



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
03.12.2014 Bulletin 2014/49

(51) Int Cl.:
E04G 5/14 (2006.01) **E04G 7/30 (2006.01)**
E04G 7/34 (2006.01) **E04G 5/16 (2006.01)**

(21) Application number: **13169396.2**

(22) Date of filing: **27.05.2013**

(84) Designated Contracting States:
AL 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 RS SE SI SK SM TR
Designated Extension States:
BA ME

(72) Inventor: **Aerts, Paul**
3201 Langdorp (BE)

(74) Representative: **Sarlet, Steven Renaat Irène et al**
Gevers
Intellectual Property House
Holidaystraat 5
1831 Diegem (BE)

(71) Applicant: **Ubes**
3201 Langdorp (BE)

(54) **Scaffolding tower assembly and method for erecting scaffolding tower**

(57) Scaffolding tower assembly comprising a scaffolding side member (140) comprising a horizontal section (141) having two engagement ends (150) for engaging a respective other scaffolding element, with a locking mechanism (144) provided at each engagement end (150) for locking said respective engagement mechanism (143) to the respective other scaffolding element,

and an actuating mechanism (160) adapted for releasing each respective locking mechanism (144). The actuating mechanism (160) comprises a diagonal section (141) being pivotably mounted to the horizontal scaffolding section (141) and a transferring mechanism (198) for transferring movement of the diagonal section (142) to the locking mechanism (144).

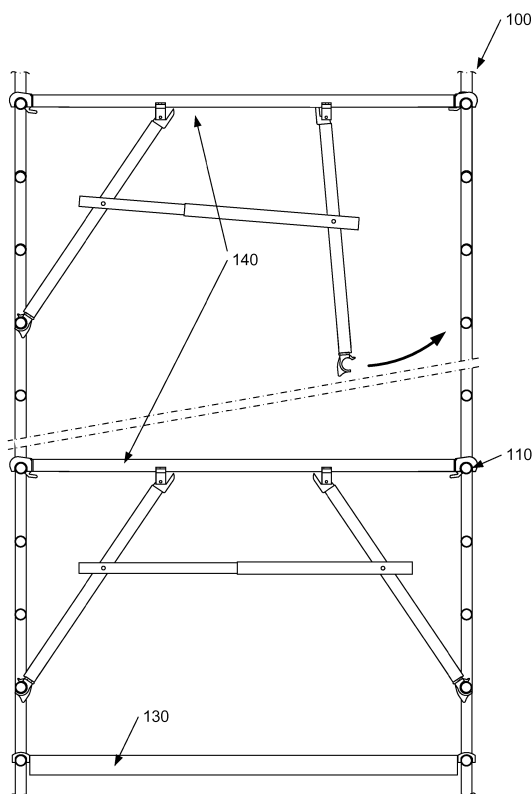


Fig. 11

Description

Technical field

[0001] The present invention relates to a scaffolding tower assembly and more specifically to a scaffolding side member used as a support, as well as, a safety section thereof. The present invention further relates to a method for erecting a scaffolding tower.

Background art

[0002] Scaffolding towers are known and widely used in a.o. the construction industry to provide access to a construction site area that is otherwise difficult to reach. Such scaffolding towers are usually assembled on-site from a collection of components such as scaffolding sections, platforms, and connectors. These components may include a range of discreet and modular components that are adapted to cooperate with each other to construct a scaffolding tower of a desired configuration and height. Each scaffolding section may include at each end an engagement mechanism to engage with other scaffolding sections and a locking mechanism to secure the scaffolding section at the desired position. It is desired that scaffolding section can be used as a support, as well as, a safety section on a scaffolding tower, thereby minimizing the number of discreet components.

[0003] A typical scaffolding tower configuration may comprise a number of levels. In order to ensure the safety of the workers and prevent accidents each level is required to be provided with a safety rail arrangement.

[0004] A scaffolding tower level may be constructed by positioning two ladder-type end frames opposite each other, and connected to one another by a number of scaffolding sections. The scaffolding sections may be placed horizontally or diagonally with respect to the end frames to support the scaffolding tower and ensure rigidity. A platform may be arranged at an appropriate position within the end frames to provide a working surface. The platform position is chosen so that a scaffolding section is arranged at a predetermined height above the working surface forming in combination with the ladder-type end frames a safety rail arrangement around the platform. In order to ensure the safety of the worker, the opening formed by the scaffolding section and the platform needs to be of certain dimensions so that it prevents a worker from slipping from the working surface. According to the safety regulations a worker needs to be protected at all times while working on the scaffolding tower. Therefore, a complete scaffolding tower level needs to include a safety rail arrangement.

[0005] However, during assembly or dismantling of a scaffolding level such a safety rail arrangement may not yet be present or it may not be properly secured in the desired position. This is because in known scaffolding sections the locking mechanism is operated by direct manual manipulation. As a result safety can be greatly

compromised especially in the case where the scaffolding tower comprises more than one level.

[0006] EP2589728 discloses an advanced guard rail that can be used as a support as well as a safety scaffolding section. The disclosed guard rail is arranged to cooperate with the ladder-type end frames to provide a safety rail arrangement around the platform. The guard rail allows once the scaffolding tower level is completed to move the platform at a different height while providing a safety rail arrangement according to the safety regulations. However, during assembly or dismantle of a scaffolding tower level such a guard rail may present a great safety hazard, especially in the case of a multi-level scaffolding tower. This is because the engagement mechanism found on the top part of the guard rail needs to be manually released. As a result the scaffolding worker needs to be at a level where the safety rail arrangement is not yet in place or not properly secured. Moreover, the guard rail is a discreet scaffold section and needs to be installed or removed as one piece. Depending on the dimensions the guard rail can be of a considerable weight, thereby difficult to move within the scaffolding tower. A further disadvantage of the proposed solution is that dismantling of a scaffolding level can be time consuming, because each of the engagement mechanisms needs to be independently released.

[0007] WO2010136044 describes a scaffolding device in which the locking mechanism, found on the engagement mechanism at each end of the scaffolding device, can be released simultaneously, thereby speeding up the dismantling process of a scaffolding tower. Such a scaffolding device can be used as a support as well as a safety scaffolding section and can be placed in a horizontal or a diagonal position. The locking mechanism release action is performed by continuously pressing the release mechanism on the scaffolding device. In all other cases the locking mechanisms are in the locked position. However, dismantling of such a scaffolding device may compromise the safety of the scaffolding worker. This is because during assembly or dismantle of the scaffolding section the worker is required to stand at a platform where the safety rail arrangement is not yet in place or not properly secured and an unacceptable opening is present above the platform that is potential hazardous as the worker may slip through the opening. The scaffolding device presented has a locking mechanism that is adapted for one hand releases, thereby allowing the worker to support himself with the other hand. However, this is not always the case because depending on the length and weight of the scaffolding device being released, the scaffolding worker may require using both hands, thereby leaving him with no way of supporting himself in the event of an accident.

[0008] Therefore there is a need to provide a scaffolding section that can be installed and dismantled by a worker standing on a complete scaffolding tower level below, thereby ensuring that the safety of the worker is not compromised.

Disclosure of the invention

[0009] It is an aim of the present invention to avoid the drawbacks of the prior art, a.o. provide a scaffolding tower assembly that comprises a side member which can be attached and dismantled in an easy and quick way by a worker standing on a complete scaffolding tower level that includes a safety rail arrangement.

[0010] To this end, the invention provides a scaffolding assembly comprising a scaffolding side member showing the technical characteristics of the first claim.

[0011] In accordance with the present invention a scaffolding tower assembly is provided, whereby said assembly may comprise a scaffolding side member that can be used both as a support as well as a safety section on a scaffolding tower. The scaffolding side member may be provided with a horizontal section that has two engagement ends on opposing sides. Each engagement end may have a mechanism for engaging a respective other scaffolding element, such as a horizontal scaffolding section of a ladder-type end frame of a scaffolding tower. In order to secure the engagement mechanism into the desired position, a locking mechanism may be provided at each engagement end to lock the respective engagement mechanism to the other scaffolding element. To position the engagement end on a scaffolding section the locking mechanism needs to be released. For this purpose an actuating mechanism is provided for each locking mechanism, which is adapted for releasing the respective locking mechanism.

[0012] According to embodiments of the present invention the actuating mechanism comprises for each of the engagement ends a diagonal section that may be pivotably attached at one end to the horizontal scaffolding section. The movement of the diagonal section is transferred to the respective locking mechanism by a transferring mechanism, thereby releasing the engagement mechanism. This configuration offers the advantage that a worker can operate the locking mechanism from a distance well below the height where the engagement end is to be suspended. In particular, the scaffolding side member can be installed on the end frames of a scaffolding tower by a worker standing on a complete level below, which includes a safe rail arrangement.

[0013] According to embodiments of the present invention, the diagonal section may also be provided with an engagement end having an engagement mechanism for engaging a respective other scaffolding member, such as a horizontal scaffolding section of a ladder-type end frame of a scaffolding tower. The engagement end of the diagonal section is located at the other end, i.e. the end opposite the end section that is pivotably attached to the horizontal section. The engagement mechanism preferably also includes a locking mechanism that may be operated by direct manual manipulation to release the engagement mechanism. By securing the diagonal sections on the end frames the scaffolding side member may offer further support on the scaffolding tower and en-

hance the safety of the worker.

[0014] According to embodiments of the present invention, the transferring mechanism of the actuating mechanism may be placed inside the horizontal section. This arrangement may prevent accidental release of the engagement mechanism and also prevent any damage while it is being transported.

[0015] According to embodiments of the present invention, the transferring mechanism may comprise a connecting rod and a guiding mechanism, which are placed inside the horizontal section. The connecting rod may be arranged to contact at one end a slanted or sloped part of the locking mechanism and at the other end an extension of the diagonal section of the scaffolding side member. Two guiding elements may be positioned at each end of the connecting rod. Each of the guiding elements may be provided with opening wide enough to fit the connecting rod. This ensures that the connecting rod contacts each of the locking mechanism and diagonal section at the correct location, which further improves reliability of the locking mechanism. The slanted part of the locking mechanism is placed at a predetermined angle with respect to the longitudinal axis of the connecting rod, which in released position, i.e. when in contact with the connecting rod may be between 120° and 150°, preferably between 130° and 140°. This can ensure reliable operation of the locking mechanism by the connecting rod.

[0016] According to embodiments of the present invention, the connecting rod may be arranged to move between a first position in which the locking mechanism is locked and a second position in which the locking mechanism is released or open. In order to ensure that after the displacement the connecting rod returns to its original position, a spring may be provided. The spring may be placed between a holding pin attached on the connecting rod and one of the guiding element. The displacement of the connecting rod may be controlled by length or rigidity of the spring.

[0017] According to embodiments of the present invention, the locking mechanism comprises a semicircular hook around the engagement mechanism. The locking mechanism may be adapted to move between the locked and the released position by a spring acting on the hook part. Due to the spring, which may for example be a torsion spring, the locking mechanism may be pre-tensioned towards the locked position.

[0018] According to embodiments of the present invention, the diagonal section may be mounted at point of the horizontal section that may be between $\frac{1}{4}$ and $\frac{1}{2}$ of the horizontal section's length. The scaffolding side member of the present invention may comprise two diagonal sections, each operating separately a respective locking mechanism on either engagement end of the horizontal section. The two diagonal sections may be further connected to each other by a telescopic middle section. This middle section can provide additional safety. The fact that it is telescopic allows the diagonal sections to be

operated independently from each other and also allows the scaffolding side member to be folded offering the advantage of ease of transportation and storage.

[0019] According to embodiments of the present invention, the scaffolding tower assembly may further comprise at least two scaffolding side members that are connectable between two end frames. Each of the end frames comprises a pair of vertical poles connected by a plurality of horizontally placed scaffolding sections, the two end frames being further connectable to each other by a plurality of scaffolding sections placed in a horizontal and/or diagonal position, and at least one platform for providing a working surface provided for being arranged between the two end frames and positioned so that the combination of at least two scaffolding side members and the two end frames form a safe rail arrangement around the platform.

[0020] It is a further aim of the present invention to provide a method for erecting a scaffolding tower comprising a scaffolding side member according to the present invention.

[0021] This aim is achieved according to the invention with the method for erecting a scaffolding tower having steps according to claim 17.

Brief description of the drawings

[0022] The invention will be further elucidated by mechanism of the following description and the appended figures.

Figure 1 shows a scaffolding tower with one level.

Figure 2 shows the scaffolding side member according to embodiments of the present invention.

Figure 3 presents the engagement end of the diagonal section.

Figure 4 shows the engagement end of the diagonal section of the scaffolding side member secured on another scaffolding section.

Figure 5 shows the scaffolding side member in a folded position.

Figure 6 shows one of the engagement ends of the horizontal section in the locked position according to embodiments of the present invention.

Figure 7 shows the engagement end of the horizontal section in the released position.

Figure 8 shows the actuating mechanism in the folded position.

Figure 9 shows the actuating mechanism during the release of the engagement mechanism.

Figure 10 shows a cross-sectional view of a scaffolding tower assembly.

Figure 11 presents a cross-sectional view of a scaffolding tower with assembly having an additional scaffolding tower level.

Figure 12 shows a scaffolding tower with two scaffolding tower levels.

Modes for carrying out the invention

[0023] The present invention will be described with respect to particular embodiments and with reference to certain drawings but the invention is not limited thereto but only by the claims. The drawings described are only schematic and are non-limiting. In the drawings, the size of some of the elements may be exaggerated and not drawn on scale for illustrative purposes. The dimensions and the relative dimensions do not necessarily correspond to actual reductions to practice of the invention.

[0024] Furthermore, the terms first, second, third and the like in the description and in the claims, are used for distinguishing between similar elements and not necessarily for describing a sequential or chronological order. The terms are interchangeable under appropriate circumstances and the embodiments of the invention can operate in other sequences than described or illustrated herein.

[0025] Moreover, the terms top, bottom, over, under and the like in the description and the claims are used for descriptive purposes and not necessarily for describing relative positions. The terms so used are interchangeable under appropriate circumstances and the embodiments of the invention described herein can operate in other orientations than described or illustrated herein.

[0026] The term "comprising", used in the claims, should not be interpreted as being restricted to the mechanism listed thereafter; it does not exclude other elements or steps. It needs to be interpreted as specifying the presence of the stated features, integers, steps or components as referred to, but does not preclude the presence or addition of one or more other features, integers, steps or components, or groups thereof. Thus, the scope of the expression "a device comprising mechanism A and B" should not be limited to devices consisting only of components A and B. It means that with respect to the present invention, the only relevant components of the device are A and B.

[0027] It should be understood that features of the present invention bearing the same reference numerals are thought to be of a similar construction.

[0028] According to embodiments of the present invention a scaffolding tower assembly is provided comprising a scaffolding side member. The scaffolding side member may function as a support as well as a safety scaffolding section, and is adapted to cooperate with other scaffolding sections to form a safety rail arrangement around a scaffolding platform. Scaffolding towers are usually provided dismantled and are required to be assembled on-site from a collection of components such as scaffolding sections, platforms, and connectors. These components may include a range of discreet and modular components that are adapted to cooperate with each other to construct a scaffolding tower of a desired configuration and height. Each scaffolding section may include at each end an engagement mechanism to engage with other scaffolding sections and a locking mechanism to secure the scaffolding tower.

folding section at the desired position. It is desired that scaffoldings section can be used as a support as well as a safety section on a scaffolding tower, thereby minimizing the number of discreet components.

[0029] As it will become evidently from the description of the various embodiments the present invention differs from the solutions disclosed in the prior in that:

- the scaffolding side member can be installed or dismantled from a safe distance by a worker standing in a complete scaffolding tower level below, which includes a safety rail arrangement as required by the safety regulations,
- the scaffolding side member can be easily transported within the scaffolding tower and stored, due to its compact size and light weight design,
- the scaffolding side member can be installed and dismantled in a easy and quick manner.

[0030] Figure 1 shows a single level scaffolding tower 100 comprising scaffolding side members 140 according to embodiments of the present invention. The scaffolding tower 100 is constructed by placing two end frame sections 110 opposite each other, whereby each end frame can be formed by a pair of vertical poles 102 connected to each other by a plurality of horizontally placed scaffolding sections 101, thereby forming a ladder-type end frame. The two end frames may be connected by horizontally positioned scaffolding sections 125, diagonally positioned scaffolding section 120 and scaffolding side members 140. The scaffolding side members 140 are provided in between the two ladder-type end frames, whereby each end of the scaffolding side member may be connected to the horizontal scaffolding section 101. A platform 130 is arranged in between the opposing ladder-type end frames 110, to provide a working surface. The platform 130 is positioned in such a way so that the combination of at least two scaffolding side members 140 and the horizontal sections 101 of the two end frames 110 form a safe rail arrangement around the platform, thereby preventing the worker from slipping from the platform 130. Installation or dismantling of the scaffolding side member 140 is performed by a worker standing at a complete lower level of the scaffolding tower.

[0031] During assembly of the first level of the scaffolding tower 100 the platform 130 is placed at the desired location after the scaffolding side members 140 have been installed and secured into position on the end frames 110. The installation as previously mentioned can be done from a level below by a worker for example standing between the horizontally positioned scaffolding sections 125 and diagonally positioned scaffolding section 120. Once the first level is completed the worker can work safely on the platform 130, which is surrounded by a complete safe rail arrangement. Therefore, during the assembly process the worker's safety is not compromised.

[0032] The reverse process can be performed for dismantling the scaffolding tower level, whereby the scaf-

folding side member is released from a distance after the platform 130 has been removed by a worker standing at a level below.

[0033] This is in contrast to the solutions presented in the prior art whereby the release of the engagement mechanism is performed by a worker standing on a non-completed scaffolding tower level.

[0034] Figure 2 presents the scaffolding side member 140 according to embodiments of the present invention comprising a horizontal section 141 having two engagement ends 150, each engagement end 150 being provided with an engagement mechanism 143, which is configured for engaging a respective other scaffolding element as shown in the other figures. The horizontal section 141 may be in the form of a tube, thereby reducing the weight. Each of the engagement ends 150 further comprises a locking mechanism 144 to secure the engagement mechanism 143 at the desired location. The scaffolding side member 140 is further provided with an actuating mechanism 160 arranged to release the locking mechanism 144 at each of the engagement ends 150. Preferably, a separate actuating mechanism 160 is provided for each of the locking mechanisms 144. According to embodiments of the present invention each of the actuating mechanisms 160 comprises a diagonal section 142 that is pivotably mounted at one end on the horizontal section 141. A transferring mechanism (explained below) is used to transfer the movement of the diagonal section 142 to the locking mechanism 144 thereby releasing the engagement mechanism 143. By using the diagonal section 141 to release the engagement mechanism, the installation or dismantle of the scaffolding side member can be done from a distance. Therefore, it is possible for a worker to perform the installation and dismantling of the scaffolding side member from a complete scaffolding tower level, which includes a safe rail installation surrounding the working surface/platform. As a result the safety of the worker is not compromised by preventing accidents such as slippage of the worker from the platform. The diagonal section 142 is further provided with engagement end 170 positioned at the end opposite the end being mounted on the horizontal section. The engagement end 170 comprises engagement mechanism 147 thereby allowing the diagonal section 142 to be attached to other scaffolding member 151 as shown in Figure 3. The engagement mechanism 147 is secured into position by the locking mechanism 146, as shown in Figure 4. The locking mechanisms 146 are operated by direct manual manipulation to release the engagement mechanism 147. By dimensioning the diagonal section 141 accordingly it can further be used as support, as well as safety sections on the scaffolding tower, thereby ensuring rigidity of the scaffolding tower.

[0035] By the pivotable mounting of the diagonal sections on the horizontal section the scaffolding side member 140 can be completely folded/flattened, as shown in Figure 5. Therefore, transportation within the scaffolding tower and storage becomes easier and safer in com-

parison to solutions presented in the prior art.

[0036] Figure 6 shows one of the engagement ends 150 of the horizontal section 141 in the locked position. The engagement end 150 is designed so that a part 190 fits inside the horizontal section 141, and secured into place by pin or a screw 195. The locking mechanism 144 is pre-tensioned towards the locked position by a torsion spring 156. The locking mechanism 144 is movable between a locked and a released position for releasing the engagement mechanism 143. To release the locking mechanism 144, the action of the torsion spring 156 has to be overcome, either by manually operating the lever 197 or by means of the diagonal section and the connecting rod 153 acting on the slanted part 152. The engagement mechanism 143 is in the form of hook that may be suitably dimensioned to be attached to the other scaffolding section. The locking mechanism 144, when in the locked position grips around the scaffolding section 151, thereby securing the engagement mechanism 143 into place.

[0037] Figure 6 further shows a transferring mechanism 198 placed inside the horizontal section 141 suitable for transferring the movement of the diagonal section 142 to the locking mechanism 144 for releasing the engagement mechanism 143. The transferring mechanism 198, comprises a connecting rod 153 arranged inside the horizontal section 141 and guiding mechanism 155 arranged for guiding the connecting rod 153 inside the horizontal section 141. The connecting rod 153 may be arranged to contact at one end a slanted part 152 of the locking mechanism 144 and at the other end, shown in figure 9, an extension of the diagonal section 142 of the scaffolding side member 140. The slanted part 152 of the locking mechanism is positioned at a predetermined angle, chosen to ensure proper operation of the locking mechanism by the rod. Therefore, when the connecting rod 153 comes in contact with the slanted part 152 of the locking mechanism 144 the locking mechanism 143 is moved to the released position, thereby releasing the engagement mechanism 143, as shown in Figure 7. The angle defined by the slanted part of the locking mechanism and the connecting rod is preferably between 120° and 150°, more preferably between 130° and 140°.

[0038] In alternative embodiments, the transferring mechanism for transferring the movement of the diagonal section to the locking mechanism may evidently be carried out in other ways, such as for example by pivoting parts, by means of a cable, or in other ways known to the person skilled in the art.

[0039] By placing the transfer mechanism 198 inside the horizontal section 141 it has the advantage that accidental release of the engagement mechanism can be avoided and damage of the transfer mechanism 198 during transport can be avoided.

[0040] The transfer mechanism is provided with a guiding mechanism for the rod, which comprises a first guided element 255 placed towards the engagement end 150. The first guided element has an opening, not shown, that

is suitable for guiding the connecting rod 153. The guiding element 255 may be a discreet component secured inside the horizontal section 141 or may be integrated on the engagement end part 190. The use of a guiding element to guide the connecting rod 153 ensures that connecting rod 153 contacts the slanted part 152 of the locking mechanism 144 at an appropriate location to releasing the engagement mechanism 143.

[0041] The connecting rod 153 may be arranged to move between a first position in which the locking mechanism is locked, as shown in Figure 6 and a second position in which the locking mechanism is released, as shown in Figure 7. To facilitate the return of the connecting rod 153 to its original position after displacement by the diagonal section, a spring 157 may be provided on the connecting rod 153. The spring 157 is provided around the connecting rod between a holding element 201 attached on the connecting rod 153 and the first guiding element 155, as shown in Figure 7. The displacement of the connecting rod 153 between the first and the second position can be controlled by the length and rigidity of the spring.

[0042] Figure 8 shows the actuating mechanism 160, whereby the diagonal section 142 is shown in the folded position thereby the locking mechanism 144 at the engagement end 150 is in the locked position. A second guiding element 255 may be placed inside the horizontal section 141 towards the end of connecting rod that contacts the diagonal section 142. The second guiding element 255 has a similar configuration to the first guiding element previously described and also has an opening suitable for guiding the connecting rod 153.

[0043] Figure 9 shows the actuating mechanism during the release of the engagement mechanism 143, whereby the movement of the diagonal section 142 is transferred to the locking mechanism 144 through the transferring mechanism 198, thereby releasing the engagement mechanism 143. The release of the engagement mechanism 143 is performed by the extension 145 of the diagonal section, which contacts the connecting rod 153 through an opening 161 on the horizontal section 141 and pushes against the rod, thereby transferring the movement of the diagonal section 142 to the locking mechanism 144 to release the engagement mechanism 143.

[0044] Preferably, according to the embodiments of the present invention the scaffolding side member 140 has two diagonal sections 142, each pivotably mounted on the horizontal section 141, as shown in Figure 2. Each of the diagonal sections 142 function as actuating mechanism and is adapted to cooperate with a respective locking mechanism 144 of each engagement end 150 of the horizontal section 141. The two diagonal sections 142 can be operated independently from each other, so the engagement mechanisms 143 of the horizontal section 141 can be released independently from each other.

[0045] Preferably, each of the diagonal sections 142 is mounted on the horizontal section 141 at a point that

provides maximum support and at the same time meets the safety regulations regarding the dimensions of the opening at the side of the scaffolding tower. Each diagonal section can be placed at a point in the horizontal section that is between $\frac{1}{4}$ and $\frac{1}{2}$ of the horizontal section's 141 length, measured starting from the respective engagement end towards the middle of the horizontal section.

[0046] According to embodiments of the present invention the two diagonal sections 142 are connected to each other with a telescopic middle section 149. This section may be used to improve the safety of the worker on the scaffolding platform.

[0047] Figure 10 and Figure 11 show a number of method steps for erecting a multi-level scaffolding tower 100. First two end frames 110 are erected. Each of the end frames 110 comprises a pair of vertical poles 102 of a certain height that may be connected to each other with a plurality of horizontally placed scaffolding sections 101. In order to keep the two end frames 110 in the erected position a plurality of scaffolding sections 120, 125 are connected in between the two end frames 110. The scaffolding sections 120 and 125 can be arranged in a horizontal or diagonal position in order to provide maximum support to the scaffolding tower 100 and ensure rigidity. Once the skeleton of the scaffolding tower 100 is in place at least two scaffolding side members 140 may be provided for each level, Figures 10 and 11 show only one. Each scaffolding side member 140 comprises a horizontal section 141 and at least two diagonal sections 142. The horizontal section 141 comprises two engagement ends 150, whereby each of the engagement ends 150 may be provided with an engagement mechanism 143, which is configured for engaging a respective horizontal scaffolding section 101 of the end frames 110. Each of the scaffolding side members 140 may be installed on the end frame 110 in a sequential manner as follows.

[0048] The scaffolding side member 140 is lifted by a worker and placed on one of the end frames 110, such that one of the engagement ends 150 of the scaffolding side member 140 is suspended on a horizontal scaffolding section 101 of a desired height. In order to attach the engagement end 150 of the scaffolding section to the respective horizontal scaffolding section 101 the locking mechanism 144 of the engagement end is moved to the release or open position. This is performed by operating the respective actuating mechanism 160 of the engagement end 150, namely by pivoting the respective diagonal section 142, thereby releasing the respective engagement mechanism 143. While the locking mechanism is in the release or open position the engaging mechanism 143 may engage the horizontal scaffolding section 101 of the end frame 110. Once the horizontal scaffolding section 101 is engaged the engagement end 150 is secured into position by pivoting the diagonal section 142 to the locked position thereby locking the engagement mechanism 143. The same steps are repeated for the other engagement end 150 of the scaffolding side mem-

ber 140. As previously discussed the diagonal sections 142 of the scaffolding side member may also be provided with engagement ends 170, which can also be secured to respective scaffolding horizontal sections 101 of the end frame 110.

[0049] Once the two scaffolding sections are in place a platform 130 may be connected in between the two end frames 110. The platform is placed at a position within the end frames so that the combination of the two scaffolding side members 140 and the two end frames 110 form a safe rail arrangement around the platform 130.

[0050] The reverse process may be followed for dismantling of the scaffolding tower. As a result a scaffolding level can be fully assembled or dismantled by a worker that is standing at a complete level below, thereby ensuring the safety of the worker at all times.

[0051] Figure 12 shows a scaffolding tower 100 according to embodiments of the present invention having a first level 300 and a second level 400. At each level scaffolding side members 140 are provided at each side of the scaffolding end frames 110.

Claims

1. A scaffolding tower assembly comprising:

- a scaffolding side member (140) comprising a horizontal section (141) having two engagement ends (150), each engagement end being provided with an engagement mechanism (143) configured for engaging a respective other scaffolding element, a locking mechanism (144) provided at each engagement end (150) for locking said respective engagement mechanism (143) to the respective other scaffolding element, and an actuating mechanism (160) adapted for releasing each respective locking mechanism (144),
- **characterised in that** the actuating mechanism (160) comprises for each of the engagement ends (150) a diagonal section (141) being pivotably mounted at one end to the horizontal scaffolding section (141) and a transferring mechanism (198) for transferring the movement of the diagonal section (142) to the locking mechanism (144) thus releasing the engagement mechanism (143).

2. The scaffolding tower assembly according to claim 1, **characterised in that** each diagonal section (142) is provided with an engagement end (170) with engagement mechanism (147) for engaging a respective other scaffolding member, said engagement end (170) being at an end of the diagonal section opposite the end that is pivotably mounted to the horizontal section.

3. The scaffolding tower assembly according to claim 1 or 2, **characterised in that** the transferring mechanism (198) comprises a connecting rod (153) arranged inside the horizontal section (141) and a guiding mechanism (155) arranged for guiding the connecting rod (153) inside the horizontal section (141). 5
4. The scaffolding tower assembly according to claim 3, **characterised in that** the connecting rod (153) is arranged to contact at one end a slanted part (152) of the locking mechanism (144) and at the other end an extension (145) of the diagonal section (142) of the scaffolding side member (140). 10
5. The scaffolding tower assembly according to claim 3 or 4, **characterised in that** the guiding mechanism (155) comprises two guiding elements (255), each positioned towards a respective end point of the connecting rod. 15
6. The scaffolding tower assembly according to claim 5, **characterised in that** each guiding element (255) is provided with an opening suitable for guiding the connecting rod (153). 20
7. The scaffolding tower assembly according to any one of claims 3-6, **characterised in that** the connecting rod (153) is arranged to move between a first position in which the locking mechanism (144) is locked and a second position in which the locking mechanism (144) is released. 25
8. The scaffolding tower assembly according to claim 7, **characterised in that** the connecting rod (153) is further provided with a spring (157) arranged for moving the connecting rod (153) to its original position after displacement by the diagonal section (142). 30
9. The scaffolding tower assembly according to claim 8, **characterised in that** the spring (157) is positioned in between a holding element (201) attached to the connecting rod (153) and a guiding element (255), thereby controlling the displacement of the connecting rod (153) between the first and the second positions. 35
10. The scaffolding tower assembly according to any one of the preceding claims, **characterised in that** the locking mechanism (144) comprises a semicircular hook part adapted for engagement with said respective other scaffolding member (151) and a spring (156) acting on the hook part to move it to a locked position. 40
11. The scaffolding tower assembly according to any one of the claims 4-10, **characterised in that** the slanted part (152) of the locking mechanism (144) being in contact with the connecting rod (153) is positioned at a predetermined angle with respect to the longitudinal axis of the connecting rod. 45
12. The scaffolding tower assembly according to any one of the preceding claims, **characterised in that** in released position the angle defined by the slanted part (152) of the locking mechanism (144) and the connecting rod (153) is between 120° and 150°, preferably between 130° and 140°. 50
13. The scaffolding tower assembly according to any one of the preceding claims, **characterised in that** the diagonal section (142) is mounted at a point of the horizontal section, which is between ¼ and ½ of the horizontal section's (142) length.
14. The scaffolding tower assembly according to any one of the preceding claims, **characterised in that** the horizontal section (141) comprises two diagonal sections (142), each adapted to cooperate with the respective engagement mechanism (143) of the respective engagement end (150) of the horizontal section (141) for releasing the respective locking mechanism (143).
15. The scaffolding tower assembly according to any one of the preceding claims **characterised in that** the two diagonal sections (142) are connected to each other via a telescopic middle section (149).
16. The scaffolding tower assembly according to any one of the claims 1-15, comprising at least two of said scaffolding side members (140) connectable between two end frames (110), each end frame (110) comprising a pair of vertical poles (102) interconnected by a plurality of horizontally placed scaffolding sections (101), the two end frames (110) being further connectable to each other by said scaffolding side members (140) and a plurality of other scaffolding sections (120, 125) placed in a horizontal (125) or diagonal (120) position, and at least one platform (130) for providing a working surface provided for being arranged between the two end frames (110) and positioned so that the combination of two of the scaffolding side members (140) and the two end frames (110) form a safe rail arrangement around the platform (130).
17. A method for erecting a scaffolding tower comprising the steps of :
 - providing two end frames (110), each comprising a pair of vertical poles (102) interconnected by a plurality of horizontally placed scaffolding sections (101),
 - arranging a plurality of scaffolding sections (120, 125) in between the two end frames (110), said scaffolding sections being arranged in a

horizontal (125) or diagonal position (120) thereby providing support to the scaffolding tower (100),

- providing two scaffolding side members (140),
 each comprising a horizontal section (141) hav- 5
 ing two engagement ends (150), each engage-
 ment end (150) being provided with an engage-
 ment mechanism (143) configured for engaging
 a respective horizontal scaffolding section (101) 10
 of the end frames (110), a locking mechanism
 (144) provided at each engagement end (150)
 for locking said respective engagement mech-
 anism (143) to the respective horizontal scaf-
 folding section (101) of the end frame (110), and 15
 an actuating mechanism (160) adapted for re-
 leasing each respective locking mechanism,
 comprising a diagonal section (141) being piv-
 otably mounted at one end to the horizontal scaf-
 folding section (141) and a transferring mecha- 20
 nism (198) for transferring the movement of the
 diagonal section (142) to the locking mechanism
 (144) thus releasing the engagement mecha-
 nism (143)
 - connecting each of the scaffolding side mem- 25
 bers (140) on the end frames (110), one engage-
 ment end after the other, by the following steps:
 pivoting the respective diagonal section (142) to
 release the respective engagement mechanism
 (143), suspending the engagement end (150)
 on one of the horizontal scaffolding sections 30
 (101) and securing the engagement end (150)
 to the horizontal scaffolding section (101) by piv-
 otting the diagonal section (142) in opposite di-
 rection thereby locking the engagement mech-
 anism (143), and 35
 - connecting a platform (130) in between the two
 end frames (110), said platform being positioned
 so that the combination of the two scaffolding
 side members (140) and the two end frames
 (110) form a safe rail arrangement around the 40
 platform (130).

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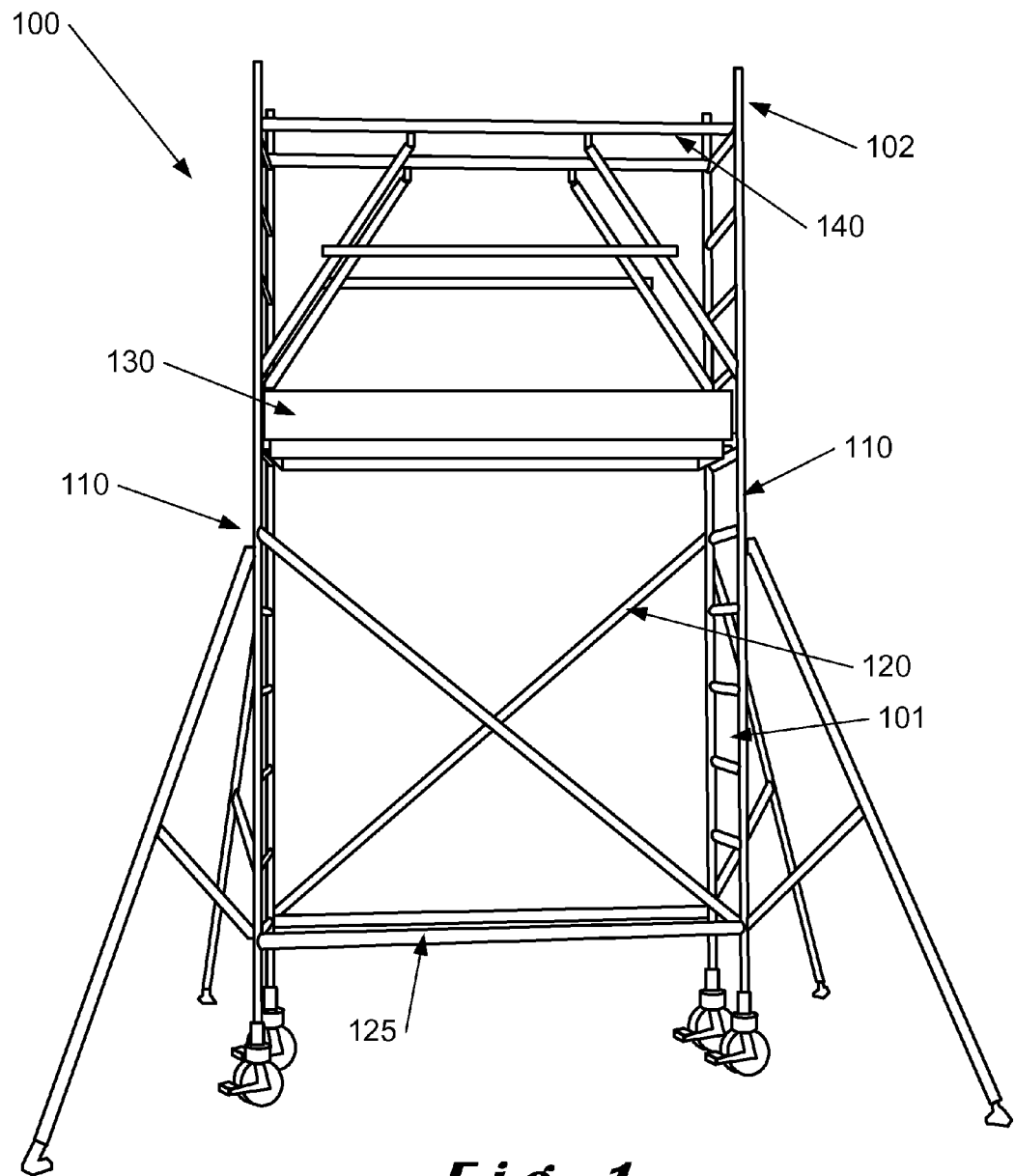


Fig. 1

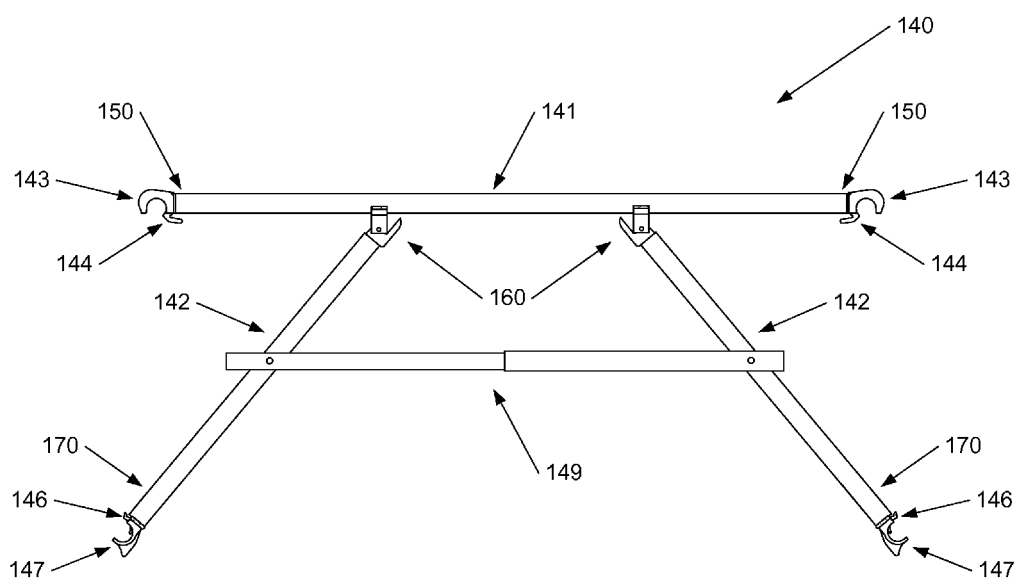
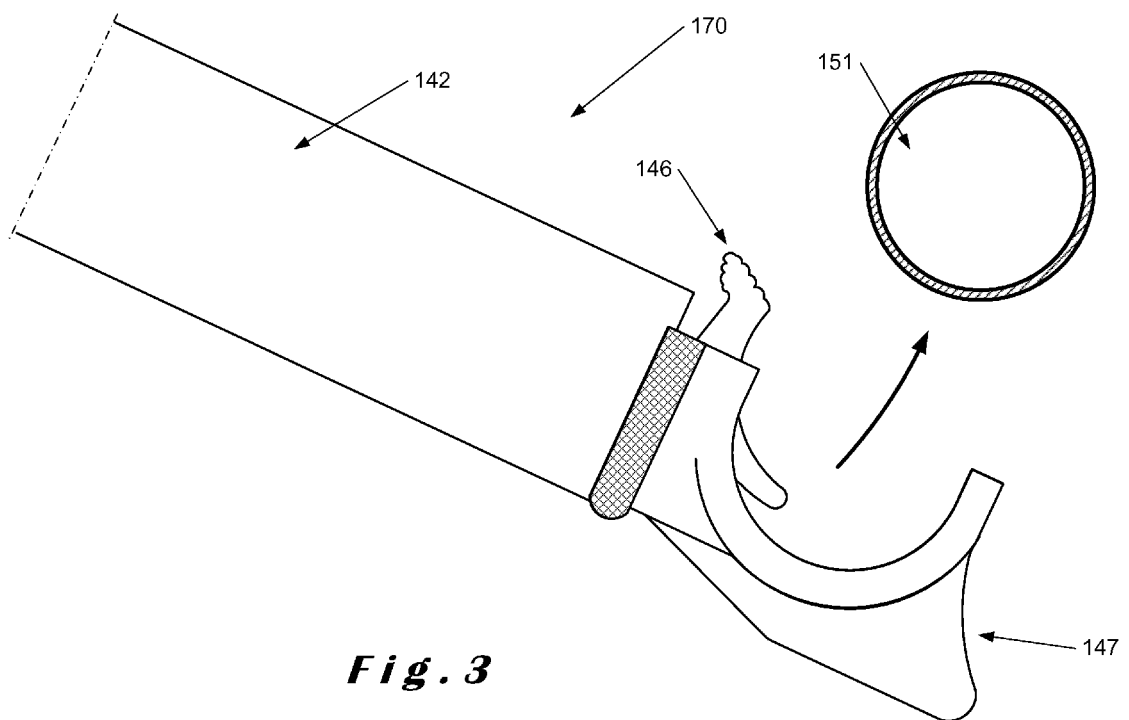


Fig. 2



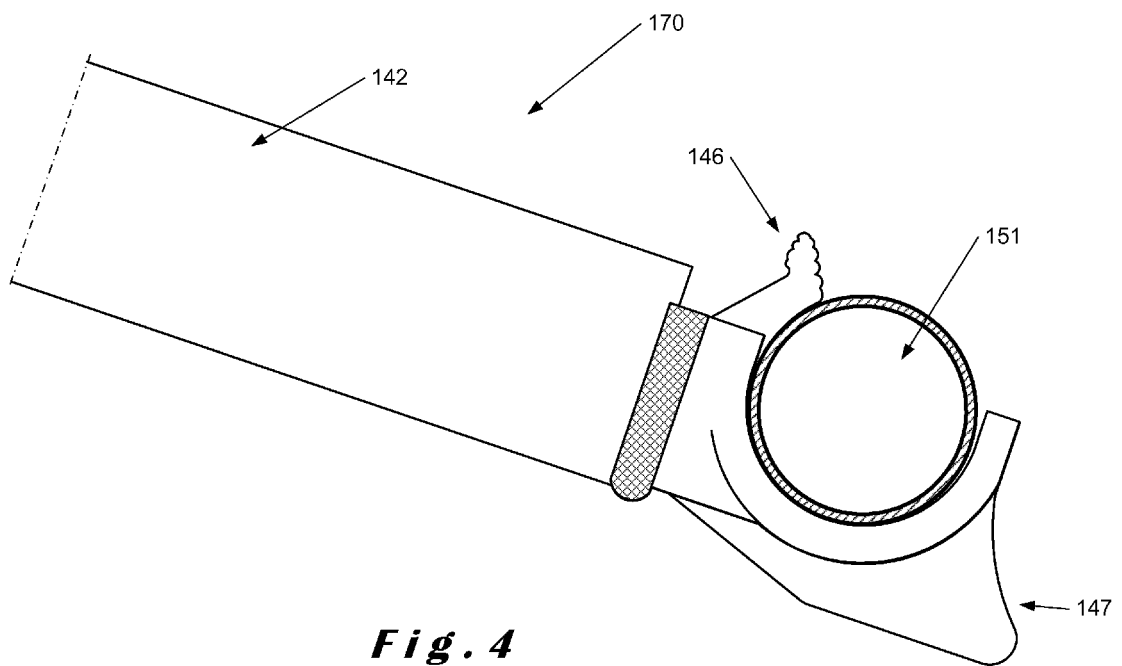


Fig. 4



Fig. 5

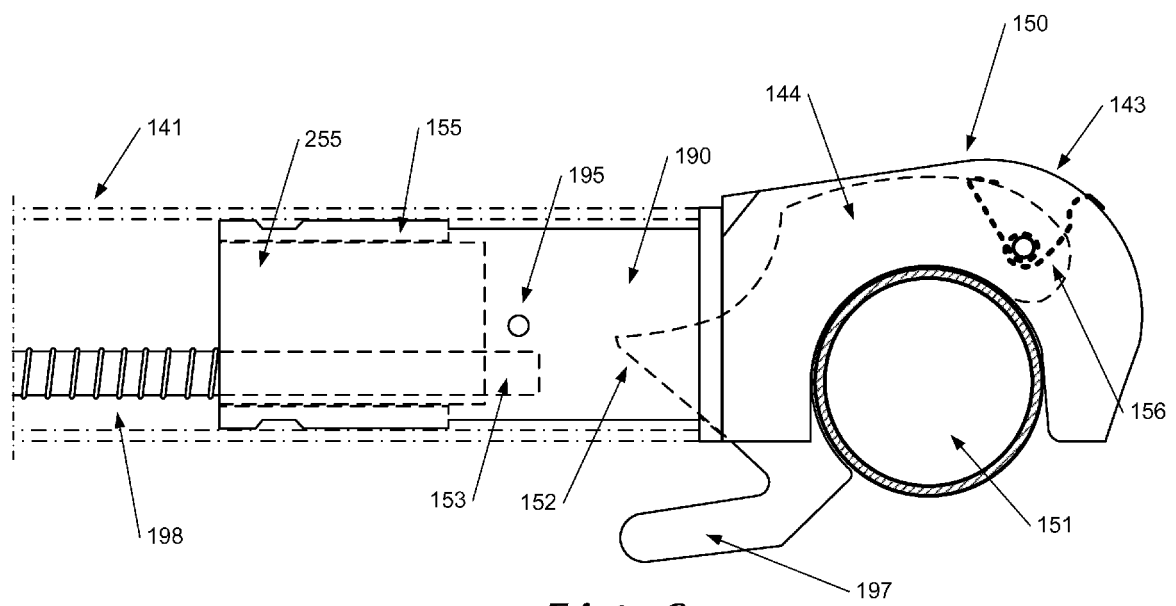


Fig. 6

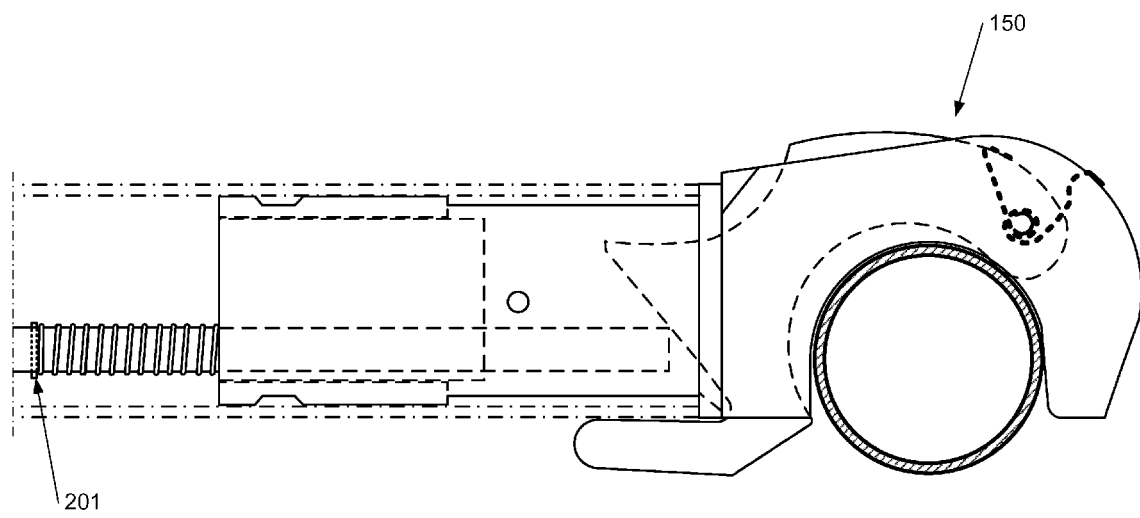


Fig. 7

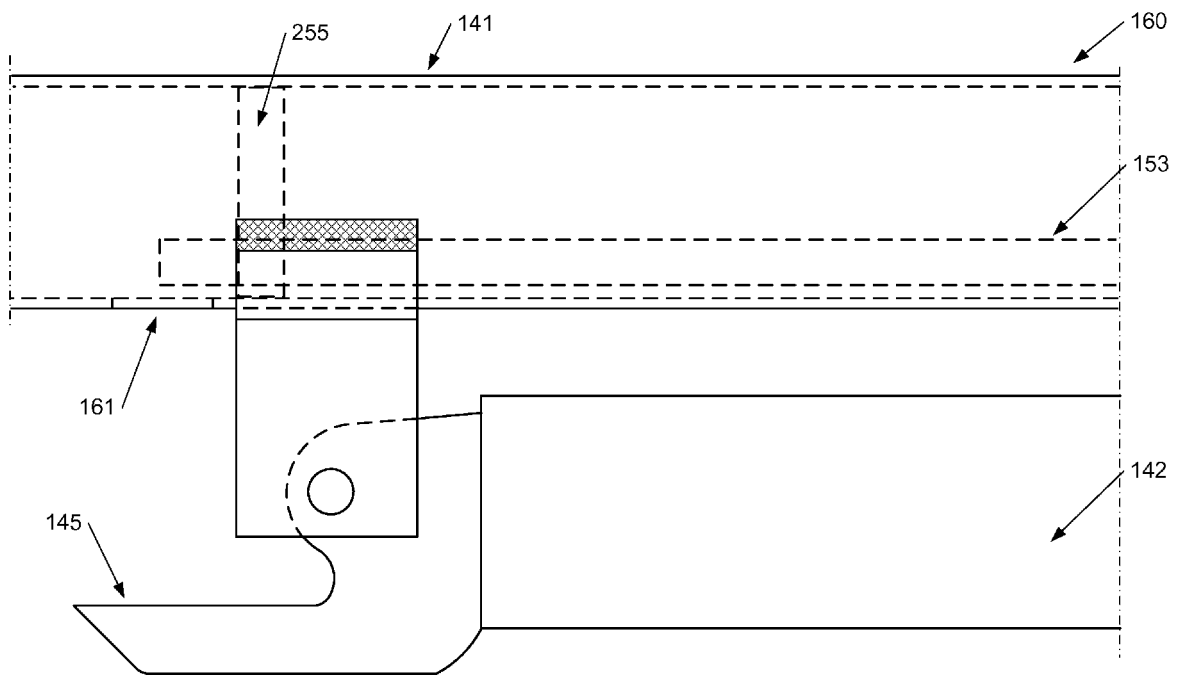


Fig. 8

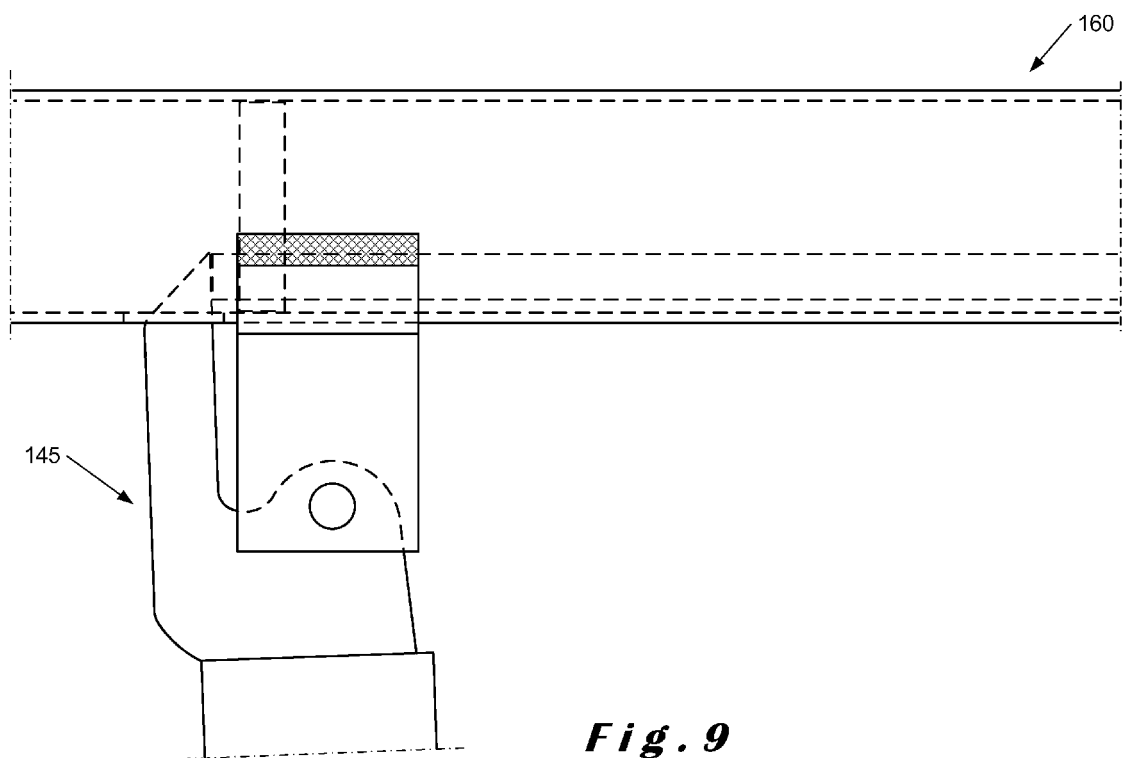


Fig. 9

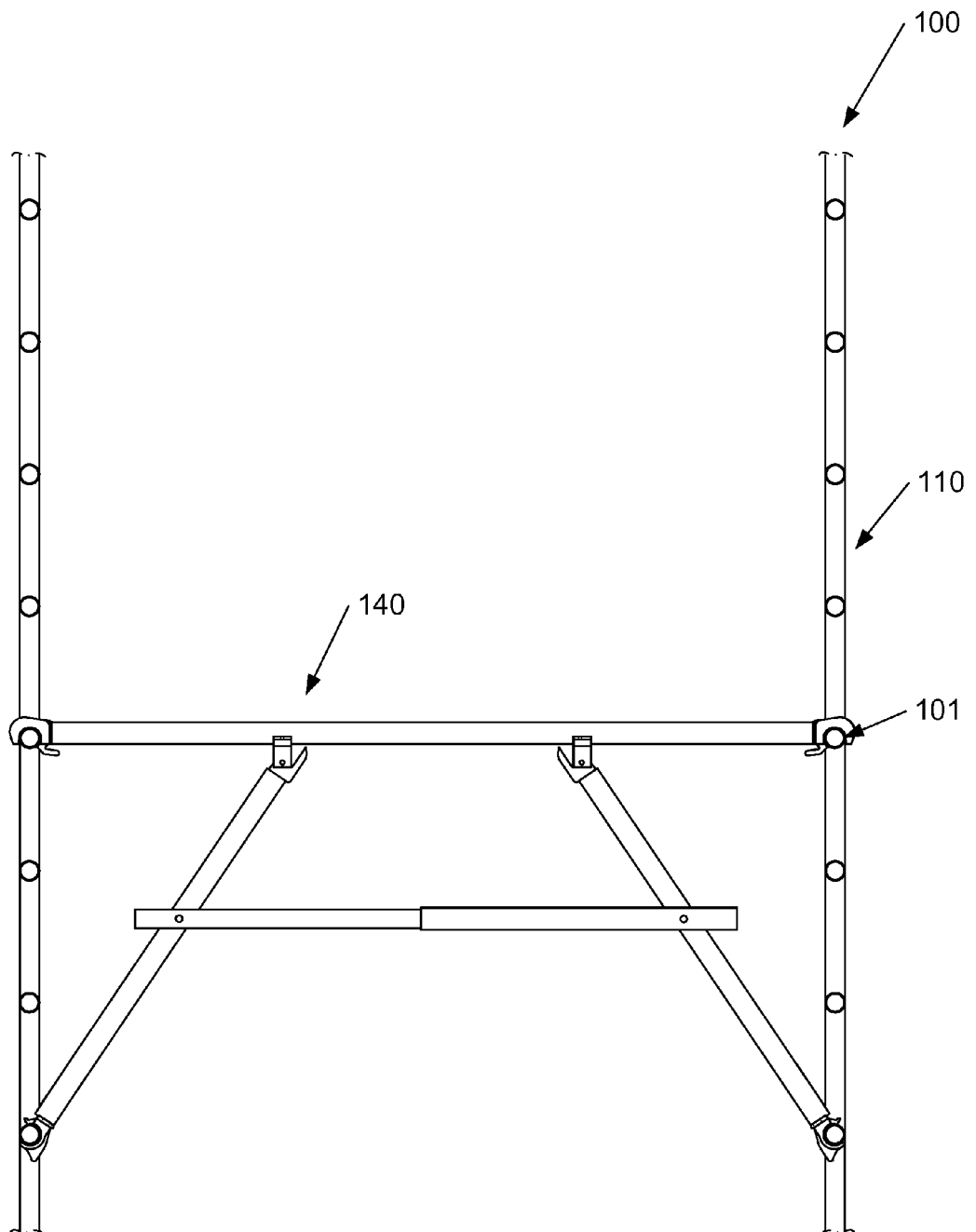


Fig. 10

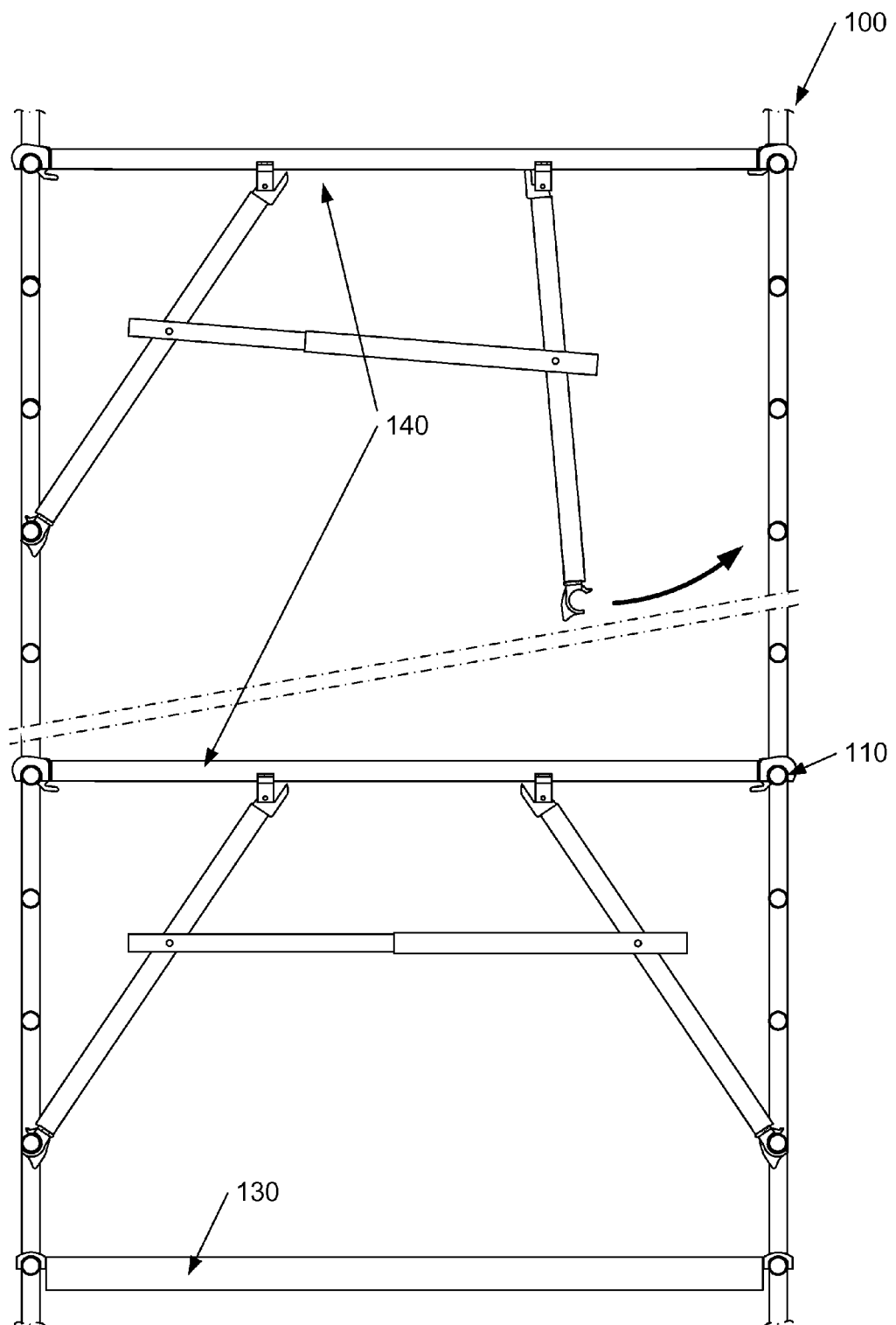
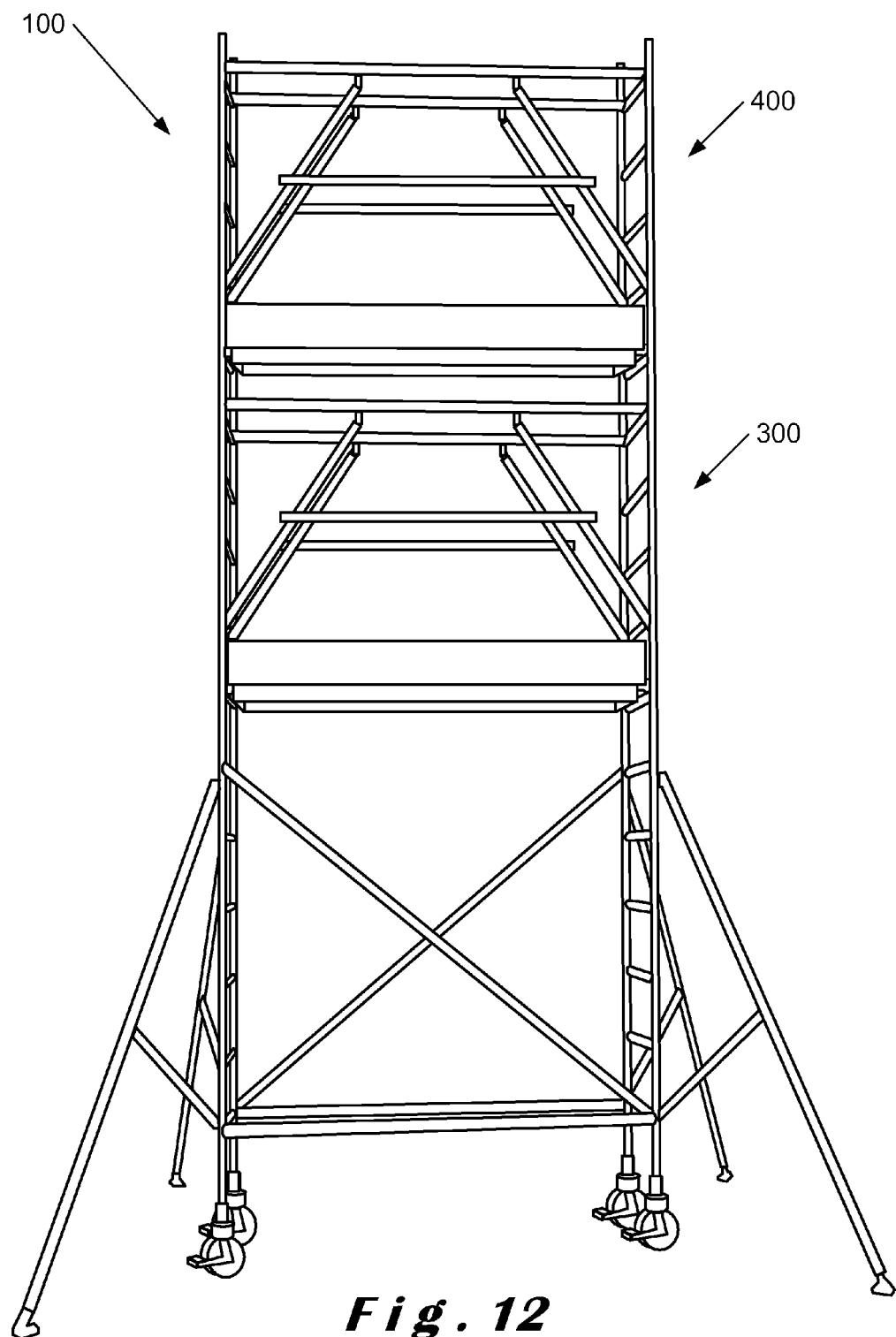


Fig. 11





EUROPEAN SEARCH REPORT

Application Number
EP 13 16 9396

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	JP 2012 097513 A (HEIWA GIKEN KK) 24 May 2012 (2012-05-24) * figures *	1-17	INV. E04G5/14 E04G7/30 E04G7/34 E04G5/16
X	JP 2010 144374 A (SANKYO CO) 1 July 2010 (2010-07-01) * figures * * figure 16 *	1-17	
X	JP 2013 064321 A (SANKYO CO) 11 April 2013 (2013-04-11) * figures * * figure 16 *	1-17	
			TECHNICAL FIELDS SEARCHED (IPC)
			E04G
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 15 October 2013	Examiner Andlauer, Dominique
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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ON EUROPEAN PATENT APPLICATION NO.**

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The members are as contained in the European Patent Office EDP file on
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15-10-2013

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

REFERENCES CITED IN THE DESCRIPTION

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