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(54) **Bed**

(57) The present invention relates to a bed comprising two first longitudinal rails, telescopic mattress side rails, two transversal frames, attachment means between said transversal frames and said two first longitudinal rails for releasable attachment, and a mattress extension frame arranged with similar attachment means and connectable between one transversal frame and said two first longitudinal rails for extending the length of the bed.

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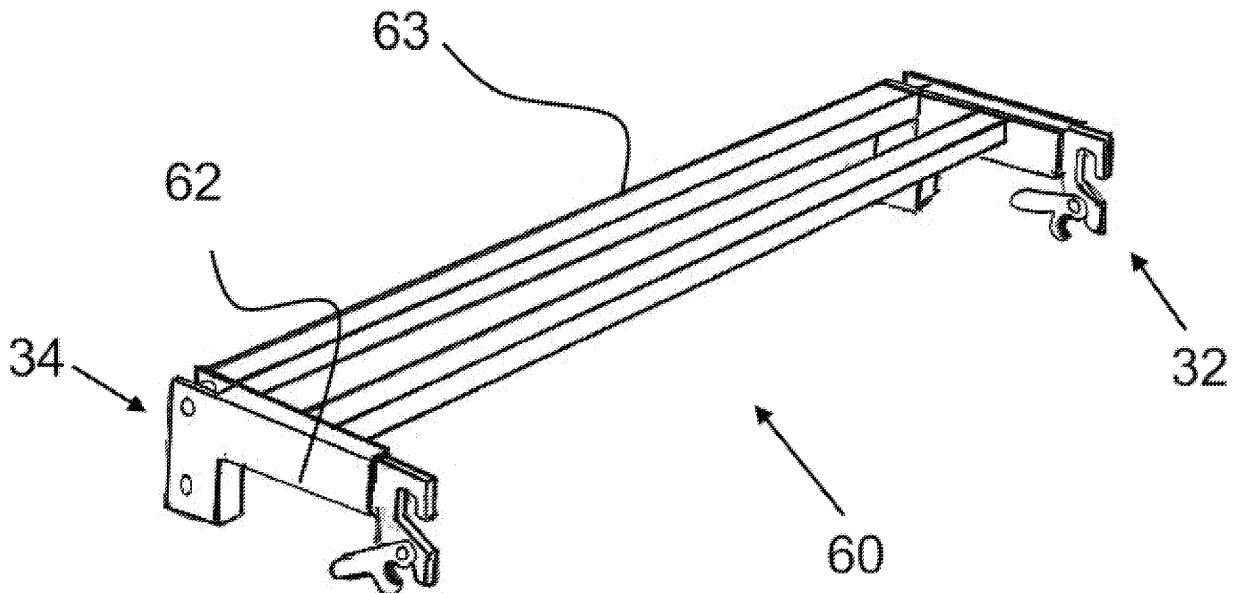


Fig. 5

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Description

TECHNICAL AREA

[0001] The present invention relates to a bed and in particular a bed to be used for patients and the like persons that need to be nursed at home or at nursing homes.

TECHNICAL BACKGROUND

[0002] Beds specially designed for the demands of nursing at home or at nursing homes, need to have a number of special functions. These include e.g. mobility such that the beds are arranged with wheels, posts attached to the bed frame to be used as lifting aids, articulated parts of the bed, connection and disconnection means for storing and transporting of the bed, i.e. versatility such that the bed may be used for patients requiring different types of aid.

[0003] Regarding connecting and disconnecting components of a bed, document US 7,007,321 describes a connection system for side rails of a bed frame comprising a hooking element cooperating with pins wherein a hook plate is forced downwards by manually pivoting a lever arm such that the pins are locked in slots of the hook plate.

[0004] Another example of attaching components to a bed frame is shown in JP 10258093 comprising a post which fits into holes in the bed frame. It further comprises a hook pivotally arranged to the post, facing downwards. When the post is positioned in the hole, the hook enters a slot in the bed post and engages the bed frame. When the component is to be released, the hook is pivoted out of engagement with the bed frame.

[0005] Another feature that many beds of this type have is latch mechanisms for articulated parts of the bed to position them in different angular positions. US 5,706,536 discloses a latch mechanism of a knee section of a bed where the latch mechanism comprises a ratchet plate and clevis pin engaging the notches of the ratchet. In order to lower the knee section, the clevis pin is moved past the last notch and towards a cam surface, whereby an escapement plate is urged so that it covers the notches.

[0006] The document US 5,513,406 discloses a hospital bed capable of being transformed into various functional beds/chairs for handling various stages of treatment and/or care of a patient. It is thus possible to connect different equipment to the bed depending on situation such as transport module group, patient critical care/step group and patient ambulatory/rehabilitation group. Each group comprises different modules such as for example a care cart module for the transport group, a weigh scale module for the patient critical care group and an exerciser unit for the patient rehabilitation group.

[0007] However, none of the disclosed beds are as such truly versatile or flexible regarding modifications and alterations depending on patient conditions and size.

BRIEF DESCRIPTION OF THE INVENTION

[0008] The aim of the present invention is to remedy the drawbacks of the state of the art and to provide a versatile care bed system for nursing patients at home.

[0009] This aim is obtained by the features of the independent patent claims. Preferable embodiments of the present invention are found in the dependent patent claims.

[0010] According to a main aspect of the invention it is characterised by a bed having a length and a width and comprising two first longitudinal rails comprising on their ends first attachment means; telescopic mattress side rails comprising on their ends third attachment means; two transversal frames adapted to be resting on a plane surface, comprising second attachment means that releasably interfaces the first attachment means, and fourth attachment means, wherein said second attachment means and respective said fourth attachment means are arranged vertically over each other for permitting the positioning of said two first longitudinal rails and respective said telescopic mattress side rails at different heights in relation to said plane surface; first transversal rails being transversally connected to said longitudinal rails; a mattress frame resting on said first transversal rails; a mattress extension frame comprising two second longitudinal rails and second transversal rails, wherein each second longitudinal rails comprises first attachment means that releasably interfaces the second attachment means of one of the transversal frames, and second attachment means that releasably interfaces the first attachment means of each first longitudinal rail for extending the length of the bed.

[0011] The present invention has a number of advantages in comparison with the known devices in this technical area. The bed according to the present invention provides a great versatility and flexibility in that it is very easy to extend the length of the bed with the mattress extension frame, which is provided with second longitudinal rails and second transversal rails, and with the same type of attachment means as the first longitudinal rails. Since the attachment means preferably have locking means that act by gravity, it is assured that the bed frame is securely locked to the end piece without having to perform further actions.

[0012] The flexibility is further ensured in that there is a plurality of attachment positions on the transversal frames in the height direction. It is thus possible to adjust the height of the bed rest depending on the length of the patient and/or caregiver.

[0013] Further, because of the possibility of extending the length of the bed, telescopic mattress side rails are positioned between the transversal frames.

[0014] These and other aspects of and advantages with the present invention will become apparent from the following detailed description and the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] In the detailed description, reference will be made to the accompanying drawings, of which

Fig. 1 shows a side view of an embodiment of a bed according to the present invention,

Fig. 2 shows a perspective view of the bed of Fig. 1, without a transversal frame,

Fig. 3 shows a perspective view of the bed of Fig. 1, with the transversal frame,

Fig. 4 shows a detailed view of the connection of one transversal frame with a first longitudinal rail,

Fig. 5 shows a perspective view of a mattress extension frame,

Fig. 6 show a detailed view in cross-section of the telescopic mattress side rail to be used with the present bed,

Fig. 7 show an extendable side guard,

DETAILED DESCRIPTION OF THE INVENTION

[0016] The embodiment of the present invention shown in the drawings is a bed having a length and a width. Said bed comprises two first longitudinal rails 10 comprising on their ends first attachment means 32; telescopic mattress side rails 18 comprising on their ends third attachment means 64; two transversal frames 20 adapted to be resting on a plane surface, comprising second attachment means 34 that releasably interfaces the first attachment means 32, and fourth attachment means 66 that releasably interfaces the third attachment means 64, wherein said second attachment means 34 and respective said fourth attachment means 66 are arranged vertically over each other for permitting the positioning of said two first longitudinal rails and respective said telescopic mattress side rails at different heights in relation to said plane surface; first transversal rails being transversally connected to said longitudinal rails; a mattress frame 65 resting on said first transversal rails (not shown); a mattress extension frame 60 comprising two second longitudinal rails 62 and second transversal rails 63, wherein each second longitudinal rails comprises first attachment means 32 that releasably interfaces the second attachment means of one of the transversal frames, and second attachment means 34 that releasably interfaces the first attachment means 32 of each first longitudinal rail for extending the length of the bed.

[0017] As shown in Fig 3, each transversal frame 20 comprises a floor rail 22 and a U-shaped frame having a horizontal part 24 and two vertical parts 14 and at least one vertical rail 28 connecting said floor rail 22 and said

U-shaped frame. The floor frame 22 comprises a pair of caster 26 for rolling the bed on the plane surface and the at least one vertical rail 28 is telescopically arranged. Also an actuator 30 is connected to said floor rail 22 and to said horizontal part of the U-shaped frame 24. The at least one telescopic vertical rail 28 comprises acting guide tubes and in order to reduce the friction between the inner and the outer guide tubes, bushings are arranged, making the movement smooth and silent when the bed is raised or lowered by the actuators 30.

[0018] A shown in Fig.2, the first attachment means 32 comprises hook means and locking means for locking said first attachment means to said second attachment means wherein said locking means comprises a lever 44 arranged such that it is moved into a locking position by gravity. The second attachment means 34 comprises a plurality of cross pins 38.

[0019] The mattress frame 65 comprises a head section, a seat section, and at least one leg section connected to each other in an articulated manner, wherein the head section and the at least one leg section are operated by a respective actuator 16.

[0020] The hook means comprises an upper hook 36 mating with a first cross pin and a lower hook 40 mating with a second cross pin. The lever 44 is pivotally arranged adjacent the lower hook such that when the lower hook engages the second cross pin, the lever is moved by the gravitational force so that the second hook is prevented from leaving the second cross pin. When the first attachment means are to be disconnected from the second attachment means, the lever is manually moved upwards, thereby freeing the lower hook from the second cross pin. As seen from Fig. 4, the cross pins 38 are arranged vertically over each for providing flexibility in adjusting the bed depending on the length of the patient and/or caregiver.

[0021] As mentioned the mattress frame 65 is arranged with a number of articulated sections for enabling different positions of a patient, such as upraised back, lifting of legs, knee-bending, etc. These sections are operated by the actuators 16. The seat section is resting on two first transversal rails, the head section is pivoted arranged to one first transversal rail and the leg section is pivoted arranged to another first transversal rail. The actuators 16 could be electrically driven and capable of performing linear movement of a piston rod, which in turn acts on a section to pivot the first transversal rails around an articulation point, to which the head section and the at least one leg section are connected to.

[0022] Figure 5 shows the further versatility and flexibility of the beds according to the present invention. There it is shown mattress extension frame 60 that is used for extending the length of the bed. As seen, one end of said second longitudinal rails 62 is arranged with the same type of hook means and locking means as the first longitudinal rails 10. The other end of the second longitudinal rails 62 is arranged with the same type of second attachment means 34 as the transversal frames 20. The two

second longitudinal rails 62 are connected by second transversal rails 63, Thus if a bed needs to be extended due to a long patient, one transversal end of the mattress extension frame is connected to one transversal frame by engaging the its hook means with the cross pins of the transversal frame, whereby the lever locks the parts. The cross pins of the other transversal end of the mattress extension frame is then connected to hook means of the first longitudinal rails 10, whereby the lever locks the parts

[0023] When the bed is extended it is an advantage that the telescopic mattress side rails 18 could still be used. Moreover, with this type of bed, mattresses of different thickness are frequently used, such as for example air-mattresses that can be quite thick. In order to have a proper protection from the side rails, the telescopic mattress side rails can be attached at different heights in relation to the plane surface extension. At least one telescopic mattress side rail may be used for protecting the mattress from displacing transversally in relation to the bed, and at least one additional telescopic mattress side rail may be used for protecting a patient against falling off the bed.

[0024] As seen in Fig. 6, the telescopic mattress side rails comprise third attachment means 64 that releasably interfaces with the fourth attachment means 66 of the transversal frames. The third attachment means 64 is in turn attached to two tubes 68. These tubes fit into outer tubes 70, extending along the length of the telescopic mattress side rails. The tubes 68 are prevented of being released from the outer tubes 70 by an attachment piece 72 connected to the third attachment means 64, and that interfaces with a pin 74 positioned on the inner surface of the telescopic mattress side rails.

[0025] Figure 7 further shows the flexibility of the bed according to the present invention. The figures show another type of telescopic mattress side rails 19 having attachment brackets 76 designed to be releasably attached to the first longitudinal rails 10. On the brackets 76, posts 78 are attached and then horizontal support tubes 80 are arranged between the posts, forming the protection for the mattress from displacing transversally in relation to the bed, and for protecting a patient against falling off the bed. These tubes 80 fit into outer tubes, extending along the length of the side rails, in a telescopic manner.

[0026] The floor rail 22 could be arranged with hooks or hangers for holding a transport stand or the mattress extension frame 60 of the bed when the stand or the mattress extension frame 60 is not in use. Thereby the personnel always knows where they are, which otherwise are very easy to misplace.

[0027] It is to be understood that the embodiments of the invention described above and shown in the drawings are to be regarded only as non-limiting examples of the invention and that it may be modified in many ways within the scope of the patent claims.

Claims

1. Bed having a length and a width and comprising:
 - two first longitudinal rails (10) comprising on their ends first attachment means (32);
 - telescopic mattress side rails (18) comprising on their ends third attachment means (64);
 - two transversal frames adapted to be resting on a plane surface, comprising second attachment means (34) that releasably interfaces the first attachment means (32), and fourth attachment means (66) that releasably interfaces the third attachment means (64), wherein said second attachment means (34) and respective said fourth attachment means (66) are arranged vertically over each other for permitting the positioning of said two first longitudinal rails and respective said telescopic mattress side rails at different heights in relation to said plane surface;
 - first transversal rails being transversally connected to said longitudinal rails;
 - a mattress frame resting on said first transversal rails;
 - a mattress extension frame (60) comprising two second longitudinal rails (62) and second transversal rails, wherein each second longitudinal rails comprises first attachment means (32) that releasably interfaces the second attachment means of one of the transversal frames, and second attachment means (34) that releasably interfaces the first attachment means (32) of each first longitudinal rail for extending the length of the bed.
2. Bed according to claim 1, wherein said first attachment means (32) comprises hook means (36, 40) and locking means for locking said first attachment means to said second attachment means.
3. Bed according to claim 2, wherein said locking means comprises a lever (44) arranged such that it is moved into a locking position by gravity.
4. Bed according to any one of the preceding claims 1-3, wherein said second attachment means (34) comprises a plurality of cross pins.
5. Bed according to any one of the preceding claims 1-4, wherein said telescopic mattress side rails comprise tubular members telescopically arranged inside each other.
6. Bed according to any one of the preceding claims 1-5, wherein each transversal frame comprises a floor rail (22) and a U-shaped frame (24) having a horizontal part and two vertical parts and at least one vertical rail (28) connecting said floor rail (22) and

said U-shaped frame (24).

- 7. Bed according to claim 6, wherein said floor frame comprises a pair of caster (26).

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- 8. Bed according to any one of the preceding claims 6-7, wherein said at least one vertical rail (28) is telescopically arranged and wherein an actuator (20) is connected to said floor rail (22) and to said horizontal part of the U-shaped frame (24).

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- 9. Bed according to any one of the preceding claims 1-8, wherein the mattress frame comprising a head section (10a), a seat section, and at least one leg section (10b, 10c) connected to each other in an articulated manner, wherein the head section and the at least one leg section are operated by a respective actuator (16).

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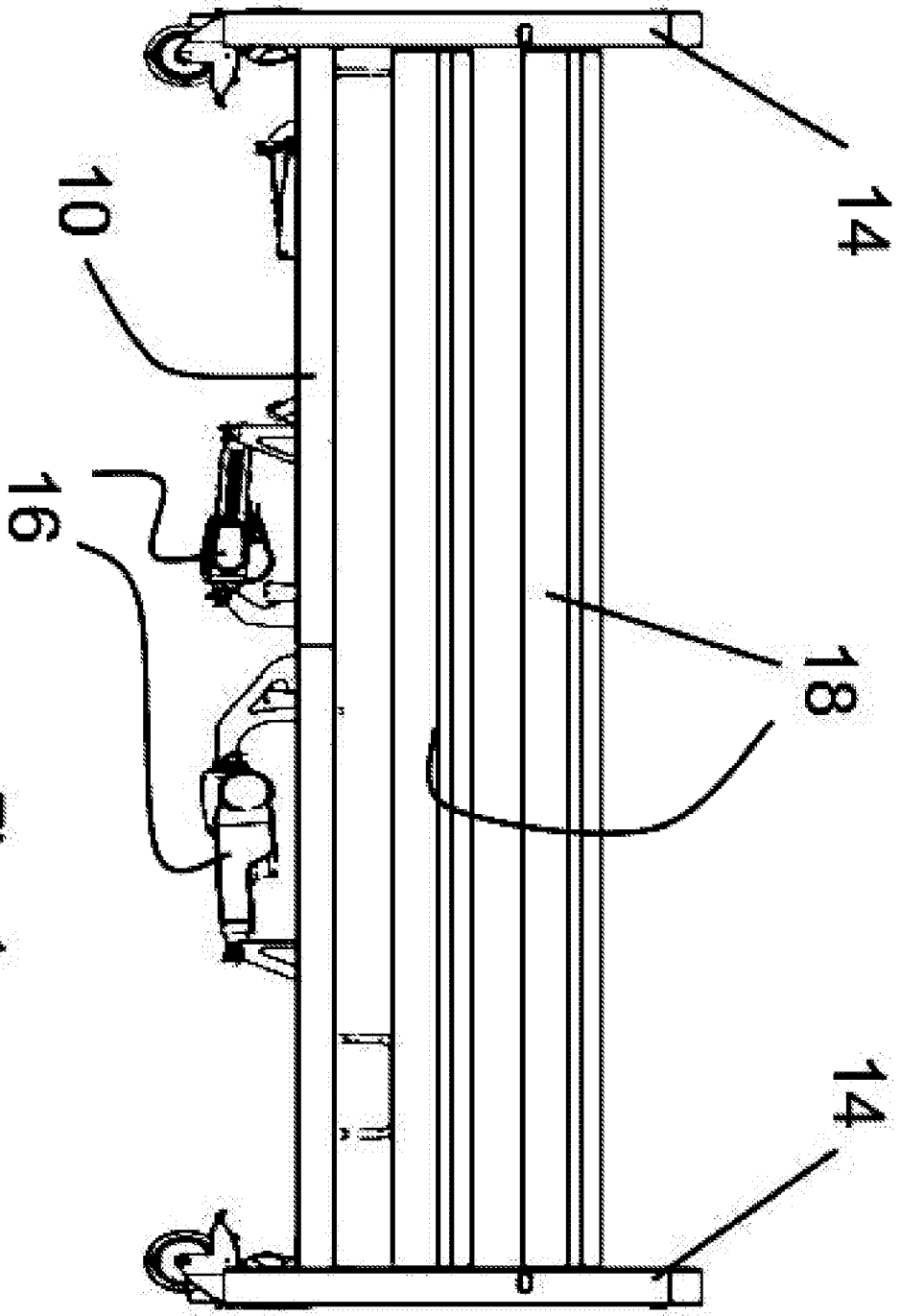


Fig. 1

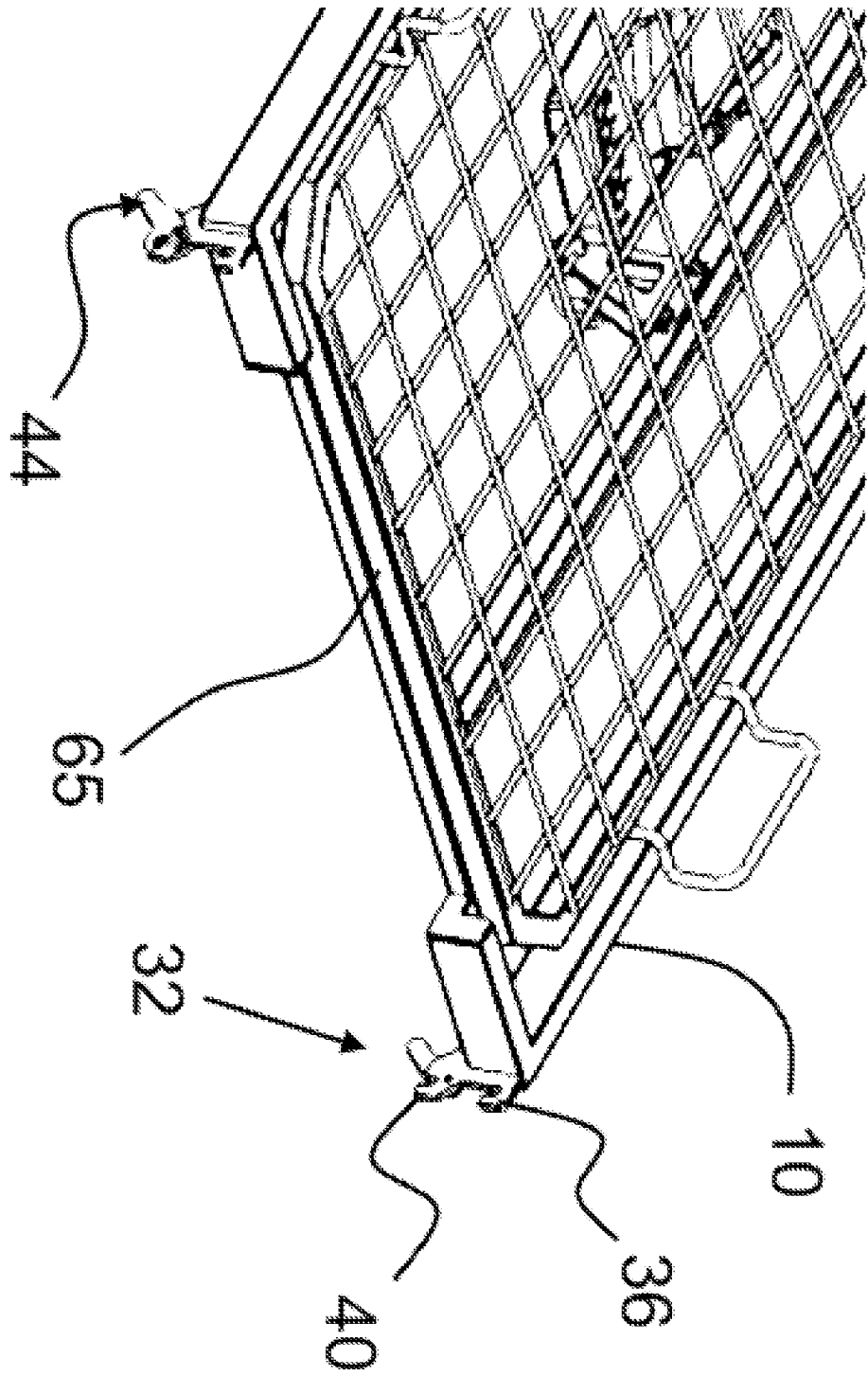


Fig. 2

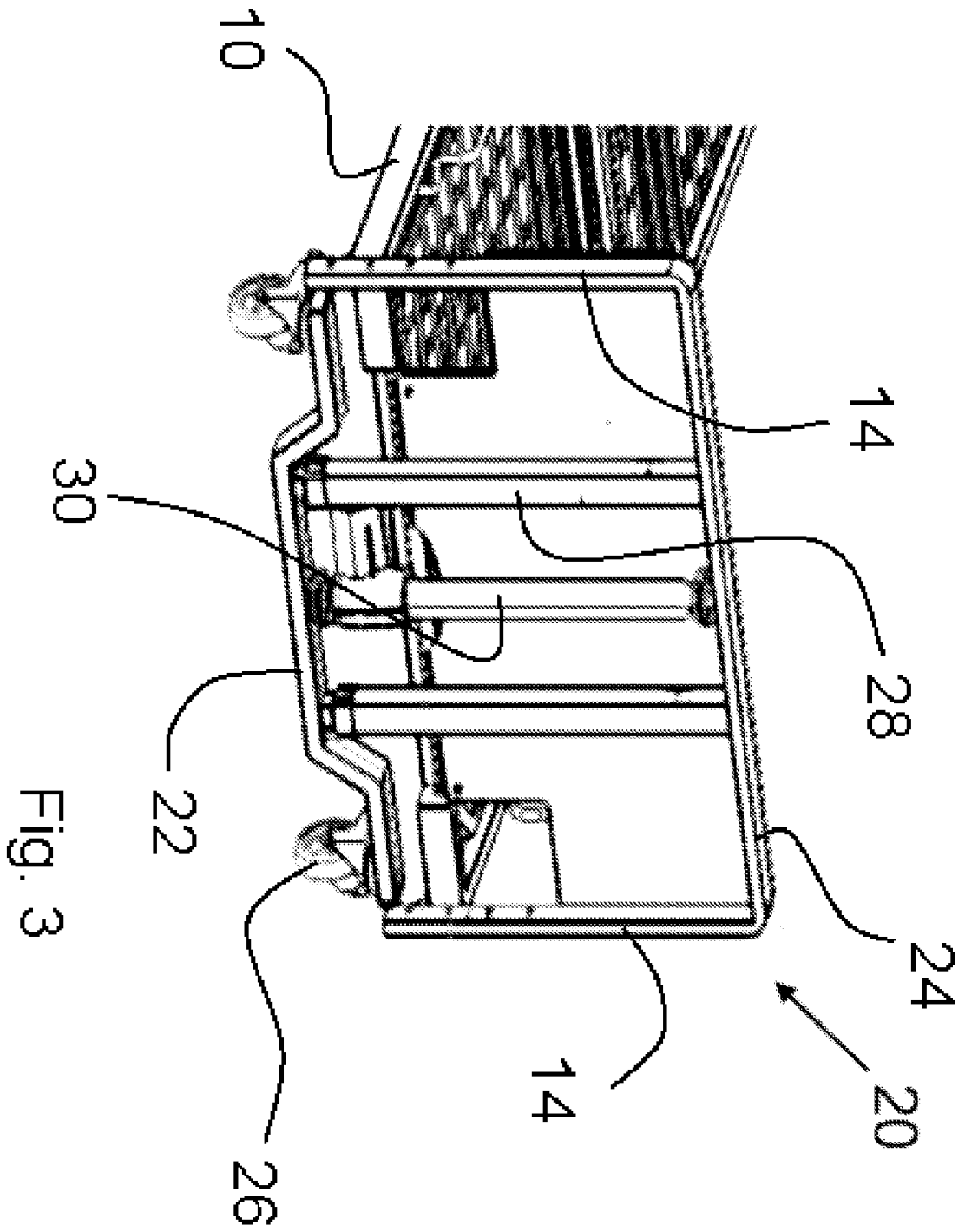


Fig. 3

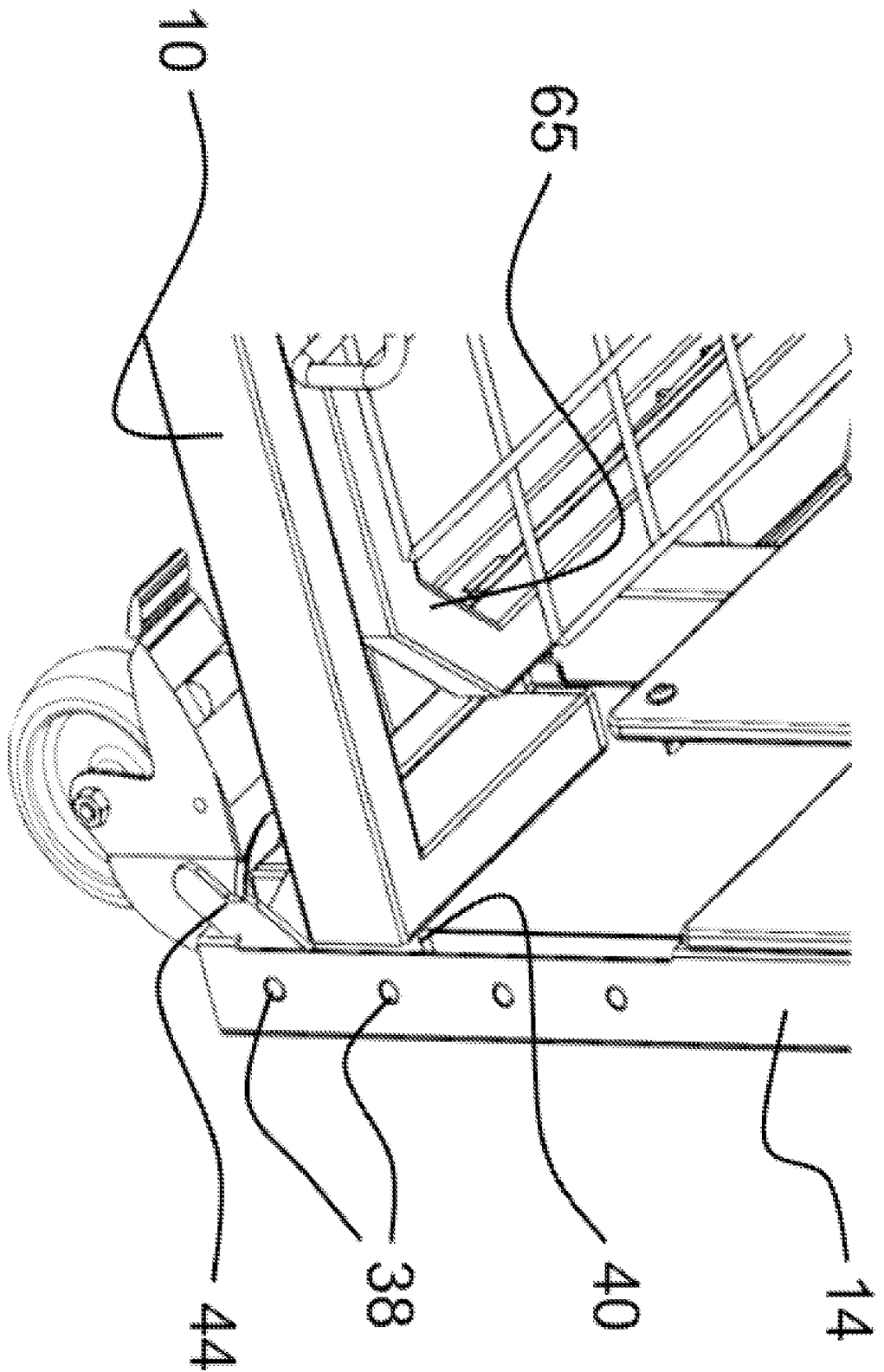


Fig. 4

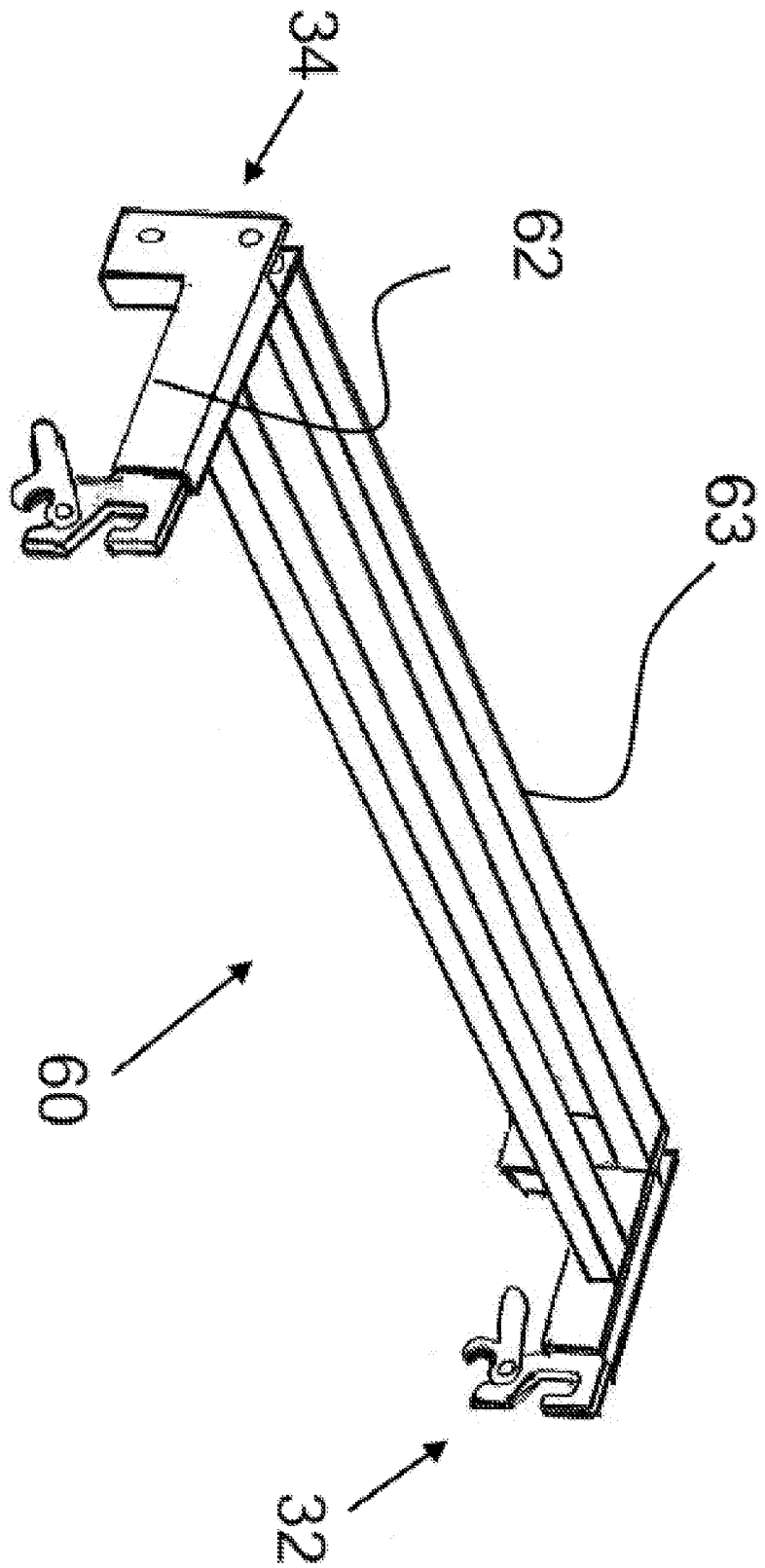


Fig. 5

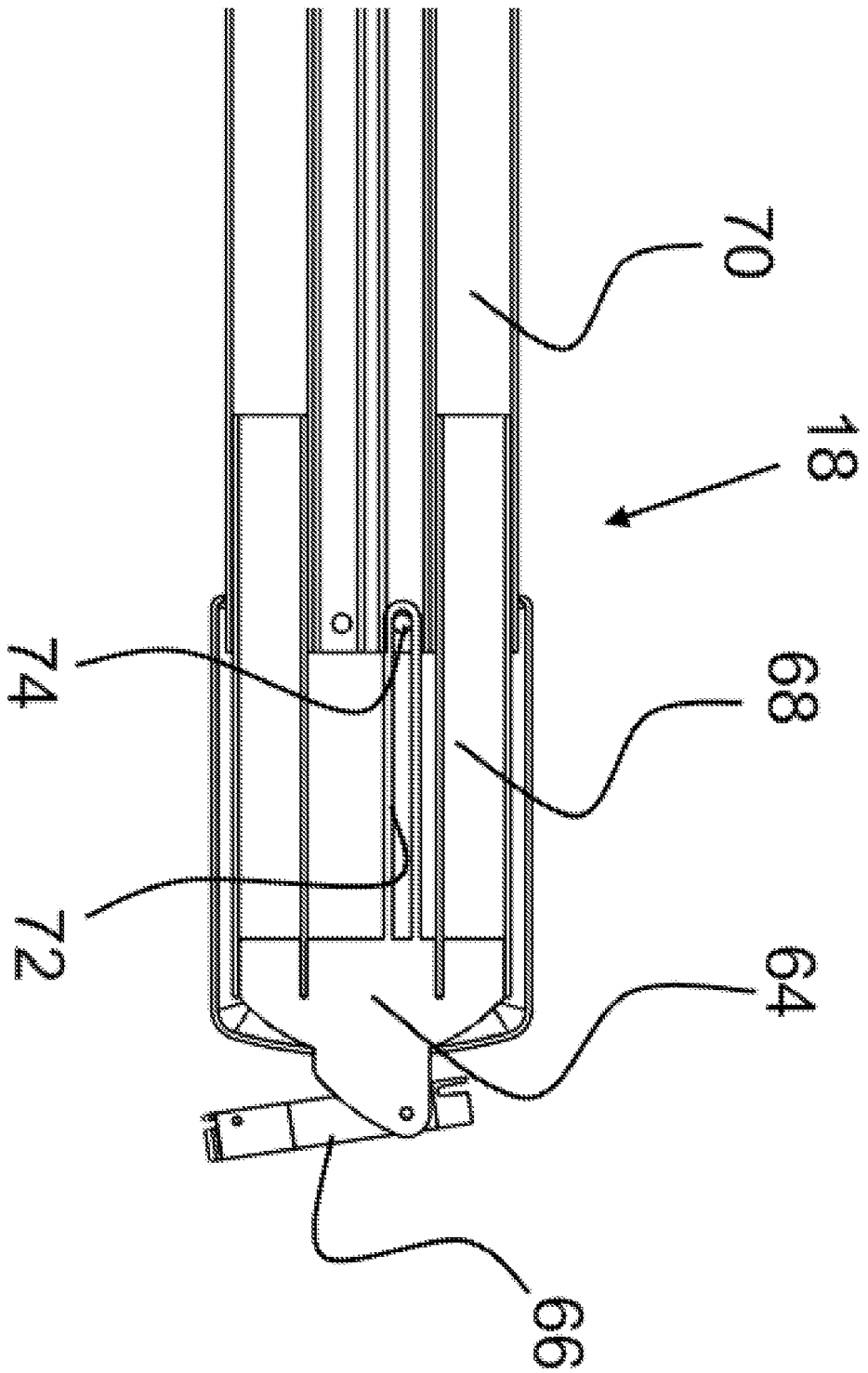


Fig. 6

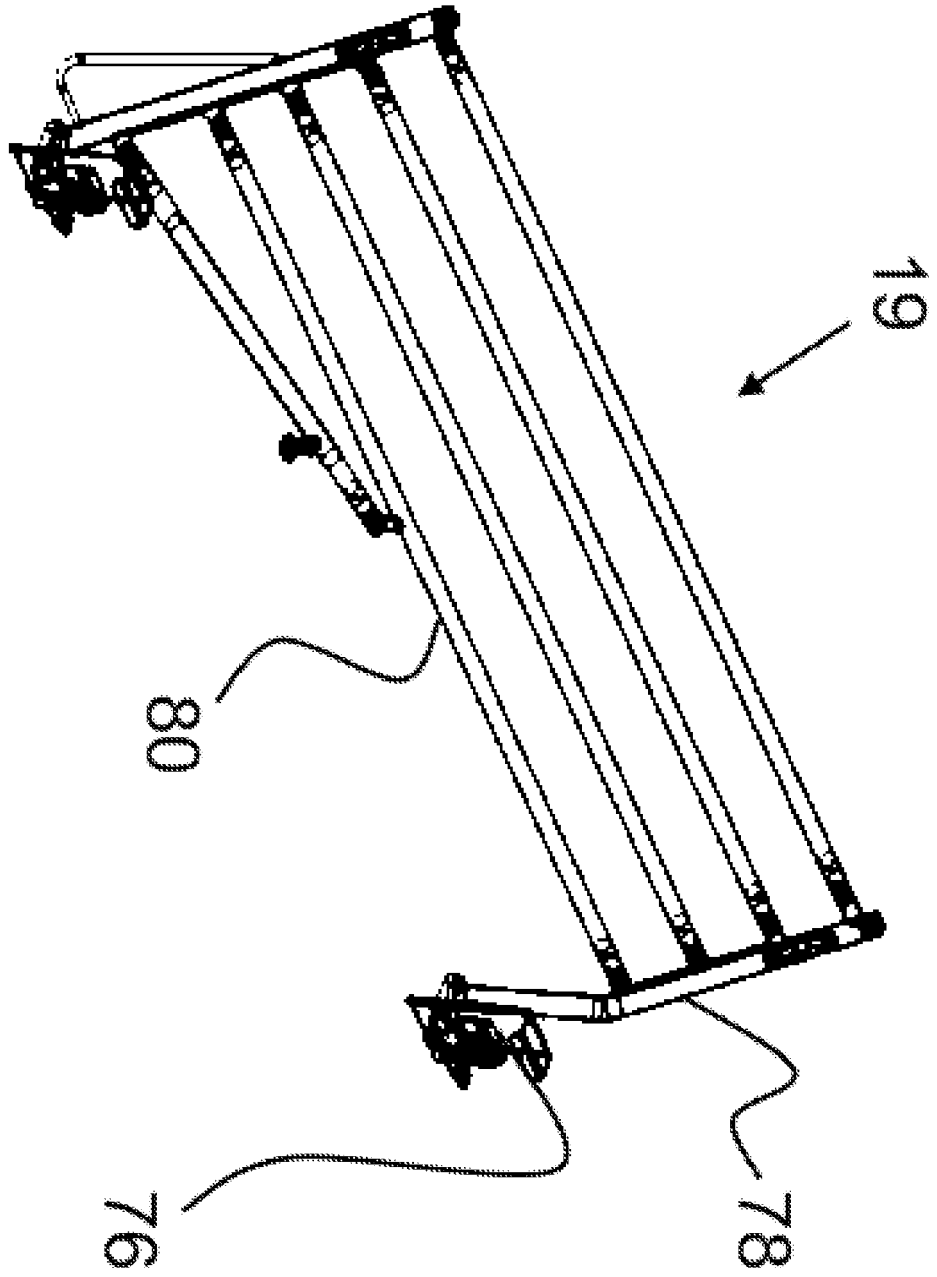


Fig. 7

**ANNEX TO THE EUROPEAN SEARCH REPORT
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