hanger (403) connected to said fixing means, wherein said net hanger (403) comprises a U-shaped portion (404, 405, 406) and wherein the rear horizontal tube (104) is accommodated in said U-shaped portion (404, 405, 406) at a distance from a short side of the net structure (102) such that the rear horizontal tube (104) protrudes from both sides of the U-shaped portion (404, 405, 406), **characterized in that** said net hanger (403) is sub-divided into several compartments for accommodating net structures (102) in separate levels.

2. A construction safety screen (200), comprising a net structure (202), an attachment arrangement (201) for supporting a rear edge of the net structure (202) and connecting the construction safety screen (200) to a construction (220) and wherein the construction safety screen (200) further comprises a net support (212) connected to said attachment arrangement (201) and to a front edge of the net structure (202), wherein said net structure (202) comprises a net (203), a front horizontal tube (205) located at a front edge of the net (203) and a rear horizontal tube (204) located at a rear edge of the net (203), and wherein the attachment arrangement (201) comprises fixing means (215, 218) for mounting the construction safety screen (200) to a construction (220) and a retaining portion (216) connected to the fixing means (215, 218), wherein the attachment arrangement (201) further comprises a net coupling part (214) connected to the retaining portion (216), wherein said net coupling part (214) clamps the rear horizontal tube (204) at a distance from a short side of the net structure (202) such that the rear horizontal tube (204) protrudes from both sides of the net coupling part (214), **characterized in that** said net coupling part (214) is adjustable and further comprises a slider (702), wherein said slider (702) is adapted to encircle the retaining portion (216 of the attachment arrangement (201), and is movable in a vertical direction along the retaining portion in a mounted state.

3. A construction safety screen (100) according to claim 1, wherein said net hanger (103) is sub-divided by a bolt (407, 408) extending between a front beam (404) and a rear beam (405) of said U-shaped portion (404, 405, 406).

4. A construction safety screen (100) according to any of claims 1 or 3 wherein said fixing means comprises an elongated plate (401) extending in a rearward manner from said net hanger (403) for attachment to a construction.

5. A construction safety screen (100) according to any of claims 1 or 3, wherein said fixing means comprises a beam (501) extending in a vertical manner for attachment to a facade.

6. A construction safety screen (100) according to any of claims 1 or 3, wherein said fixing means comprises

clamping means (601, 602) for attachment to a scaffolding.

7. A construction safety screen (200) according to claim 2, wherein said fixing means comprises a beam (215), having a fastener (218) at one end thereof for attachment to a construction (220) and wherein the retaining portion (216) is connected to the beam (215) by means of a transverse beam (217).

8. A construction safety screen (200) according to claim 2 or 7, wherein the retaining portion (216) comprises upper and lower limiting means, wherein, in a mounted state, said slider (702) is moveable along the retaining portion (216) of the attachment arrangement (201) between said upper and lower limiting means.

9. A construction safety screen (100, 200) according to any of the preceding claims, wherein the attachment arrangement (101, 201, 400) further comprises an offset beam (800) by means of which the construction safety screen (100, 200) is connectable to a construction (120, 220) in an offset position.

10. A construction safety screen (100, 200) according to any of the preceding claims, wherein the net support (112, 212) comprises a fundament (108, 208) extending substantially vertically downwards and wherein the net support (112, 212) further comprises a lever arm (106, 206), wherein a lower region of said lever arm (106, 206) is attached to the fundament (108, 208) and an upper region of said lever arm (106, 206) is attached to the front horizontal tube (105, 205) at a front edge of the net structure (102, 202).

11. A construction safety screen (100, 200) according to claim 10, wherein an adjustable rear support (109, 209, 900) is attached to the fundament (108, 208) in order to provide support against the construction (120, 220) for the construction safety screen (100, 200).

12. A construction safety screen (100, 200) according to claim 11, wherein the adjustable rear support (109, 209, 900) comprises means (905, 906) for clamping the adjustable rear support to the fundament (108, 208).

13. A construction safety screen (100, 200) according to claim 11, wherein an extension member (330) is inserted into the fundament (108, 208), wherein said extension member (330) is telescopically displaceable with respect to the fundament (108, 208).

Patentansprüche

1. Schutzwand für den Bau (100), umfassend:

eine Netzstruktur (102);
eine Befestigungsanordnung (101, 400) zum Stützen eines hinteren Rands der Netzstruktur (102) und Verbinden der Schutzwand für den Bau (100) mit einer Konstruktion,
wobei die Schutzwand für den Bau (100) ferner einen Netzträger (112) umfasst, der mit der Befestigungsanordnung (101, 400) und mit einem vorderen Rand der Netzstruktur (102) verbunden ist,
wobei die Netzstruktur (102) ein Netz (103), eine vordere horizontale Röhre (105), die an einem vorderen Rand des Netzes (103) angeordnet ist, und eine hintere horizontal Röhre (104) umfasst, die an einem hinteren Rand des Netzes (103) angeordnet ist, und
wobei die Befestigungsanordnung (101, 400) Befestigungsmittel zum Montieren der Schutzwand für den Bau (100) an einer Konstruktion (120) und einer Netzaufhängungsvorrichtung (403), die mit dem Befestigungsmittel verbunden ist, umfasst,
wobei die Netzaufhängungsvorrichtung (403) einen U-förmigen Abschnitt (404, 405, 406) umfasst und
wobei die hintere horizontale Röhre (104) in dem U-förmigen Abschnitt (404, 405, 406) in einem Abstand von der kurzen Seite der Netzstruktur (102) untergebracht ist, sodass die hintere horizontale Röhre (104) aus beiden Seiten des U-förmigen Abschnitts (404, 405, 406) hervorsteht,
dadurch gekennzeichnet, dass
die Netzaufhängungsvorrichtung (403) in mehrere Fächer zum Unterbringen der Netzstrukturen (102) auf unterschiedlichen Ebenen aufgeteilt ist.

2. Schutzwand für den Bau (200), umfassend:

eine Netzstruktur (202);
eine Befestigungsanordnung (201) zum Stützen eines hinteren Rands der Netzstruktur (202) und Verbinden der Schutzwand für den Bau (200) mit einer Konstruktion (220), und
wobei die Schutzwand für den Bau (200) ferner einen Netzträger (212) umfasst, der mit der Befestigungsanordnung (201) und mit einem vorderen Rand der Netzstruktur (202) verbunden ist,
wobei die Netzstruktur (202) ein Netz (203), eine vordere horizontale Röhre (205), die an einem vorderen Rand des Netzes (203) angeordnet ist, und eine hintere horizontal Röhre (204) umfasst,

die an einem hinteren Rand des Netzes (203) angeordnet ist, und
wobei die Befestigungsanordnung (201) Befestigungsmittel (215, 218) zum Montieren der Schutzwand für den Bau (200) an einer Konstruktion (220) und einen Halteabschnitt (216) umfasst, der mit dem Befestigungsmittel (215, 218) verbunden ist,
wobei die Befestigungsanordnung (201) ferner ein Netzkoppelteil (214) umfasst, das mit dem Halteabschnitt (216) verbunden ist, wobei das Netzkoppelteil (214) die hintere horizontale Röhre (204) in einem Abstand von einer kurzen Seite der Netzstruktur (202) einklemmt, sodass die hintere horizontale Röhre (204) aus beiden Seiten des Netzkoppelteils (214) heraussteht,
dadurch gekennzeichnet, dass
das Netzkoppelteil (214) verstellbar ist und ferner einen Schieber (702) umfasst, wobei der Schieber (702) zum Umgeben des Halteabschnitts (216) der Befestigungsanordnung (201) ausgelegt ist und in eine vertikale Richtung entlang des Halteabschnitts in montiertem Zustand bewegt werden kann.

3. Schutzwand für den Bau (100) nach Anspruch 1, wobei die Netzaufhängungsvorrichtung (103) von einem Bolzen (407, 408) unterteilt wird, der sich zwischen einem vorderen Holm (404) und einem hinteren Holm (405) des U-förmigen Abschnitts (404, 405, 406) erstreckt.

4. Schutzwand für den Bau (100) nach einem der Ansprüche 1 oder 3, wobei das Befestigungsmittel eine längliche Platte (401) umfasst, die sich nach hinten von der Netzaufhängvorrichtung (403) zum Befestigen mit einem Bau erstreckt.

5. Schutzwand für den Bau (100) nach einem der Ansprüche 1 oder 3, wobei das Befestigungsmittel einen Holm (501) umfasst, der sich vertikal zum Befestigen an einer Gebäudefassade erstreckt.

6. Schutzwand für den Bau (100) nach einem der Ansprüche 1 oder 3, wobei das Befestigungsmittel Klemmmittel (601, 602) zum Befestigen an einem Gerüst umfasst.

7. Schutzwand für den Bau (200) nach Anspruch 2, wobei das Befestigungsmittel einen Holm (215) mit einem Befestigungsmittel (218) an einem Ende davon zum Befestigen an einer Konstruktion (220) umfasst und wobei der Halteabschnitt (216) mit dem Holm über einen Querholm (217) verbunden ist.

8. Schutzwand für den Bau (200) nach Anspruch 2 oder 7, wobei der Halteabschnitt (216) obere und untere Begrenzungsmittel umfasst, wobei in einem montierten Zustand der Schieber (702) entlang des Halteabschnitts (216) der Befestigungsanordnung (201) zwischen oberen und unteren Begrenzungsmitteln bewegt werden kann.

9. Schutzwand für den Bau (100, 200) nach einem der vorherigen Ansprüche, wobei die Befestigungsanordnung (101, 201, 400) ferner einen Versatzholm (800) umfasst, mit dem die Schutzwand für den Bau (100, 200) mit einer Konstruktion (120, 220) in einer Versatzposition verbunden werden kann.

10. Schutzwand für den Bau (100, 200) nach einem der vorherigen Ansprüche, wobei der Netzträger (112, 212) ein Fundament (108, 208) umfasst, das sich im Wesentlichen vertikal nach unten erstreckt und
wobei der Netzträger (112, 212) ferner einen Hebelarm (106, 206) umfasst,
wobei ein unterer Bereich des Hebelarms (106, 206) an dem Fundament (108, 208) angebracht ist und ein oberer Bereich des Hebelarms (106, 206) an der vorderen horizontalen Röhre (105, 205) an einem vorderen Rand der Netzstruktur (102, 202) angebracht ist.

11. Schutzwand für den Bau (100, 200) nach Anspruch 10, wobei ein verstellbarer hinterer Träger (109, 209, 900) an dem Fundament (108, 208) angebracht ist, um eine Abstützung an der Konstruktion (120, 220) für die Schutzwand für den Bau (100, 200) bereitzustellen.

12. Schutzwand für den Bau (100, 200) nach Anspruch 11, wobei der verstellbare hintere Träger (109, 209, 900) Mittel (905, 906) zum Einklemmen des verstellbaren hinteren Trägers an dem Fundament (108, 208) umfasst.

13. Schutzwand für den Bau (100, 200) nach Anspruch 11, wobei ein Erweiterungselement (330) in das Fundament (108, 208) eingeführt wird, wobei das Erweiterungselement (330) ausziehbar in Bezug auf das Fundament (108, 208) ist.

Revendications

1. Écran de sécurité pour une construction (100), comprenant une structure de filet (102), un agencement d'attache (101, 400) pour supporter un bord arrière de la structure de filet (102) et relier l'écran de sécurité pour une construction (100) à une construction, l'écran de sécurité pour une construction (100) comprenant en outre un support de filet (112) relié audit agencement d'attache (101, 400) et à un bord avant de la structure de filet (102), ladite structure de filet (102) comprenant un filet (103), un tube horizontal avant (105) situé au niveau d'un bord avant

du filet (103) et un tube horizontal arrière (104) situé au niveau d'un bord arrière du filet (103), et l'agencement d'attache (101, 400) comprenant un moyen de fixation pour monter l'écran de sécurité pour une construction (100) sur une construction (120) et un système d'accrochage de filet (403) relié audit moyen de fixation, ledit système d'accrochage de filet (403) comprenant une partie en forme de U (404, 405, 406) et le tube horizontal arrière (104) étant reçu dans ladite partie en forme de U (404, 405, 406) à une certaine distance d'un côté court de la structure de filet (102) de telle sorte que le tube horizontal arrière (104) fasse saillie depuis les deux côtés de la partie en forme de U (404, 405, 406), **caractérisé en ce que** ledit système d'accrochage de filet (403) est subdivisé en plusieurs compartiments pour recevoir des structures de filet (102) à différents niveaux.

2. Écran de sécurité pour une construction (200) comprenant une structure de filet (202), un agencement d'attache (201) pour supporter un bord arrière de la structure de filet (202) et relier l'écran de sécurité pour une construction (200) à une construction (220), l'écran de sécurité pour une construction (200) comprenant en outre un support de filet (212) relié audit agencement d'attache (201) et à un bord avant de la structure de filet (202), ladite structure de filet (202) comprenant un filet (203), un tube horizontal avant (205) situé au niveau d'un bord avant du filet (203) et un tube horizontal arrière (204) situé au niveau d'un bord arrière du filet (203), et l'agencement d'attache (201) comprenant un moyen de fixation (215, 218) pour monter l'écran de sécurité pour une construction (200) sur une construction (220) et une partie de retenue (216) reliée au moyen de fixation (215, 218), l'agencement d'attache (201) comprenant en outre une partie d'accouplement de filet (214) reliée à la partie de retenue (216), ladite partie d'accouplement de filet (214) serrant le tube horizontal arrière (204) à une certaine distance d'un côté court de la structure de filet (202) de telle sorte que le tube horizontal arrière (204) fasse saillie depuis les deux côtés de la partie d'accouplement de filet (214), **caractérisé en ce que** ladite partie d'accouplement de filet (214) peut être ajustée et comprend en outre un coulisseau (702), ledit coulisseau (702) étant prévu pour encercler la partie de retenue (216) de l'agencement d'attache (201) et pouvant être déplacé dans une direction verticale le long de la partie de retenue dans l'état monté.

3. Écran de sécurité pour une construction (100) selon la revendication 1, dans lequel ledit système d'accrochage de filet (103) est subdivisé par un boulon (407, 408) s'étendant entre une poutre avant (404) et une poutre arrière (405) de ladite partie en forme de U (404, 405, 406).

4. Écran de sécurité pour une construction (100) selon l'une quelconque des revendications 1 ou 3, dans lequel ledit moyen de fixation comprend une plaque allongée (401) s'étendant vers l'arrière depuis ledit système d'accrochage de filet (403) en vue de l'attache à une construction.

5. Écran de sécurité pour une construction (100) selon l'une quelconque des revendications 1 ou 3, dans lequel ledit moyen de fixation comprend une poutre (501) s'étendant verticalement en vue de l'attache à une façade.

6. Écran de sécurité pour une construction (100) selon l'une quelconque des revendications 1 ou 3, dans lequel ledit moyen de fixation comprend un moyen de serrage (601, 602) pour l'attache à un échafaudage.

7. Écran de sécurité pour une construction (200) selon la revendication 2, dans lequel ledit moyen de fixation comprend une poutre (215), ayant une attache (218) à une extrémité de celle-ci pour l'attache à une construction (220) et dans lequel la partie de retenue (216) est reliée à la poutre (215) au moyen d'une poutre transversale (217).

8. Écran de sécurité pour une construction (200) selon la revendication 2 ou 7, dans lequel la partie de retenue (216) comprend des moyens de limitation supérieur et inférieur, ledit coulisseau (702), dans un état monté, pouvant être déplacé le long de la partie de retenue (216) de l'agencement d'attache (201) entre lesdits moyens de limitation supérieur et inférieur.

9. Écran de sécurité pour une construction (100, 200) selon l'une quelconque des revendications précédentes, dans lequel l'agencement d'attache (101, 201, 400) comprend en outre une poutre décalée (800) au moyen de laquelle l'écran de sécurité pour une construction (100, 200) peut être relié à une construction (120, 220) dans une position décalée.

10. Écran de sécurité pour une construction (100, 200) selon l'une quelconque des revendications précédentes, dans lequel le support de filet (112, 212) comprend une base (108, 208) s'étendant substantiellement verticalement vers le bas et dans lequel le support de filet (112, 212) comprend en outre un bras de levier (106, 206), une région inférieure dudit bras de levier (106, 206) étant attachée à la base (108, 208) et une région supérieure dudit bras de levier (106, 206) étant attachée au tube horizontal avant (105, 205) au niveau d'un bord avant de la structure de filet (102, 202).

11. Écran de sécurité pour une construction (100, 200)

selon la revendication 10, dans lequel un support arrière ajustable (109, 209, 900) est attaché à la base (108, 208) afin de fournir un support contre la construction (120, 220) pour l'écran de sécurité pour une construction (100, 200).

12. Écran de sécurité pour une construction (100, 200) selon la revendication 11, dans lequel le support arrière ajustable (109, 209, 900) comprend un moyen (905, 906) pour serrer le support arrière ajustable à la base (108, 208).

13. Écran de sécurité pour une construction (100, 200) selon la revendication 11, dans lequel un organe d'extension (330) est inséré dans la base (108, 208), ledit organe d'extension (330) pouvant être déplacé télescopiquement par rapport à la base (108, 208).

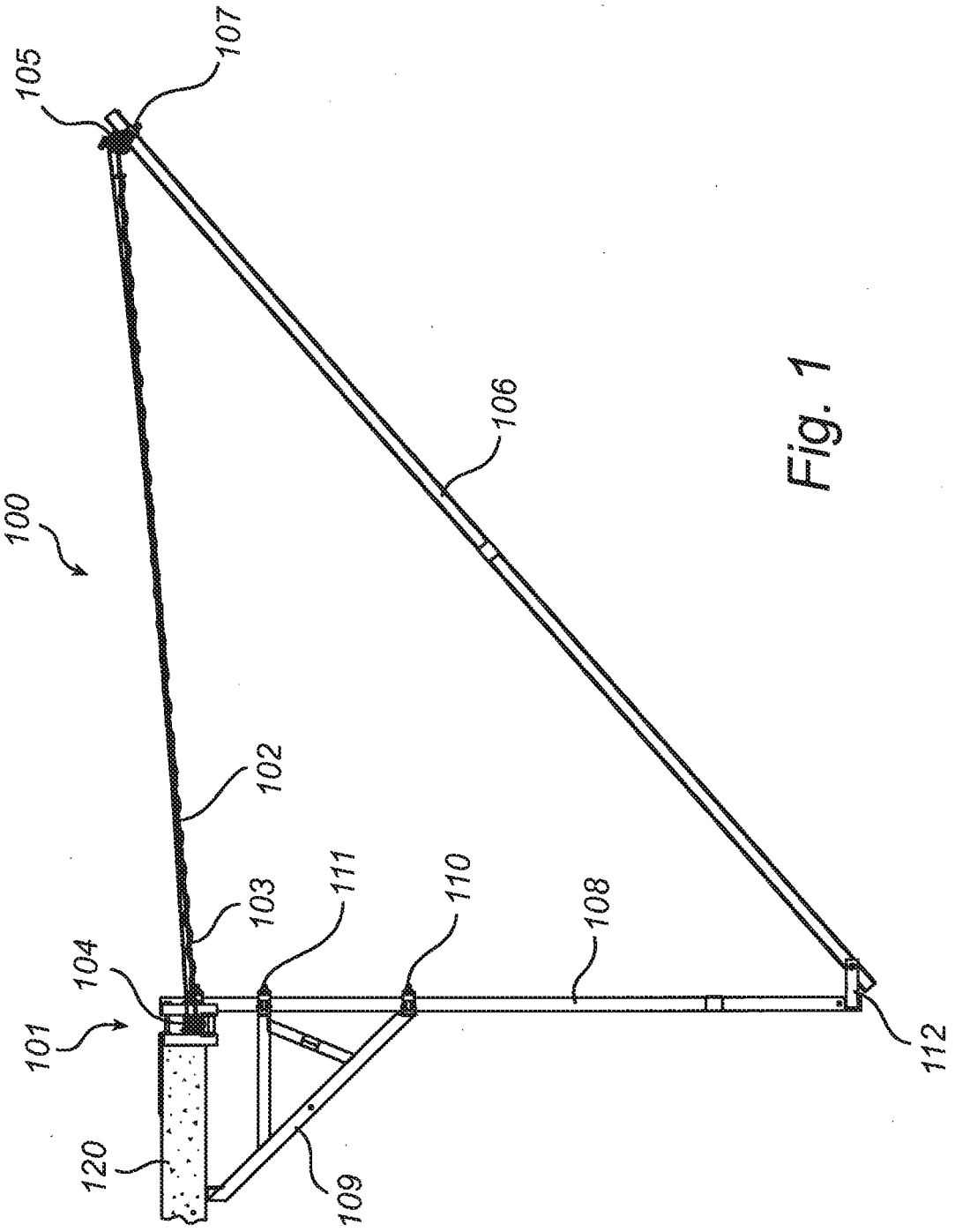


Fig. 1

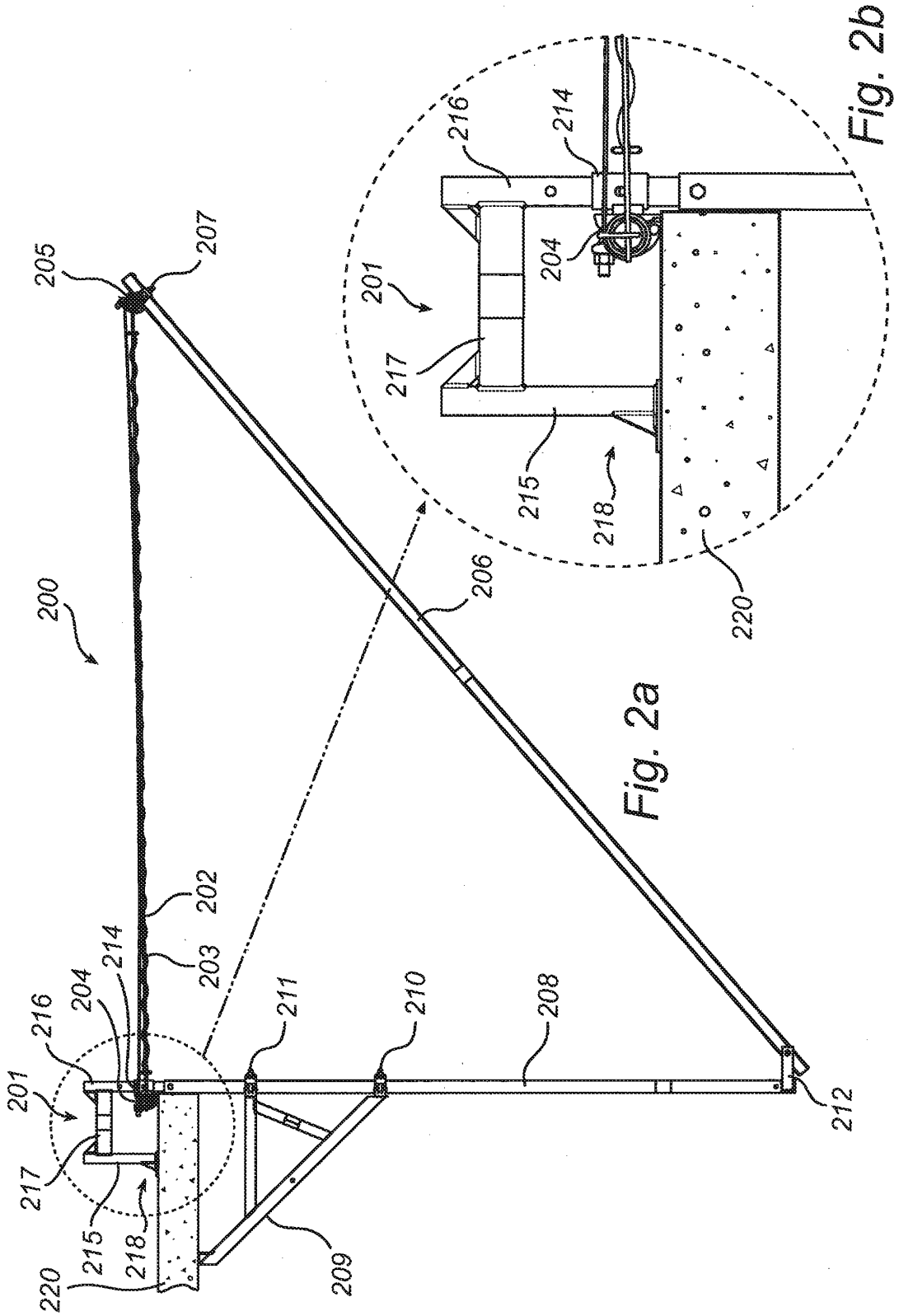

200
201
202
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Fig. 2a

Fig. 2b

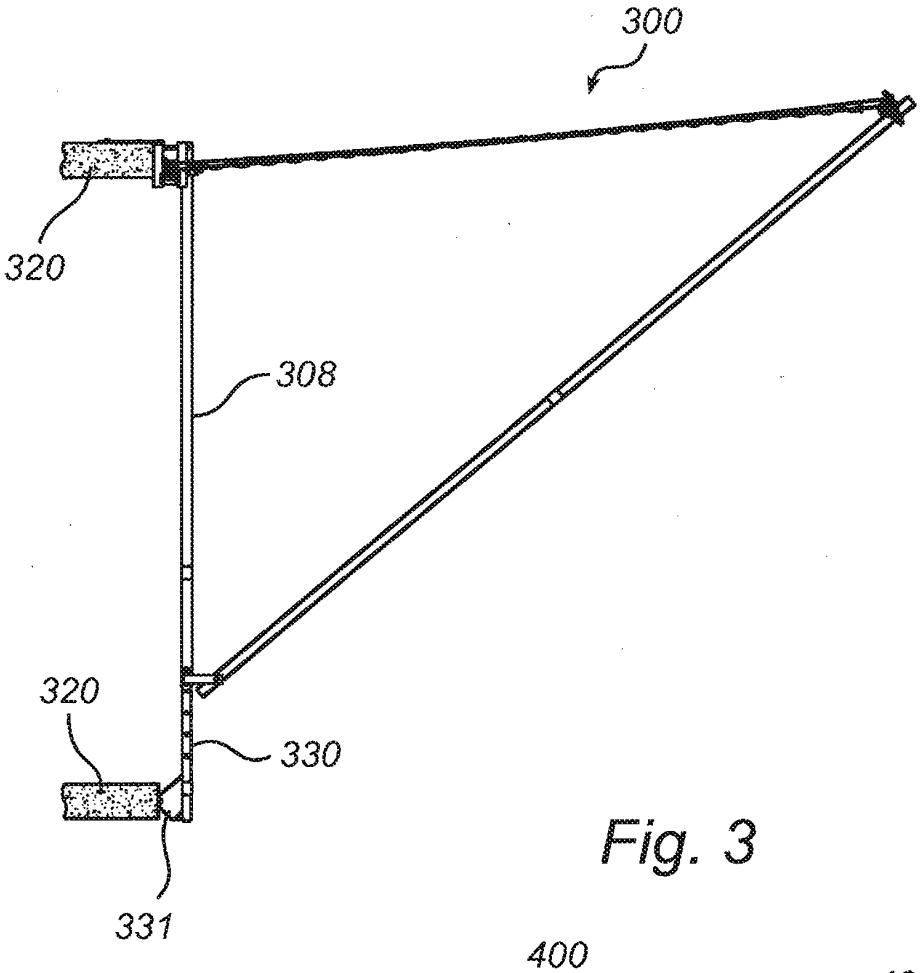


Fig. 3

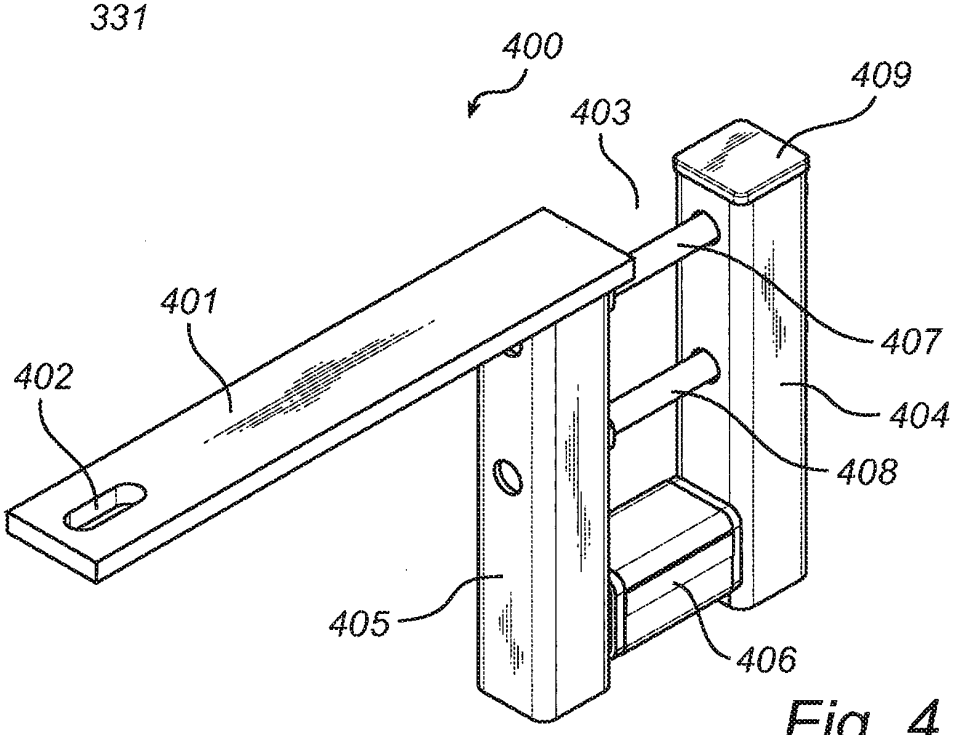


Fig. 4

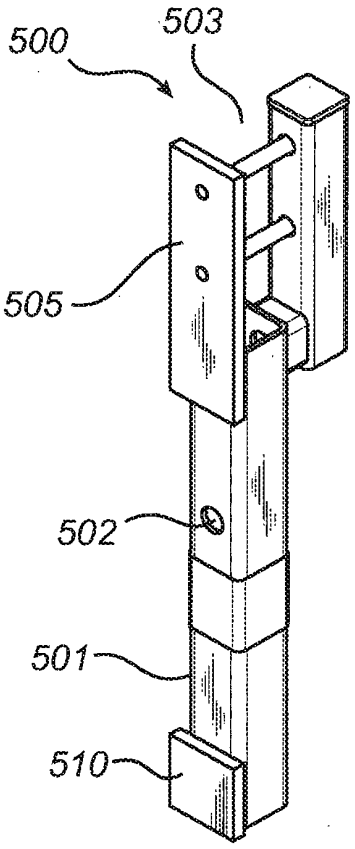


Fig. 5

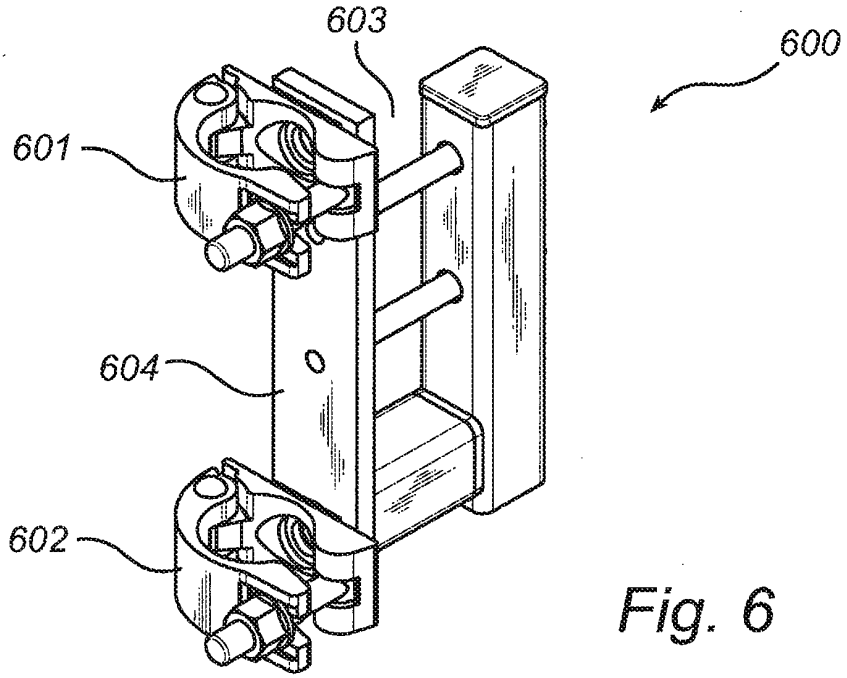


Fig. 6

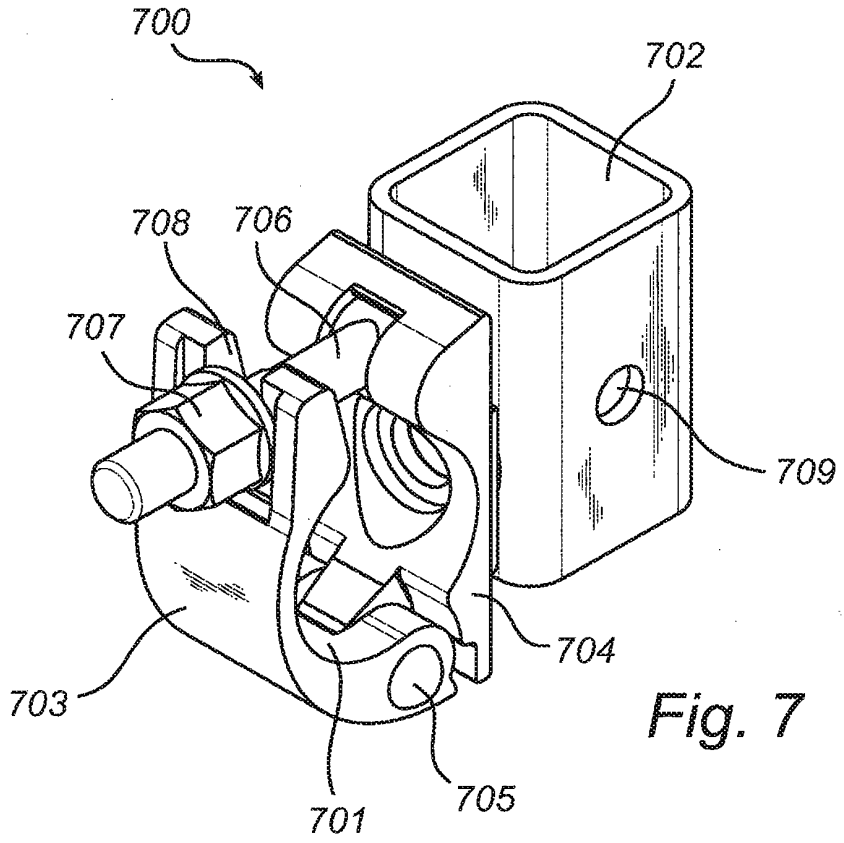


Fig. 7

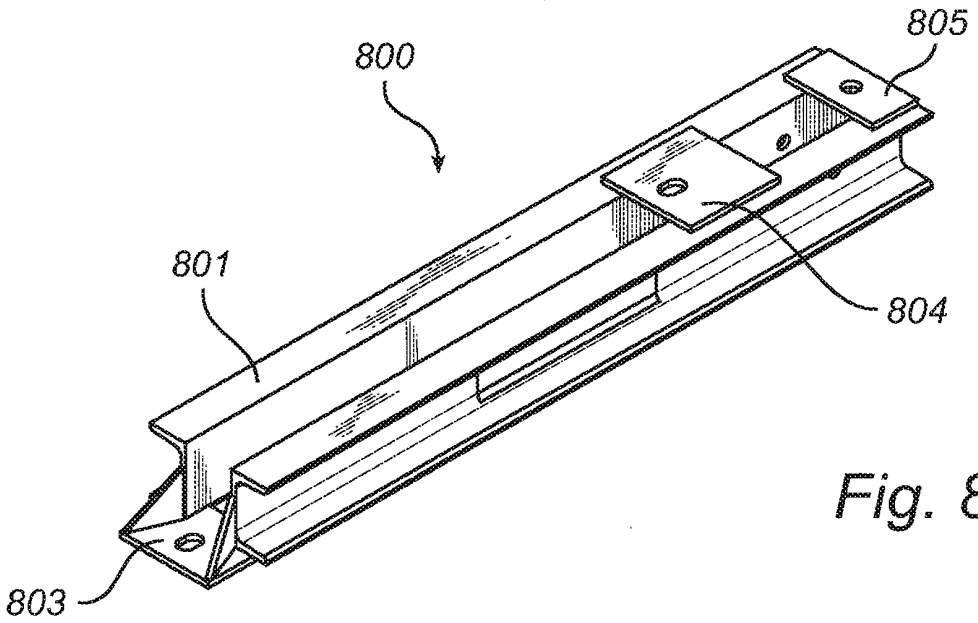


Fig. 8

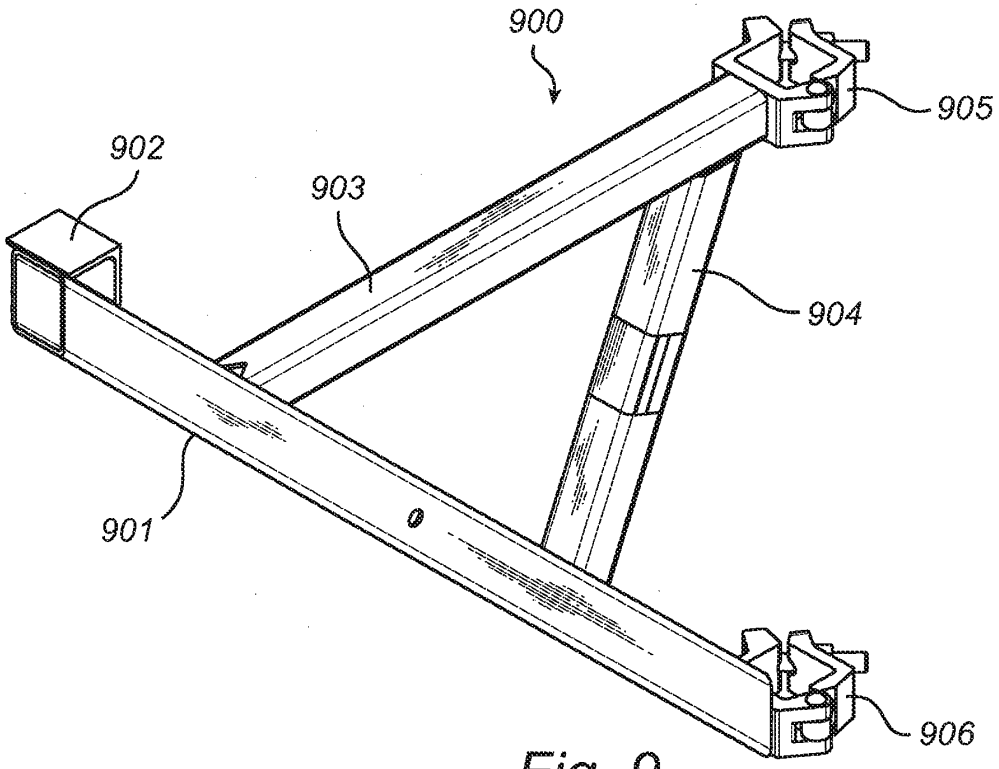


Fig. 9

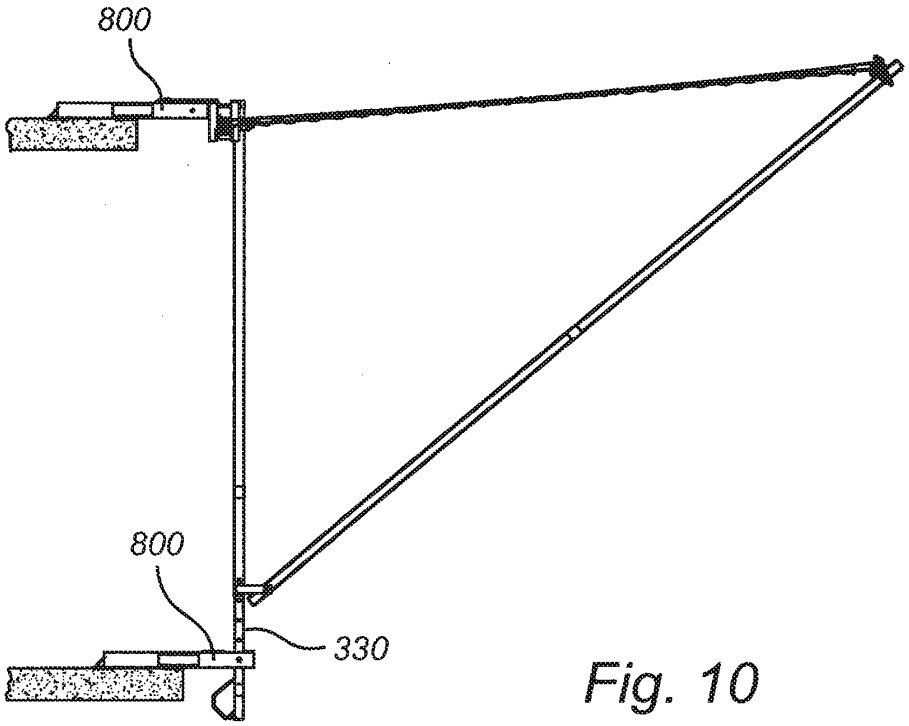


Fig. 10

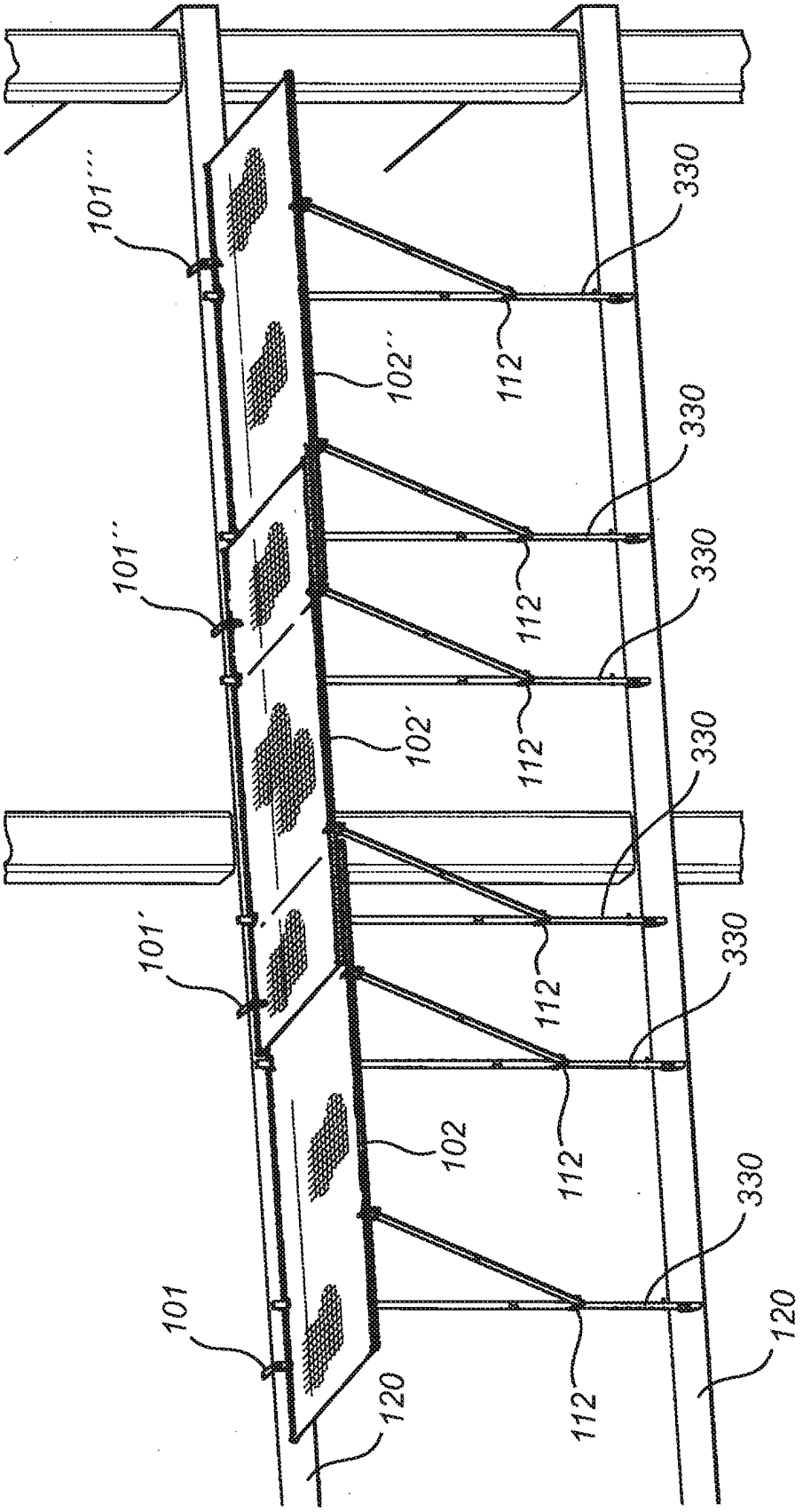


Fig. 11

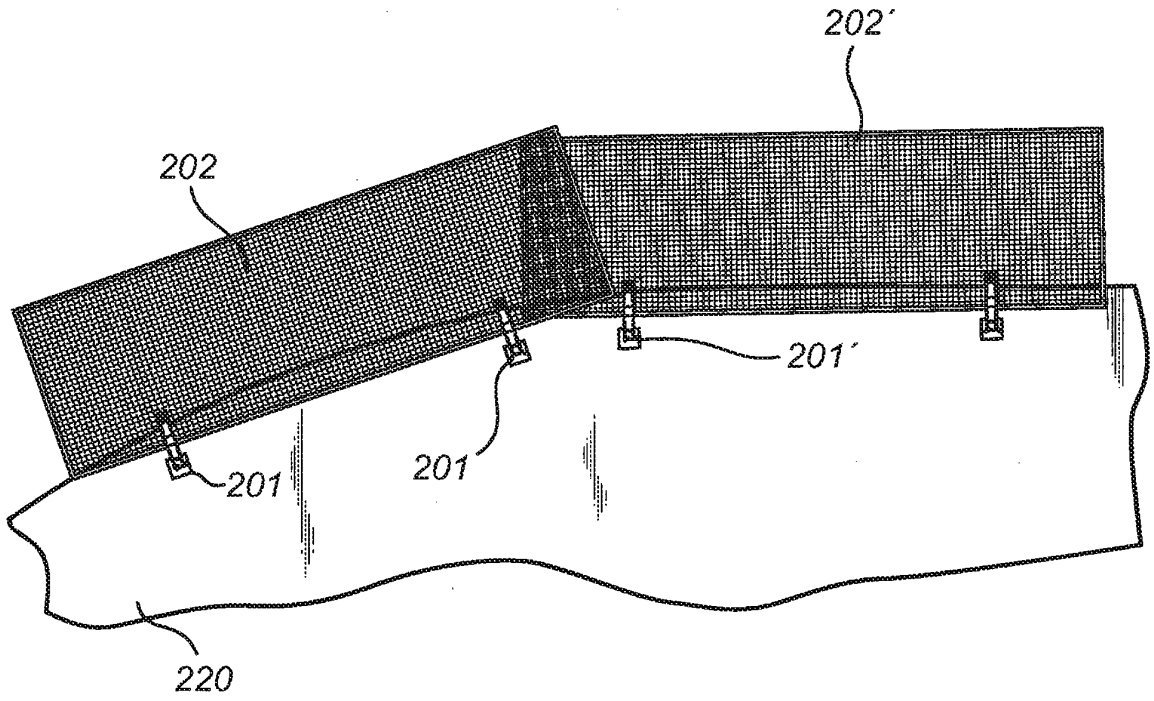


Fig. 12

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 20060214150 A **[0002]**
- FR 94002 E **[0002]**
- FR 1585600 **[0002]**
- FR 1479930 **[0002]**
- DE 3323878 **[0002]**
- FR 1490572 **[0002]**