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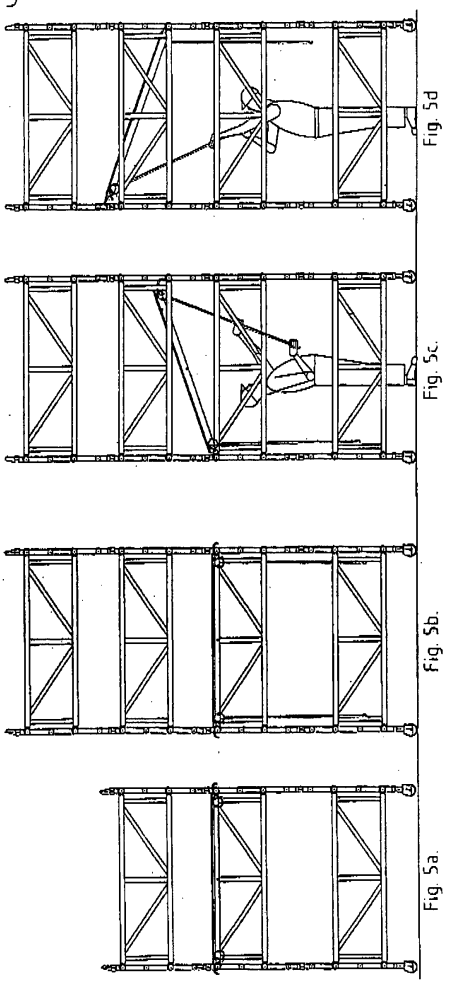
(54) Simplified scaffolding tower

(57) A simplified scaffolding tower system has only two principal component variations (2,12), which when used in conjunction with a scaffolding platform enable a safe and simple construction method to be adopted. The scaffolding structure forms a perimeter guard rail system which protects all faces of the structure irrespective of the position and level at which the platform units are installed. This ensures that the operatives are protected from falling at all times.

Fig. 5



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Description

[0001] The present invention relates to a scaffolding tower or the like for access to elevated locations. More particularly but not exclusively, it relates to such a scaffolding tower adapted to be erected with safety guardrails already in place.

[0002] Scaffolding has long been used in industry for gaining access to high and awkward locations. Whilst scaffolding provides a safe environment on which to work, this is not always the case for workers erecting and dismantling scaffolding structures. Various systems exist for providing temporary safety guard rails in advance of the erection of the scaffolding tower but they are often difficult to install and adjust.

[0003] Recent changes in UK legislation require that scaffolding erectors and dismantles should be provided with guardrail protection at all times whilst erecting, altering and dismantling scaffolding. Many of the existing safety systems and methods are difficult to use correctly and may not provide guardrail protection that is fully in accordance with the current safety regulations. An additional problem is that instruction manuals for erecting scaffolding towers to satisfy the new regulations are often complicated to understand, due to the numerous different components and build variations used to construct the towers safely. Often, the workers erecting the towers are not fully familiar with (or simply do not understand) the approved safe methods of use.

[0004] In addition, it is often impossible to make minor adjustments to platform working heights safely without effectively rebuilding the scaffolding.

[0005] It is hence an object of the present invention to provide scaffolding apparatus that obviates the above shortcomings of existing apparatus, that is simpler to erect, use and dismantle, and that provides fall protection for anyone erecting, working on or dismantling said scaffolding apparatus.

[0006] According to a first aspect of the present invention, there is provided scaffolding apparatus comprising two end elements, each comprising a pair of elongate upright members having a plurality of elongate cross members extending therebetween, and at least one platform means repositionably mountable to extend between said end elements and provided with a plurality of first hook means selectably repositionable between a first locked disposition so extended as to be engageable with a cross member of an end element and a second free disposition adapted to be moved past a cross member without engagement therewith, characterised in that the scaffolding apparatus also comprises a plurality of side frame elements so mountable to extend between said end elements as to brace the assembled scaffolding apparatus and to act as guardrail means for adjacent platform means.

[0007] According to a second aspect of the present invention, there is provided a method for erecting scaffolding comprising the steps of providing scaffolding apparatus as claimed in any one of the preceding claims, erecting said end elements, connecting said end elements with at least one first side frame element, mounting a platform means between the end elements, mounting further side frame elements to extend between the end elements above said at least one first side frame element, raising the platform means by sequentially disengaging first hook means at a first end thereof from a respective first cross member, raising said first end and re-engaging its first hook means with a second cross member above the first, and then disengaging first hook means at a second end thereof, raising said second end and re-engaging its first hook means, characterised in that at least one of said further side frame elements so extends between the end elements above a current level of the platform means as to act as guardrail means for the scaffolding.

[0008] This invention relates to a simplified scaffolding tower system comprising only two principal component variations, which when used in conjunction with a scaffolding platform, which may be raised into position remotely from below, thus enabling a safe simple construction method to be adopted which ensures that the erection personnel are protected from falling at all times. The scaffolding structure is arranged such that the scaffolding frames form a perimeter guard rail system which protects all faces of the structure irrespective of the position and level at which the platform units are installed, the operatives are thus protected from falling at all times.

[0009] The invention will now be more particularly described with reference to the following drawings in which:-

Figure 1 shows a front elevation and a side elevation of a scaffolding tower end frame as used in the present invention;

Figure 2 shows a side elevation, an end elevation and a scrap side elevation of an attachment hook of a guardrail frame of the present invention;

Figure 3 shows a side elevation, an end elevation and a plan view of a platform with a trapdoor, as used in the present invention;

Figures 3a & 3b show details of a folding hook mechanism of the platform shown in Figure 3;

Figure 4 shows a side elevation, an end elevation and a plan view of a scaffolding tower embodying the present invention during its initial erection sequence;

Figures 5a to 5d show a progressive construction sequence of the tower shown in

Figure 4 as erection continues, including details of repositioning of the scaffolding platform thereof; and

Figures 6a to 6c show further progressive construction sequences with an erector working from a protected place of safety on said scaffolding platform.

[0010] The scaffolding tower of the present invention comprises scaffolding end frames 2 which incorporate vertical frame members 4 and multiple horizontal frame members 6 forming a ladder-like structure. A frame con-

necting arrangement 8 is situated at the top of each vertical frame member such that frame members may be connected together.

[0011] Scaffolding guardrail frames 12 comprise vertical guardrail members 14, upper 16 and lower 18 horizontal guardrail members together with diagonal bracing members 19 forming a stiff structural framework. The guardrail frame incorporates attachment hooks 20 with at least two opposing said hooks 22 incorporating retractable plunger mechanisms 24 enabling the guardrail frame 12 to be releasably attached to the scaffolding end frames 2.

[0012] Two scaffolding end frames 2 and two scaffolding guardrail frames 12, when connected together, form a rectangular enclosure forming an enclosed guardrail frame structure.

[0013] Scaffolding platform units 30 comprising platform side members 32, a flat rectangular platform surface 34, a trapdoor aperture 36 and two pairs of attachment hook members 40 provide a working platform for the scaffold tower. The attachment hook members 40 are pivotally attached at each corner of the platform unit 30 and incorporate a lock/release and control mechanism 42 such that each pair of hook members may be extended and locked by the action of a spring mechanism, and can be released and controllably rotated to a downwards facing direction, thus enabling one end of the platform unit to be raised past a supporting horizontal end frame member 6 and relocated onto a higher or lower end frame horizontal member 6. Particularly suitable attachment hooks are those disclosed in my earlier European Patent Application No. 06025243.4, now published under the number EP1795671A1. The platform units 30 may thus be repositioned onto any rung position to provide a level working platform. The rotation and return device may comprise a spring mechanism as illustrated or may comprise a counterbalance mechanism to provide the return action. The platform unit 30 may also be provided with an integral elongate remote operating tool 44, capable of being stowed beneath the platform unit 30 when not in use.

[0014] To erect a typical scaffolding tower (Fig 4), adjustable jacks or castor wheels are inserted into the bottom of the tubular legs of a pair of scaffolding end frames, the end frames are connected together using a pair of guardrail frames to form a rectangular enclosure. A second pair of scaffolding end frames is located onto the connecting means of the first pair of scaffolding frames which are then similarly connected together using guardrail frames forming a taller rectangular enclosure.

[0015] At this stage a platform unit is first placed on the ground beneath the scaffolding tower, the platform unit may then be raised to the position of the third or fourth horizontal frame rung by raising the end of the platform unit and hooking the first pair of hooks over the horizontal member at the desired height. Raising the other end of the platform unit and simultaneously releasing the end hooks and lowering them into the downwards position allows the hooks to pass the horizontal frame members such that the hooks are then permitted to return to their original position which may then be located onto the opposite horizontal frame member forming a raised platform level surrounded by a perimeter guardrail. Access to this platform may be accomplished by climbing through the large aperture formed between the upper and lower guardrail frames. A person standing on this platform is able to erect a third tier of tower components safely from this guarded platform, as shown in Fig 4.

[0016] The scaffolding platform may then be raised from beneath by releasing the platform hooks at each end of the platform in turn and raising the platform to the top of the second level of frames (Fig 5a).

[0017] By using the trapdoor as a means of access to the platform a fourth scaffolding level can be installed (Fig 5b).

[0018] The platform may then be raised remotely, as shown in Fig 5c, using the elongate remote operating tool 44 (stowed beneath the platform deck) such that the platform may be located onto the top of the third level of the scaffolding (Fig 5d to Fig 6a.) To erect further scaffolding components a second platform unit is introduced at the lower levels of the structure giving a platform from which the upper platform may be incrementally raised. From the raised upper platform, subsequent tower components may then be added, until the structure is completed (Fig 6c). Dismantling is the reverse of the erection procedure with the platforms being lowered within the structure so that they always provide a safely guarded place from which to work.

[0019] As an aid to the stability of freestanding scaffolding tower structures, additional releasable components forming stabilisers may be attached to the tower base, in order to provide a larger base area to assist in maintaining structural stability. These stabilisers may optionally form an integral part of the lower end frame units, which further simplifies erection procedures.

Claims

1. Scaffolding apparatus comprising two end elements, each comprising a pair of elongate upright members having a plurality of elongate cross members extending therebetween, and at least one platform means repositionably mountable to extend between said end elements and provided with a plurality of first hook means selectably repositionable between a first locked disposition so extended as to be engageable with a cross member of an end element and a second free disposition adapted to be moved past a cross member without engagement therewith, **characterised in that** the scaffolding apparatus also comprises a plurality of side frame elements so mountable to extend between said end elements as to brace the assembled scaffolding apparatus and to act as guardrail means for adjacent platform

means.

2. Scaffolding apparatus as claimed in claim 1, **characterised in that** said side frame elements are each provided with a plurality of second hook means, each releasably engageable with a cross member of an end element.

3. Scaffolding apparatus as claimed in either claim 1 or claim 2, **characterised in that** the side frame elements extend in a substantially vertical plane, in use, and are provided at each horizontally remote end with a plurality of second hook means, each disposed to engage with a different cross member of a respective end element.

4. Scaffolding apparatus as claimed in any one of the preceding claims, **characterised in that** each side frame element comprises a generally rectangular framework of elongate members, optionally a braced said framework.

5. Scaffolding apparatus as claimed in any one of the preceding claims, **characterised in that** each end element comprises a plurality of end element modules, each module comprising a pair of upright members having a plurality of cross members extending therebetween and being sequentially connectable to form a respective end element.

6. Scaffolding apparatus as claimed in any one of the preceding claims, **characterised in that** the apparatus comprises solely said end elements, platform means and side frame elements.

7. Scaffolding apparatus as claimed in any one of the preceding claims, **characterised in that** each first hook means comprises a locking body disposable to retain the first hook means in its first locked disposition and selectably displaceable to release the first hook means into its second free disposition.

8. Scaffolding apparatus as claimed in claim 7, **characterised in that** said locking body is biased towards said retaining disposition.

9. Scaffolding apparatus as claimed in claim 8, wherein said biased locking body is adapted to urge the first hook means towards its first locked disposition.

10. A method for erecting scaffolding comprising the steps of providing scaffolding apparatus as claimed in any one of the preceding claims, erecting said end elements, connecting said end elements with at least one first side frame element, mounting a platform means between the end elements, mounting further side frame elements to extend between the end elements above said at least one first side frame element, raising the platform means by sequentially disengaging first hook means at a first end thereof from a respective first cross member, raising said first end and re-engaging its first hook means with a second cross member above the first, and then disengaging first hook means at a second end thereof, raising said second end and re-engaging its first hook means, **characterised in that** at least one of said further side frame elements so extends between the end elements above a current level of the platform means as to act as guardrail means for the scaffolding.

Fig 1

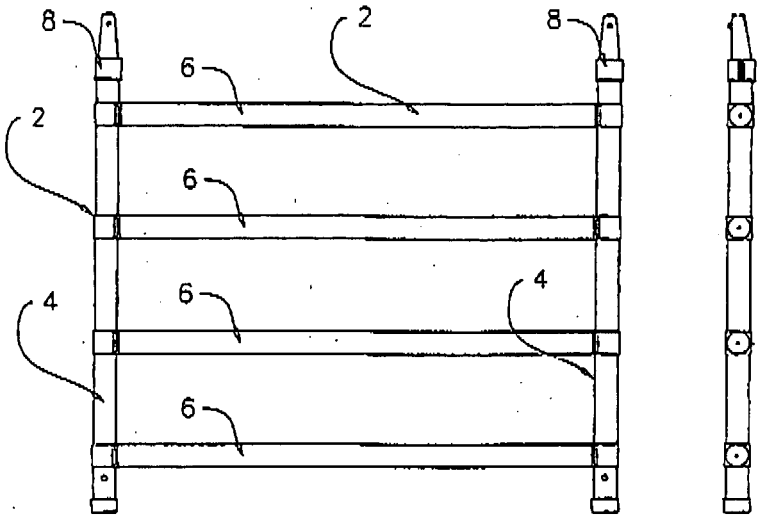


Fig. 2

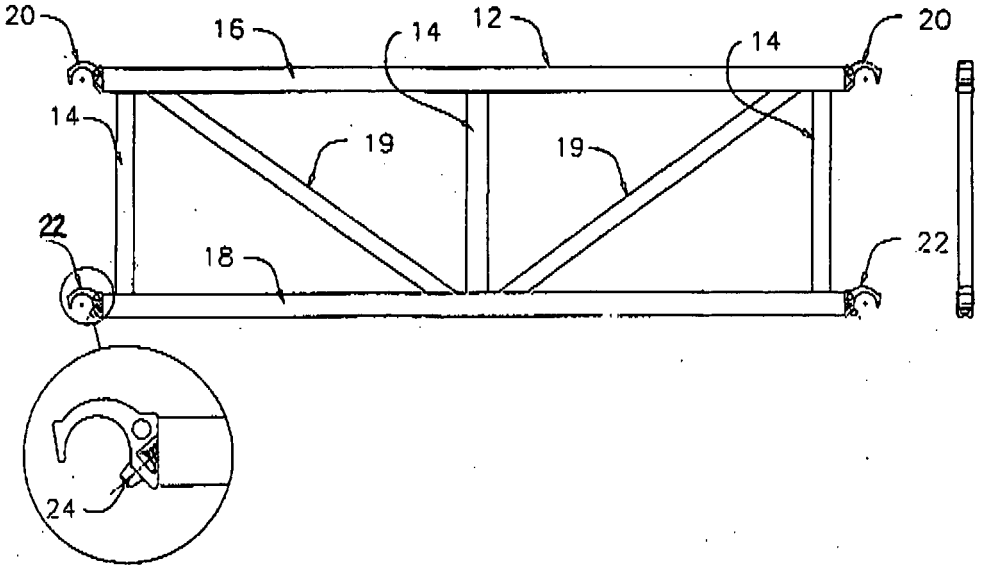


Fig. 3.

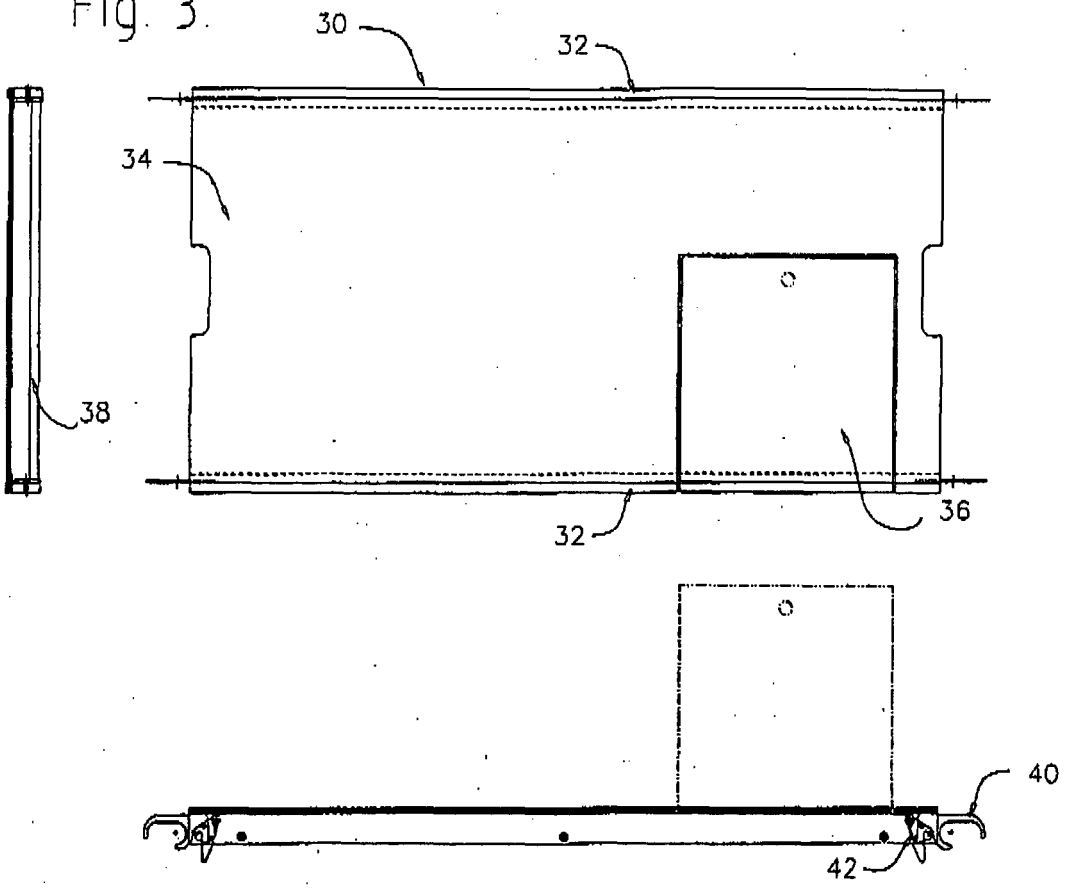


Fig. 3a.

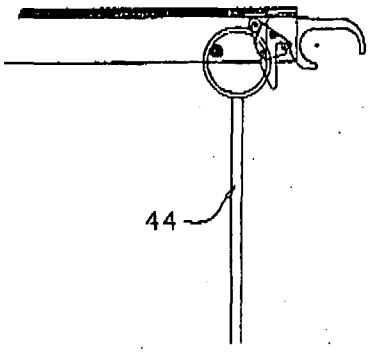


Fig. 3b

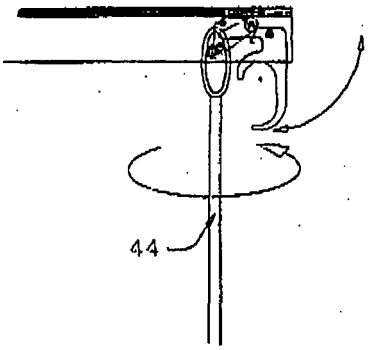
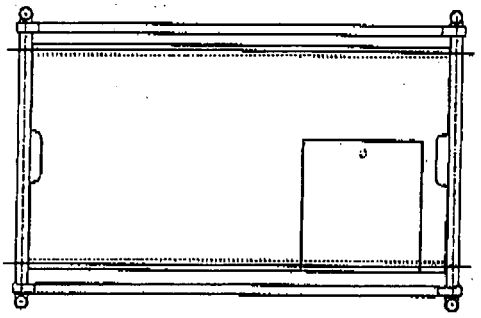
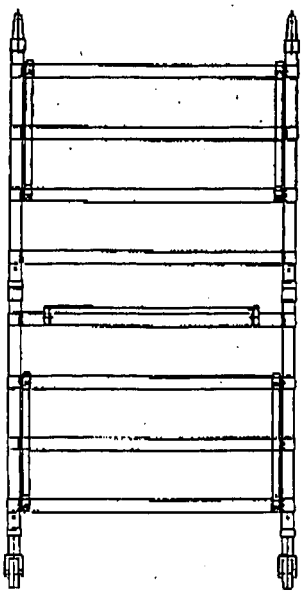


Fig. 4.





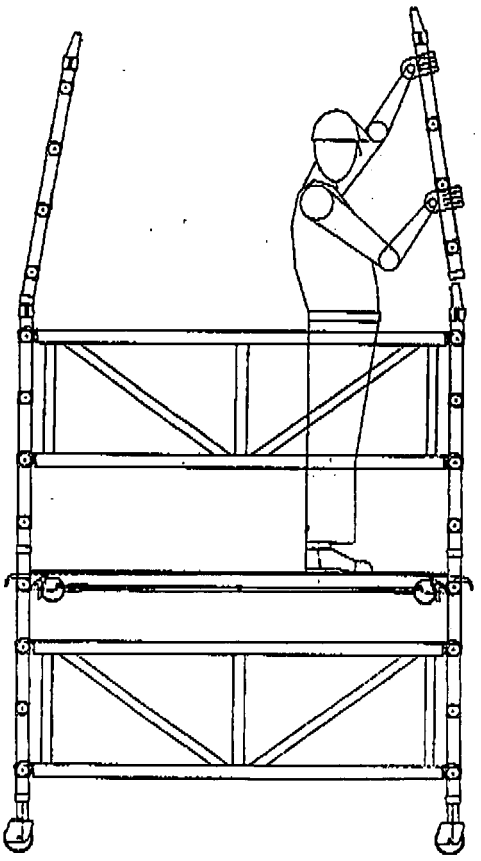


Fig. 5.

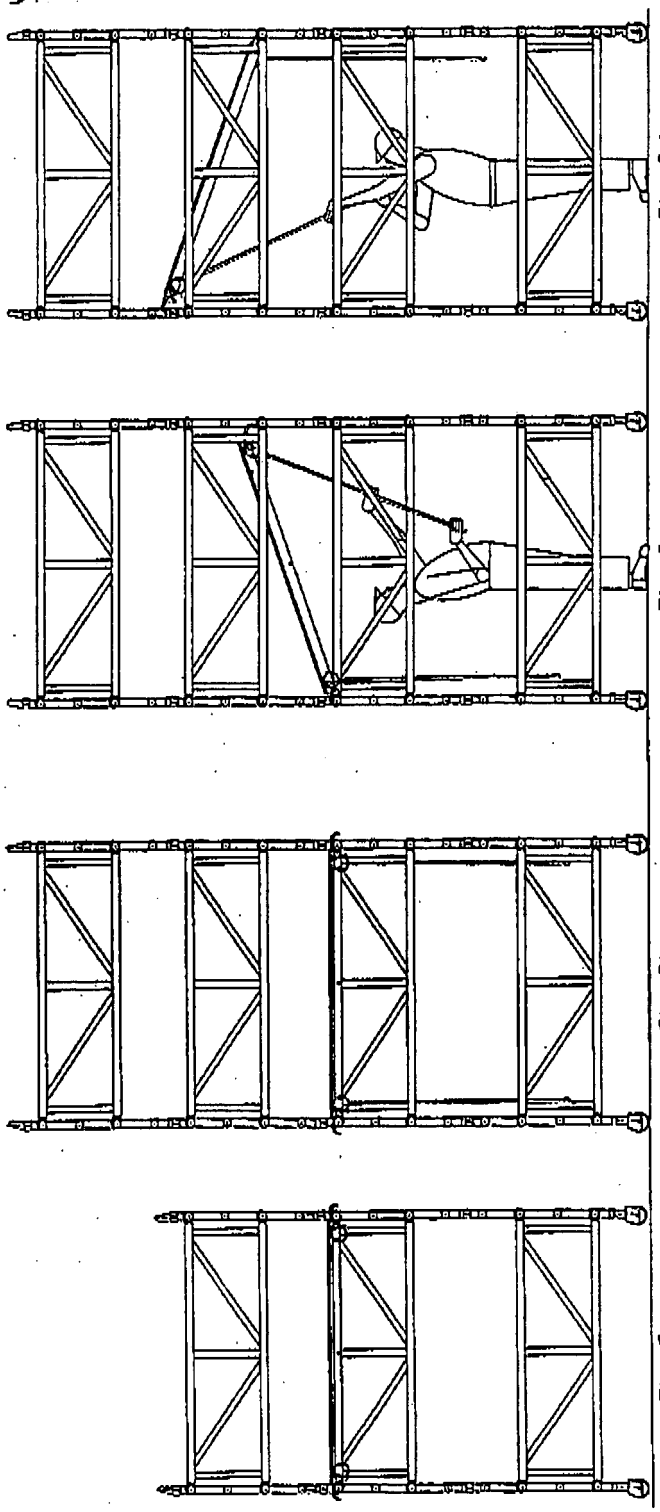


Fig. 5d

Fig. 5c.

Fig. 5b.

Fig. 5a.

Fig. 6.

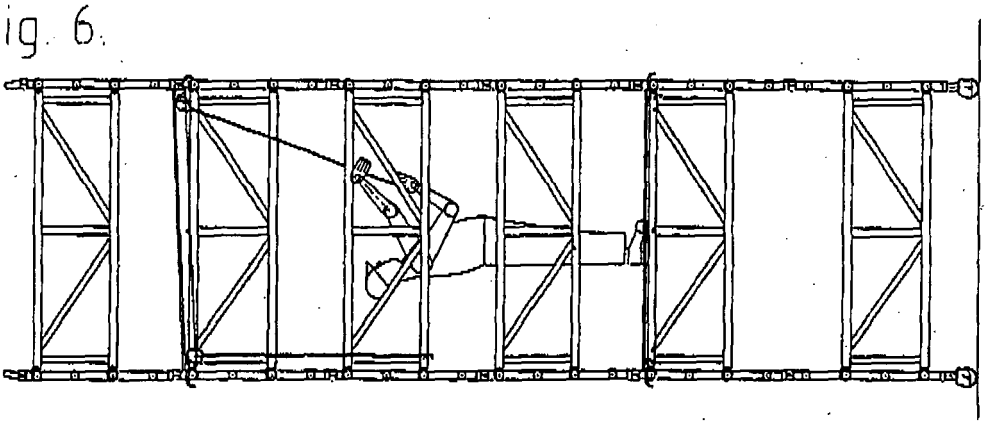


Fig 6c

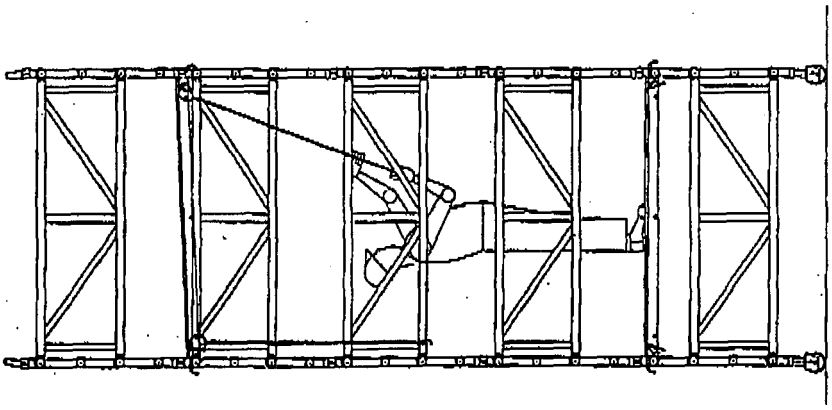


Fig. 6b.

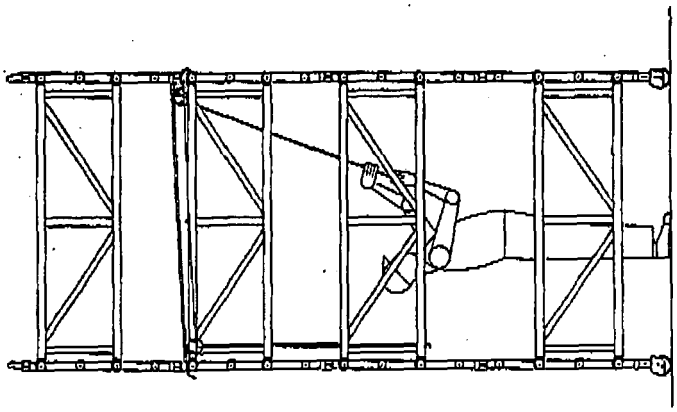


Fig 6a

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- EP 06025243 A **[0013]**
- EP 1795671 A1 **[0013]**