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(54) Accessory attachement system for a bed.

(57) A bed, in particular a hospital bed, comprises a bed frame structure, said bed frame structure being provided with a head side end portion thereof and a foot side end portion thereof, said end portions each comprising a laterally extending end bar (44, 50), each of said end bars (44, 50) being provided for carrying a substantially U-shaped bar (52) and for carrying a panel (54) extending within an area surrounded by said U-shaped bar (52) and said end bar (50), each of said end bars (44, 50) being provided with at least two insert holes (102, 104), having a tapered longitudinal section profile with a taper angle for receiving correspondingly tapered insertion pins (106, 108) being provided on said panel (54), said taper angle being dimensioned so as to enable attachment and detachment of said panel (54) to and from said end bar (50) with said U-shaped bar (52) being carried by said end bar (50).

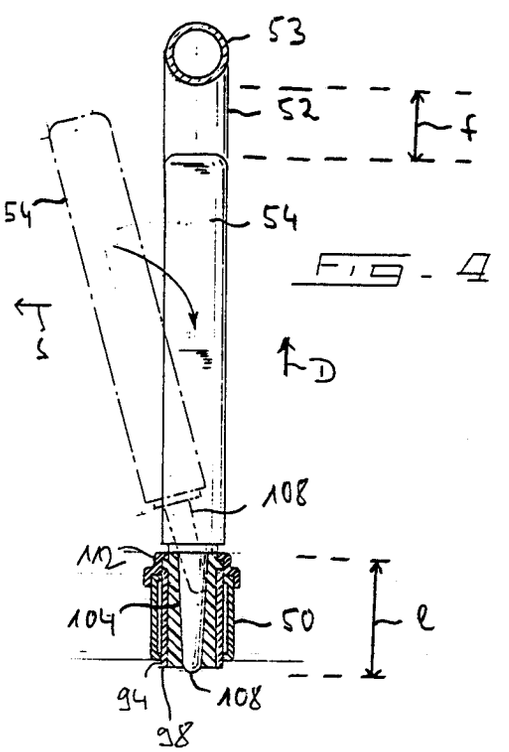

FIG. 4

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The present invention relates to a bed, in particular a hospital bed, comprising a bed frame structure. The bed frame structure is provided with a head side end portion thereof and a foot side end portion thereof, the end portions each comprising a laterally extending end bar. Each of the end bars is provided for carrying a substantially U-shaped bar and for carrying a panel extending within an area surrounded by the U-shaped bar and the end bar.

The U-shaped bar of generally known hospital beds is used for manoeuvering the bed when positioning the same in a hospital room or moving it on the floor. Further, such a U-shaped bar may be used for attaching a plurality of different accessories to the bed. The panels provided on the foot side end portion and the head side end portion serve for defining respective end faces of the bed in order to improve the appearance of the hospital beds and to fasten different accessories to the bed, for example, a table showing a patient's medical history, etc. Additionally, the panels can be used instead of the U-shaped bar for moving the bed. For providing the hospital bed with other accessories the panels may be detached from the bed in order to allow the fixing of other accessories to respective end bars of the bed and to provide free access to the bed from the foot side or the head side.

The panels of known hospital beds are carried by the side legs of portions of the U-shaped bar by means of several carrying studs horizontally projecting from said side leg portions and being engaged by a U-shaped connection part projecting from said panel. Therefore, the panel can be mounted to the bed only in case the U-shaped bar is also mounted to the bed. The carrying studs and connection parts impede effective cleaning and desinfection of the hospital bed and have a negative effect on its outer appearance. In some cases the panel is even fixed to the U-shaped bar so that there is no possibility of removing the panel from the end bar without removing the respective U-shaped bar.

Therefore, it is the object of the invention to provide a bed, in particular a hospital bed, the panel of which may be easily detached from and reattached to an end bar independent of a U-shaped bar being carried by the end bar in order to allow free access to the bed from a head side or a foot side and/or to allow the attachment of further accessories to the end bar.

According to the invention this object is achieved by providing each of the end bars with at least two insert holes having a tapered longitudinal section profile with a taper angle for receiving a correspondingly tapered insertion pin being provided on the panel. The taper angle is dimensioned so as to enable attachment to and detachment of the panel from the end bar with said U-shaped bar being carried by the end bar. With regard to the bed according to the invention, detachment of the panel from the end bar with the U-shaped bar being carried by the end bar may be effected by slightly lifting up the panel and then tilting it with respect to a plane defined by the U-shaped bar and then be further lifted until the insertion pins are withdrawn from the respective insert holes. Therefore, it is easily possible to detach the panel from the respective end bar without interfering with the U-shaped bar carried by the end bar. For reattaching the panel to the end bar, the tapered insertion pins are inserted into the respective insert holes with the panel being inclined with respect to the plane defined by the U-shaped bar, and the panel is lowered until the tapered surface of the insertion pins completely abuts against the correspondingly tapered surface of the insert holes. By doing so, the panel automatically comes into its rest position in which it is completely arranged within the area surrounded by the U-shaped bar and the end bar. Since, according to the invention, the panel is directly mounted to the end bar, the U-shaped bar does not necessarily have to be attached to the bed. Further, the insertion pins of the mounted panel are completely housed within the insert holes thus improving the outer appearance of the bed.

The end frame structure may comprise a lower support structure, being provided with ground wheels, a height and/or inclination adjustable support frame being supported by the lower support structure and carrying a mattress, at least one of the end bars being mounted to the lower support structure. Therefore, the end bar has a substantially constant distance to the floor and the lower support structure. This is particularly advantageous when the panel is to be removed in order to provide space for, e.g., a plurality of pipes, etc., connecting a medical device, also standing on the floor, with a patient lying on the bed.

Further, at least one of the end bars may be mounted to the support frame. This at least one panel may be the foot side end panel, which secures that in case the support frame is arranged such that the foot side end portion thereof is in a very low position and the head side end portion thereof is in a lifted position, the patient or elements being disposed on the bed are prevented from falling out of the bed at the foot side end of the bed. Further, it is possible to attach, for example, a leg treatment pole to the foot side end bar which follows the movement of the support frame.

For ensuring a particular stable configuration, the U-shaped bar may be fixedly mounted to the respective end bar.

Alternatively, the end bars may be provided with insert holes for removably receiving end por-

tions of the U-shaped bar. With this configuration the U-shaped bar may also be detached from the respective end bar, thereby guaranteeing completely free access from the respective end side of the bed, with the possibility of attaching a plurality of different accessories with the respective panel being in place.

The present invention further relates to an accessory attachment system for a bed, in particular a hospital bed, comprising a bed frame structure. The bed frame structure is provided in a head side end portion thereof and/or a foot side end portion thereof with at least one insert hole for inserting accessories, particularly a U-shaped bar, a pole for carrying infusion liquid containers, etc. At least one of the insert holes is of non-cylindrical cross-sectional shape.

The accessory attachment system of the present invention allows attachment of different accessories to the bed, whereby the different accessories may be adapted to different specific requirements. A pole for carrying infusion liquid containers, for example, may be attached to the bed, whereby the specific non-cylindrical cross-sectional form prevents the pole from rotating about a longitudinal axis of the respective insert hole. Thus, the pole is carried by the bed without the risk of changing its position with respect to the bed, thereby eliminating the risk that upon a swinging movement of the pole an infusion needle connected to an infusion liquid container carried by the pole by an infusion pipe may be pulled out of an arm of a patient lying on the bed.

The insert holes of the accessory attachment system of the present invention, however, allow attachment of a plurality of different accessories, and, therefore, obviate providing a plurality of different insert holes.

Preferably, the bed frame comprises a head side end bar and/or a foot side end bar, whereby the head side end bar and/or the foot side end bar are provided with at least one insert hole. In this case, all the accessories are attached to the bed at the end sides thereof without obstructing lateral access to the bed.

In case two of the insert holes are provided in respective lateral end portions of the head side end bar and/or the foot side end bar, accessories such as a U-shaped bar, etc., may be easily attached to the bed.

If a hollow cylindrical member with a longitudinal axis is provided at each lateral end portion of the head side end bar and/or the foot side end bar, and if an insert bushing is inserted into each of the hollow cylindrical members, each of the insert bushings being provided with one of the insert holes, respectively, the insert holes having a specific cross-sectional area may be easily provided in the respective end bars. As the end bars are generally made of metall a complicated manufacturing procedure for providing the insert holes with a specific non-cylindrical cross-sectional area may be avoided.

For fixing the insert bushing within the hollow cylindrical member, it is proposed that the insert bushing has a cross-sectional diameter slightly larger than the inside diameter of the hollow cylindrical member, and that an outer circumferential surface of the insert bushing is provided with a plurality of ribs extending substantially parallel to the longitudinal axis of the head side end portion. Therefore, by inserting the insert bushing into the hollow cylindrical member, the ribs may be deformed, thereby providing a press fitting of the insert bushing within the head side end portion without necessitating any further fastening means for the insert bushing.

For guaranteeing an easy deformation of the ribs it is proposed that the ribs are in the form of teeth.

The hollow cylindrical members may be provided with at least one recess for engagement with a projection on the insert bushing for preventing rotation of the insert bushing within the cylindrical member. Thereby, an accessory inserted into the insert bushing is prevented from rotating if a rotational force acts upon the accessory.

In order to prevent the respective accessory inserted into the insert hole from dropping too deep into the hole, it is proposed that the insert bushing is provided with an end wall of the insert hole for providing an abutment surface for the accessory inserted into the insert hole.

Further, the bushing may be provided with a fastening portion for fastening a shock-absorbing member, particularly an abutment wheel with a vertically extending wheel axle. These wheels serve as abutment members in case the bed touches a wall or the like when being moved, thereby preventing excessive shocks from being transmitted to the bed and, thus, to a patient lying on the bed.

In order to allow insertion of accessories of different cross-sectional areas, for example, a square-like cross-sectional area for preventing rotation of the accessory within the insert hole, or a circular cross-sectional area, when it is not necessary to prevent such rotation, it is proposed that the insert hole has a cross-sectional area defined by an area of a square and an area of a circle extending beyond the area of the square, the circle having the same centre as the square and having a diameter larger than a length of one of the sides of the square and smaller than a length of a diagonal of the square.

The invention further relates to an accessory attachment system for a bed, in particular a hospital bed, comprising a bed frame with a head side end bar and a foot side end bar. The head side end bar and/or foot side end bar are provided with a plurality of insert holes for inserting accessories, particularly a panel, etc., said insert holes having a tapered longitudinal section profile for receiving correspondingly tapered insertion pins being provided on said accessory.

The accessory attachment system according to this aspect of the invention allows attachment or detachment of a panel or the like to or from a bed, in case other accessories, for example, a U-shaped bar, are attached to the bed or no such accessory is attached to the bed at all. By removing the panel from the bed, the tapered insert holes and the correspondingly tapered insertion pins allow tilting of the panel with respect to a plane defined by the U-shaped bar and subsequent withdrawing of the insertion pins from the insert holes by simply lifting the panel without interference with the U-shaped bar. For attaching the panel to the respective end bar the procedure may be carried out in reverse order without obstruction by the U-shaped bar attached to the bed.

For attaching a panel to the respective end bar it is preferred to provide two insert holes laterally spaced apart in the head side end bar and/or foot side end bar for preventing rotation of the panel with respect to the end bar.

In a preferred embodiment, a plurality of hollow cylindrical members having a longitudinal axis are provided in the head side end bar and/or the foot side end bar, an insert bushing being inserted into each of the hollow cylindrical members, each of the insert bushings being provided with one of the insert holes, respectively. As the end bars are generally formed of substantially rectangular hollow profile members, the provision of insert bushing being provided with insert openings, respectively, avoid complicated manufacturing steps for providing respective tapered hole surfaces in the end bars, thus considerably reducing manufacturing costs.

Preferably, the insert bushings are made of plastics material.

As a further aspect, the present invention is directed to a pole for carrying at least one infusion liquid container, etc. The pole comprises an insert portion for insertion into an insert hole, an intermediate portion and a carrier portion for carrying the at least one container, etc. The container portion is offset with respect to the insert portion such that when the insert portion is inserted into the insert hole, the carrier portion and the at least one container, etc., carried by the container portion completely extend within a foot print of the bed.

The pole of the present invention ensures that a hospital bed provided with such a pole may be placed with each of its outer circumferential edges directly adjacent to a wall or the like, without the risk of interfering with parts of the pole or parts carried by the pole. As a first aspect, this allows space-saving positioning of hospital beds in a hospital room. As a second aspect, this avoids the risk of damaging the pole or members carried by the pole when the bed touches a wall.

In a preferred embodiment the intermediate portion comprises a first vertical portion connected with a lower end thereof to the insert portion, and an inclined portion connected with a lower end thereof to an upper end of the first vertical portion and carrying at its upper end the carrier portion. This configuration of the pole ensures that the carrier portion of the pole may completely extend within the foot print of the bed and that, due to the provision of the first vertical portion, there is always sufficient space between the carrier portion of the pole and the patient lying on the bed, even when the bed is lifted up to its maximum.

The carrier portion may comprise a second vertical portion connected with a lower end thereof to the upper end of the inclined portion and being provided with carrier means at its upper end for carrying the at least one container. This secures a sufficiently free space between the container, etc., and the patient lying on the bed, even when disposing containers, etc., of large dimensions on the pole.

In order to prevent a swinging movement of the pole about a longitudinal axis of the first vertical portion it is proposed that the insert portion has a cross-sectional area which at least in a section thereof is non-cylindrical, for insertion into an insert hole having a corresponding cross-sectional area.

In some cases, however, it may be desired that the pole is rotatable about the longitudinal axis of the first vertical portion. In this case, it is preferred that the insert portion has a cylindrical cross-sectional area.

In order to enable adjustment of the height of the pole and/or the position of the carrier portion above the bed, it is proposed that the first vertical portion and/or the inclined portion are variable in length. Additionally, the second vertical portion may be variable in length.

In the following, preferred embodiments of the invention will be described to the appending drawings in which

- fig. 1 is a perspective side view of a hospital bed according to the present invention;
- fig. 2 is a perspective view of an end bar of the hospital bed according to the present invention provided with the accessory attachment system according

to the present invention;

fig. 3 is a sectional view taken along a line III-III in fig. 2;

fig. 4 is a sectional side view of the end bar, the U-shaped bar and the panel taken along a line IV-IV in figure 3, showing the way of attaching the panel to or detaching it from the end bar;

fig. 5 is a view of the panel and the end bar in fig. 4 in direction V;

fig. 6 is a diagrammatic representation of the bed of fig. 1, showing an end portion thereof with an end bar and a pole being inserted into one of the insert holes;

fig. 7 is a side view of a pole for carrying infusion liquid containers, etc.; and

fig. 8 is a side view of an embodiment of an insertion portion of the pole of fig. 7.

In figure 1 a hospital bed is generally denoted by 10. The hospital bed comprises a lower support structure 12 with ground wheels 14 for easily moving the bed 10 on the floor. A support frame 16 is height adjustably and inclination adjustably supported by said lower support structure 12 via respective pairs of support arms 18 and 20. Each of the support arms 18, 20 comprises two arm parts 22, 24, 26, 28, being articulated to each other with one end portion thereof and articulated to the lower support structure (arm portions 22, 26) and to the support frame 16 (arm portions 24, 28) with another end thereof, respectively. The height and/or the inclination of the support frame 16 with respect to the lower support structure 12 may be adjusted by a known device, e.g., a cylinder piston device, which is not illustrated in the figure.

The support frame 16 carries a bed frame 30 constituted of a plurality of bed frame parts. These bed frame parts comprise a bed frame part 32 supporting the upper body of a patient lying on a bed, a bed frame part 34 for supporting a patient's hip, a bed frame part 36 for supporting a patient's the upper leg portion (thigh portion) and a bed frame part 38 for supporting a patient's lower leg portion. Bed frame parts 32 and 36 are articulated with one end portion to the support frame 16, respectively, so as to enable adjustment of inclination of these bed frame parts 32, 36 with respect to support frame 16. Additionally, the articulated end portion of the frame part 32 is linearly movable in a longitudinal direction of the support frame 16 upon swinging movement of the frame part 32. Thereby the lying or sitting position of the patient may be adjusted. The lower leg supporting bed frame part 38 is articulated with one end thereof to another end of the upper leg supporting bed frame part 36 so as to enable adjustment of the knee inclination angle of the patient. The inclination of the various articulated bed frame parts may be adjusted by any known devices, such as a cylinder piston device, a threaded rod and an electric motor, etc. (not illustrated in the figures).

Further, the bed frame parts 32 and 38 carry side rail members 40 and 42 in order to prevent the patient from falling out of bed and also to assist the ingress or egress of the patient to and from the bed. The side rail members 40 and 42 are swingably mounted to the respective bed frame parts 32 and 38 so as to be swingable between a working position (illustrated in fig. 1) in which the side rail members 40 and 42 prevent the patient from falling out and also prevent lateral access to the bed, and a rest position (not illustrated in fig. 1), in which the side rail members 40, 42 are swung towards the ground in order to enable lateral access to the bed.

As further shown in fig. 1, a plurality of holding devices 61 is mounted to the bed frame parts 32, 36, 38. These holding devices 61 serve for supporting respective mattress supporting panel parts 62, 65, 69 with respect to the respective bed frame parts 32, 36 and 38. The mattress supporting panel parts, in turn, carry a mattress (not illustrated in fig. 1).

The holding devices 61 further serve for laterally fixing the mattress 70 represented in fig. 3 by broken lines with respect to the respective bed frame part (bed frame part 38 in figs. 2 and 3).

The bed further comprises a head side end bar 44 being connected to the lower support structure 12 by mounting rods 46, 48. A foot side end bar 50 is directly fixed to the support frame 16. The head side end bar 44 and the foot side end bar 50 are arranged with respect to a longitudinal axis of the bed 10 so as to extend substantially perpendicularly in a lateral direction with respect to the longitudinal axis at the respective head side end and foot side end of the bed 10.

The head side end bar 44 and foot side end bar 50 serve for carrying a plurality of different accessories. As shown in figure 1 these accessories may comprise a substantially U-shaped bar 52 and a foot side panel 54 being carried by the foot side end bar 50, and a head side panel 56, a pole 58 for carrying containers for infusion liquid, etc., a patient helper 60 carrying a grip (not illustrated in fig. 1) for helping the patient lying in the bed change his position in the bed. Of course, a plurality of further accessories not illustrated in the figures may be carried by the respective end bars 44, 50, and it is also possible to attach the pole 58, for example, to the foot side end bar 50 and to attach a substantially U-shaped bar 52 to the head side end bar 44, in case the patient helper 60 is not necessary.

In figures 2 and 3, the foot side end bar 50 is shown in detail. These figures in particular show

the different insert holes for attaching different accessories to the respective end bars.

The foot side end bar 50 is formed of a substantially rectangular hollow profile member, which preferably is made of metall. The end bar 50 is fixedly mounted to respective frame bars 62, 64 of the support frame 16 by welding or the like. At each of the lateral ends 66, 68 of the end bar 50 a hollow cylindrical member 70, 72 is fixed to the end bar 50 by welding or the like.

An insert bushing 74, 78 is inserted into each of the hollow cylindrical members 70, 72. As can be seen with respect to the insert bushing 74, which is shown in a position immediately before being inserted into the hollow cylindrical member 70. The insert bushing 74 has a substantially cylindrical cross-sectional area with ribs 76 being formed of an outer circumferential surface of the bushing 74. As the outer diameter of the cross-sectional area of bushing 74 is selected such as to be slightly larger than an inside diameter of the head side end bars, the ribs 76 are deformed upon inserting the bushing 74 into the head side end bar, thereby providing a press fitting of the insert bushing 74 within the hollow cylindrical member 70.

The insert bushing 74 further comprises a projection 79 on its outer circumferential surface which, upon inserting the insert bushing into the hollow cylindrical member 70, engages a recess 81 in the wall of the hollow cylindrical member 70 for preventing rotation of the insert bushing 74 within the hollow cylindrical member 70.

Further, the insert bushing 74 comprises a fastening portion 80, which may be of metall or the like, and which serves for fastening an abutment wheel 82 by to the insert bushing 74 and, therefore, to the end bar 50. The abutment wheel 82 is fixed to the fastening portion 80 by means of a washer 85 and a snap ring 87 engaging an annular recess 89 in the surface of the fastening portion 80. The fastening portion 80 further is provided with a through hole 91 extending substantially parallel to the axis 90 for allowing drainage of the respective bushing when cleaning the bed 10. The abutment wheel 82 serves for preventing shocks from being transmitted to the bed and to the patient in case the bed abuts against the wall upon movement of the bed. The abutment wheel 82, in particular, is carried rotatably about a longitudinal axis of the hollow cylindrical member 70.

For attaching the different accessories to the end bar, the bushings 74 and 78 are provided with insert holes 88 and 90, respectively. The insert holes 88, 90 extend parallel to the longitudinal axis 86. As can be seen from figure 3, the insert bushings 74, 78 further are provided with an end wall 92, constituting an end wall of the respective openings 88, 90 and also carrying the fastening portion 80 for the respective abutment wheels 82. The end wall 92 serves as an abutment wall for an accessory inserted into the opening 90.

As can be seen in figure 2, the openings 88, 90 are provided with a cross-sectional area which at least in a section thereof is non-cylindrical. In particular, the cross-sectional area is defined by an area of a square and an area of a circle extending beyond the area of the square, whereby the circle has the same centre as the square and has a diameter larger than the length of one of the sides of the square and smaller than a length of a diagonal of the square. This particular cross-sectional area allows insertion of accessories having different cross-sectional areas of their respective insert portions. In case the insert portions are provided with a substantially square-like cross-sectional area, the respective accessory being provided with such an insert portion is fixed within the insert bushing 78 against rotation about the longitudinal axis 86. This has the particular advantage that accessories such as the pole 58 mentioned before or the patient helper 60 are always held in a predetermined position with respect to the bed 10 and without the risk of a lateral swinging movement of the respective accessories.

For insertion of the substantially U-shaped bar 52, which, due to lower manufacturing costs is preferably made of a hollow cylindrical profile material, the insert openings 88, 90 are provided with circular sections. Therefore also an accessory having a substantially circular cross section as the U-shaped bar 52 may be inserted into the holes 88, 90. Fixing the U-shaped bar 52 against lateral rotation is not necessary since the U-shaped bar 52 is fixed to the end bar 50 at two laterally spaced positions upon insertion in the respective insert holes 88, 90.

As can be seen in figures 2, 3 and 4, the end bar 50 is provided with further hollow cylindrical members 94, each of the hollow cylindrical members 94 receiving a further insert bushing 96, 98. The hollow cylindrical members 94 are disposed on the end bar 50 at respective positions between the lateral ends 66, 68 of the end bar 50 and have a longitudinal axis 100 which extends substantially parallel to the longitudinal axis 86 of the hollow cylindrical members 70, 72. The hollow cylindrical members 94 are inserted into holes provided in the walls of the end bar 50 and may be fastened to the end bar 50 by welding or the like. Each of the insert bushings 96, 98 is provided with an insert hole 102, 104 for insertion of respective insertion pins 106, 108 being provided at the lower end of the panel 54 (cf. figs. 4 and 5).

As can best be seen in figures 3 and 4, each of the insert holes 102, 104 has a tapered longitudinal

section profile, and each of the insertion pins 106, 108 has a correspondingly tapered longitudinal section profile. As can be seen in figure 4, this tapered longitudinal section profile of the insert openings 102, 104 and the insertion pins 106, 108 allows easy attachment or detachment of the panel 54 even if U-shaped bar 52 is attached to the end bar 50. For example, for detaching the panel 54 from the end bar 50, the panel 54, which, in its mounting position, is substantially housed in an area surrounded by the end bar 50 and the U-shaped bar 52, has to be lifted up in a direction D and then be tilted to one of the sides (side S in figure 4) for further lifting the panel 54 above an upper portion 53 of the U-shaped bar 52 without being obstructed by the U-shaped bar 52. For this reason, the taper angle of the openings 104, 102 and the correspondingly tapered insertion pins 106, 108 has to be dimensioned in accordance with the length l of the insertion pins 106, 108 so as to allow tilting of the panel 54 in direction S to such an extent that a further lifting movement of the panel 54 is not obstructed by the U-shaped bar 52. As can be seen in fig. 4, the length l of the insertion pins 106, 108 may be greater than free distance f between the mounted panel 54 and the upper portion 53 of the U-shaped bar 52, thus ensuring a secure attachment of the panel 54 with only a small free space between panel 54 and the upper portion 53 of U-shaped bar 52 and for ensuring a smooth upper surface of the end bar 50.
For attaching the panel 54 to the end bar 50 the same procedure has to be carried out in reverse order.

An upper surface 110 of the end bar 50 is covered by a cover member 112 which is provided with openings 114, 116 corresponding to the respective insert openings 90, 104 of the insert bushings. The cover member 112 serves for additionally fixing the various insert bushings against detachment from the end bar 50. In particular, the cover member 112 is fixed to the end bar 50 by screws 118 (fig. 3) which also extend through a hole provided in a fastening portion 120 provided on the insert bushings 96, 98 for additionally fixing the bushings 96, 98 to the end bar 50. The cover member 112 further improves the appearance and cleaning of the end bar 50.

It is evident that the head side end bar 54 is substantially of the same structure as the foot side end bar 50 so that a detailed description of the structure of the head side end bar 44 is omitted here.

As described before and as can be seen in fig. 1, the head side end bar 44 is fixedly mounted to the lower support structure 12, whereas the foot side end bar 50 is fixedly mounted to the support frame 16. This has the advantage that the foot side end bar 50 with the foot side panel 54 and the U-shaped bar 52 is moved together with the support frame 16, if the height or the inclination of the support frame 16 is adjusted. Therefore, the foot side panel 54 always provides an abutment wall at the foot side end of the bed 10, irrespective of the inclination or the height position of the support frame 16 and, therefore, prevents elements positioned on the bed from falling out of bed in case the support frame 16 is inclined to a high extent.

The head side end bar 44, however, always remains in a fixed position with respect to the lower support structure and, thus, to the floor. Accessories such as the pole 58 can therefore be mounted to the bed 10 via the head side end bar 44 without being inclined when adjusting the inclination of the support frame 16, which is a necessary feature if liquid containers, etc., are carried by the pole 58.

The end bars 44, 50, however, may be mounted to different structural members of the bed 10 in case requirements differing from the requirements mentioned above.

As can be seen in fig. 5, the panel 54 may be provided with grip portions 122, 124 for allowing manoeuvering of the bed 10 even if no U-shaped bar is attached to the respective end bars.

Figures 6 to 8 show a specific preferred embodiment of the pole 58. As can best be seen in fig. 7, the pole 58 comprises an insert portion 126 which is of a substantially square-like cross section for inserting the same into an insert hole as, for example, shown in figure 2. As mentioned before, this square-like cross-sectional area of the insert portion 126 prevents the pole 58 from rotating within the respective insert bushing. At an upper end 128 of the insert portion 126 a first vertical portion 130 of the pole 58 is inserted into the insert portion 126 and is fixed with respect to the insert portion 126 by a fixing means 132 of a generally known kind, for example, by using a clamping screw. The fixing means 132, in particular, allows fixing of the first vertical portion 130 with respect to the insert portion 126 in different high positions so as to adjust the vertical extension of the pole 58. At an upper end 134 of the first vertical portion an inclined portion 136 is connected with a lower end 138 thereof to the first vertical portion 130. An upper end 140 of the inclined portion 136 is connected to a lower end 142 of a second vertical portion 144. The second vertical portion 144 carries carrying means 148 at its upper end 146. Containers for infusion liquid, etc., may be fastened to the carrier means 148 in a generally known manner.

As can be seen in figures 7 and 6, a carrier portion 150 constituted by the second vertical portion 144 and a carrier means 148 is offset with respect to the insert portion 126 such that in case

the pole 58 is inserted into a respective insert hole, the pole 58 completely extends within a foot print of the bed 10. Therefore, no parts or portions of the pole 58 or containers carried by the pole 58 extend beyond the foot print of the bed 10. The risk of the pole 58 abutting against a wall with a respective forced swinging movement of the pole is eliminated. The hospital beds provided with such a pole may be positioned closely adjacent to a wall even if the wall is provided with a housing 137 for pipes, cables or the like protruding from the wall 139 as indicated by broken lines in fig. 7. This leads to a space-saving positioning of the hospital beds within the hospital rooms.

The insertion portion 126 may also be provided with an end pin 152 at a lower end 154 thereof for allowing the use of the pole 58 according to the invention with other attachment systems already known in the state of the art.

Figure 8 shows a further embodiment of the insert portion 126'. The insert portion 126' is of a substantially circular cross section and, at its lower end 154', is provided with an end member 156' which has a square-like cross-sectional area for insertion into an insert hole as mentioned before.

The hospital bed according to the present invention provides a system for attaching different accessories to the bed for adapting the bed to different requirements. The attachment system is designed such that accessories as, for example, a foot panel or a head panel, may be attached to or detached from the bed even if other accessories such as a U-shaped bar are attached to the bed. This obviates the necessity of detaching a plurality of accessories in case, for example, the head and/or the foot panel have to be attached or detached. The accessory attachment system according to the present invention further provides the possibility of fixing the respective accessories to the bed without the risk of a swinging movement of the accessories, which is particularly advantageous if, for example, a pole for carrying liquid containers or the like is used as an accessory. With the accessory attachment system according to the present invention the hospital bed provided with such an accessory attachment system may be quickly adapted to different requirements without major reconstructions being necessary.

Claims

1. A bed, in particular a hospital bed (10), comprising a bed frame structure, said bed frame structure being provided with a head side end portion thereof and a foot side end portion thereof, said end portions each comprising a laterally extending end bar (44, 50), each of said end bars (44, 50) being provided for carrying a substantially U-shaped bar (52) and for carrying a panel (54) extending within an area surrounded by said U-shaped bar (52) and said end bar (50), each of said end bars (44, 50) being provided with at least two insert holes (102, 104), having a tapered longitudinal section profile with a taper angle for receiving correspondingly tapered insertion pins (106, 108) being provided on said panel (54), said taper angle being dimensioned so as to enable attachment and detachment of said panel (54) to and from said end bar (50) with said U-shaped bar (52) being carried by said end bar (50).

2. A bed according to claim 1, said bed frame structure comprising a lower support structure (12) being provided with ground wheels (14), a height and/or inclination adjustable support frame (16) being supported by said lower support structure (12) and carrying a mattress, at least one (44) of said end bars (44, 50) being mounted to said lower support structure (12).

3. A bed according to claims 1 or 2, said bed frame structure comprising a lower support structure (12) being provided with ground wheels (14), a height and/or inclination adjustable support frame (16) being supported by said support structure (12) and carrying a mattress, at least one (50) of said end bars (44, 50) being mounted to said support frame (16).

4. A bed according to claims 1 to 3, said U-shaped bar being fixedly mounted to the respective end bar.

5. A bed according to claims 1 to 3, at least one (50) of said end bars (44, 50) being provided with insert holes (88, 90), for removably receiving end portions of said U-shaped bar (52).

6. Accessory attachment system for a bed, in particular a hospital bed (10), comprising a bed frame structure, said bed frame structure being provided in a head side end portion thereof and/or a foot side end portion thereof with at least one insert hole (88, 90) for inserting accessories, particularly a U-shaped bar (52), a pole (58) for carrying infusion liquid containers, etc., at least one of said insert holes (88, 90) having a non-cylindrical cross-sectional form.

7. Accessory attachment system according to claim 6, said bed frame structure comprising a head side end bar (44) and a foot side end bar (50), said head side end bar (44) and/or said foot side end bar (50) being provided with at

least one insert hole (88, 90).

8. Accessory attachment system according to claim 7, two of said insert holes (88, 90) being provided in respective lateral end portions (66, 68) of said head side end bar (44) and/or said foot side end bar (50).

9. Accessory attachment system according to claim 8, a hollow cylindrical member (70, 72) with a longitudinal axis (86), being provided at each lateral end portion (66, 68) of said head side end bar (44) and/or said foot side end bar (50), an insert bushing (74, 78) being inserted into each of said hollow cylindrical members (70, 72), each of said insert bushings (74, 78) being provided with one of said insert holes (88, 90), respectively.

10. Accessory attachment system according to claim 9, said insert bushing (74, 78) having a cross-sectional diameter slightly larger than an inside diameter of said hollow cylindrical member (70, 72), an outer circumferential surface of said insert bushing (74, 78) being provided with a plurality of ribs (76) extending substantially parallel to said longitudinal axis (86) of said hollow cylindrical member (70, 72).

11. Accessory attachment system according to claim 10, said ribs (76) being in the form of teeth.

12. Accessory attachment system according to one of claims 9 to 11, said hollow cylindrical members (70, 72) being provided with at least one recess (81) for engagement with a projection (79) on said insert bushing (74, 78) for preventing rotation of said insert bushing (74, 78) within said hollow cylindrical member (70, 72).

13. Accessory attachment system according to one of claims 9 to 12, said insert bushing (74, 78) being provided with an end wall (92) of said insert hole (90) for providing an abutment surface for said accessory inserted into said insert hole (90).

14. Accessory attachment system according to one of claims 9 to 13, said insert bushing (74, 78) being provided with a fastening portion (80) for fastening a shock absorbing member, particularly an abutment wheel (82) with a vertically extending wheel axle.

15. Accessory attachment system according to one of claims 6 to 14, said insert hole (88, 90) having a cross-sectional area defined by an area of a square and an area of a circle extending beyond said area of said square, said circle having the same centre as said square and having a diameter larger than a length of one of said sides of said square and smaller than a length of a diagonal of said square.

16. Accessory attachment system for a bed, in particular a hospital bed (10), comprising a bed frame structure with a head side end bar (44) and a foot side end bar (50), said head side end bar (44) and/or said foot side end bar (50) being provided with a plurality of insert holes (102, 104), for inserting accessories, particularly a panel (54), etc., said insert holes (102, 104), having a tapered longitudinal section profile for receiving correspondingly tapered insertion pins (106, 108) being provided on said accessory.

17. Accessory attachment system according to claim 16, two insert holes (102, 104), being provided laterally spaced apart in said end side head bar (44) and/or said foot side end bar (50) .

18. Accessory attachment system according to one of claims 16 or 17, a plurality of hollow cylindrical members (94) having a longitudinal axis (100), being provided in said head side end bar (44) and/or said foot side end bar (50), an insert bushing (96, 98) being inserted into each of said cylindrical members (94), each of said insert bushings (96, 98) being provided with one of said insert holes (102, 104), respectively.

19. Accessory attachment system according to one of claims 17 or 18, wherein said insert bushings (96, 98) are made of plastics material.

20. Pole for carrying at least one infusion liquid container, etc., for use in an accessory attachment system for a bed according to one of claims 6 to 15, said pole (58) comprising an insert portion (126) for insertion into an insert hole, an intermediate portion (130, 136) and a carrier portion (150) for carrying said at least one container, etc., said carrier portion (150) being offset with respect to said insert portion (126) such that in case said insert portion (126) is inserted into said insert hole, said carrier portion (150) and said at least one container, etc., carried by said carrier portion completely extend within a foot print of said bed (10).

21. Pole according to claim 20, said intermediate portion (130, 136) comprising a first vertical portion (130), connected with a lower end thereof to said insert portion (126), and an inclined portion (136) connected with a lower end thereof to an upper end of said first vertical portion (130) and carrying at its upper end said carrier portion (150).

22. Pole according to claim 21, said carrier portion (150) comprising a second vertical portion being connected with a lower end thereof to said upper end of the inclined portion (136) and being provided with carrier means (148) at its upper end (146) for carrying said at least one container, etc.

23. Pole according to one of claims 20 to 22, said insert portion (126) having a cross-sectional area which at least in a section thereof is non-cylindrical, for insertion into an insert hole having a corresponding cross-sectional area.

24. Pole according to one of claims 20 to 22, said insert portion having a cylindrical cross-sectional area.

25. Pole according to one of claims 21 to 23, said first vertical portion (130) and/or said inclined portion (136) being variable in length.

26. Pole according to one of claims 22 to 25, said second vertical portion (144) being variable in length.

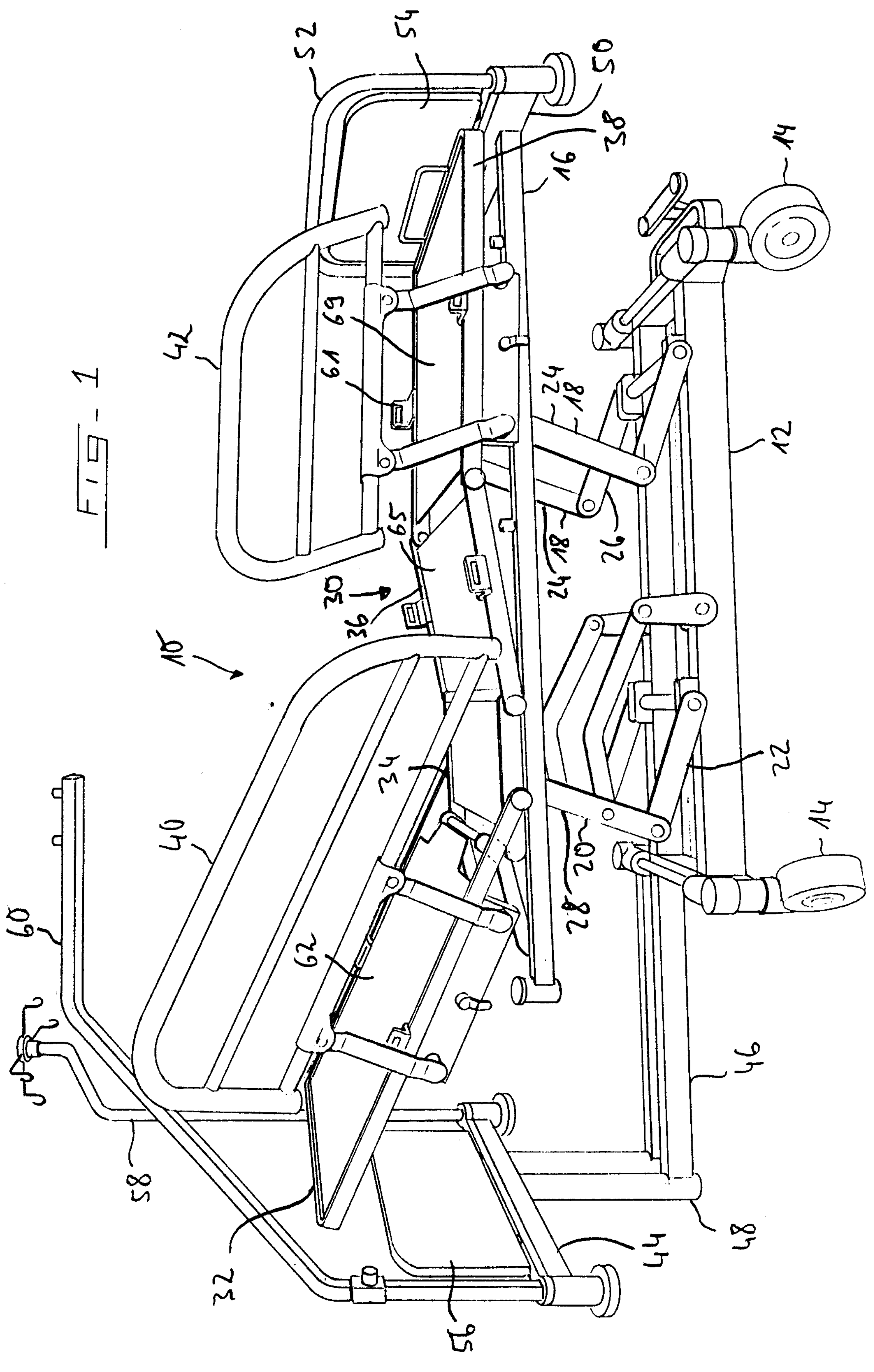
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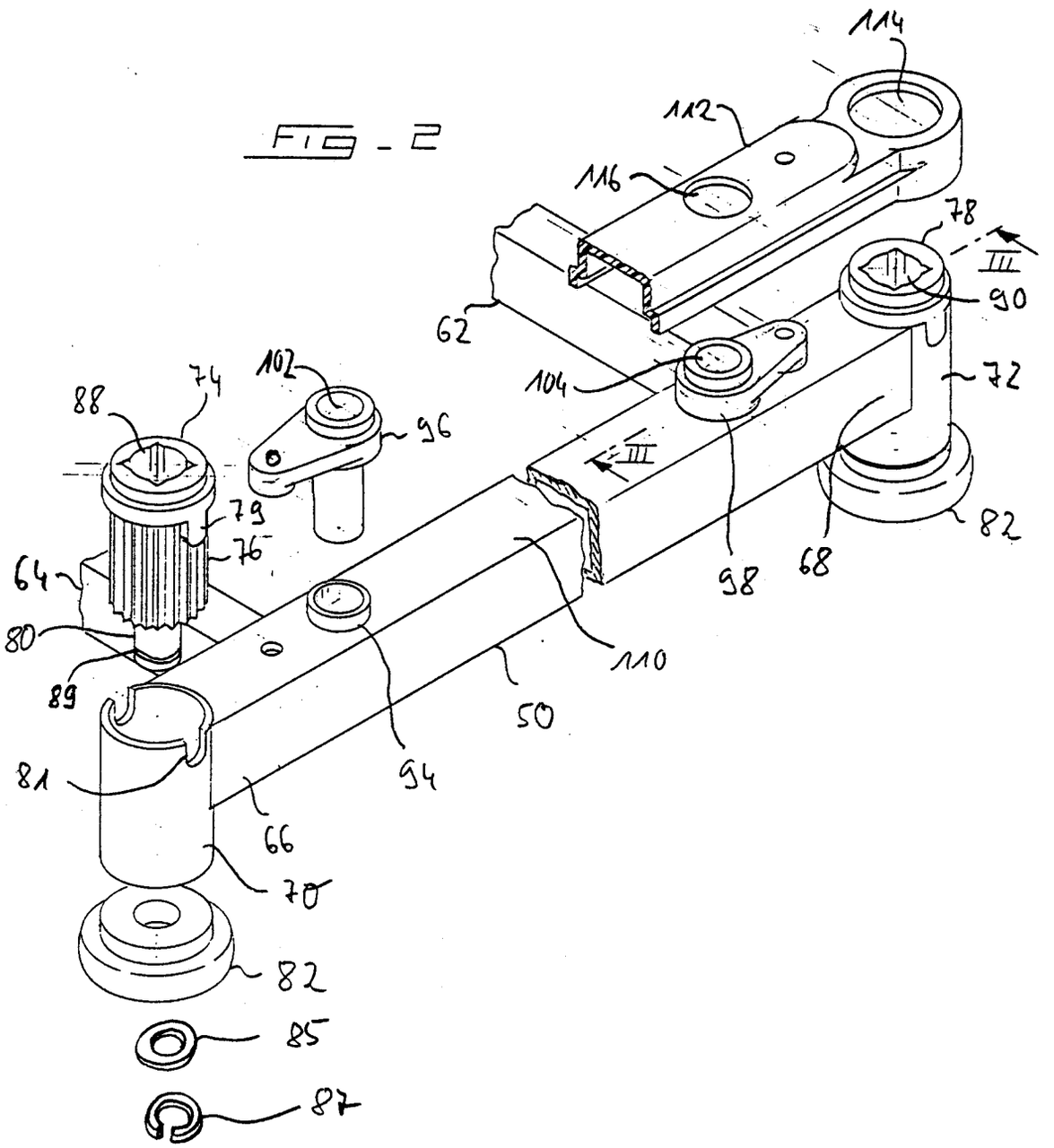
FIG - 1

FIG - 2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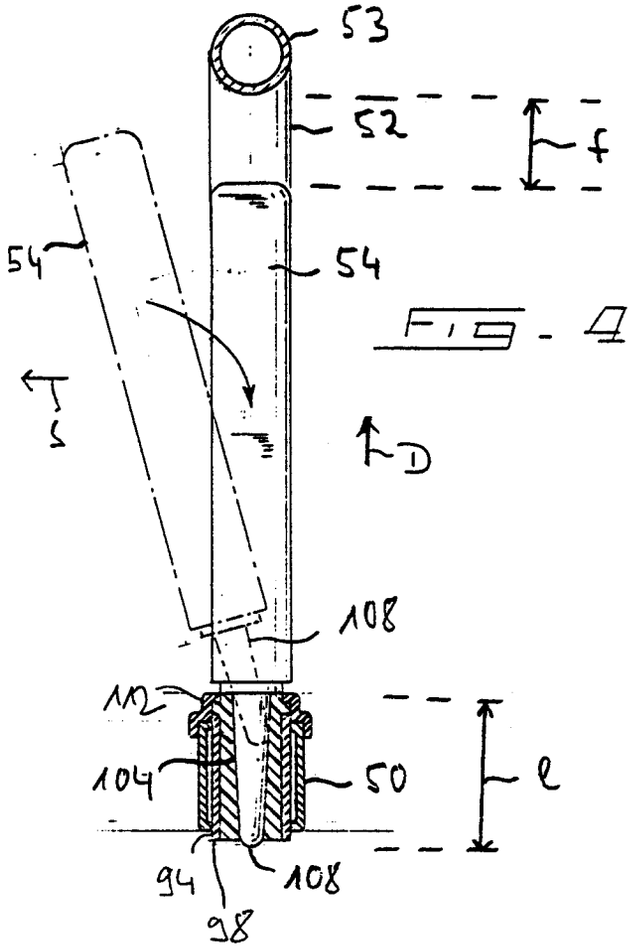
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FIG - 4

FIG - 3

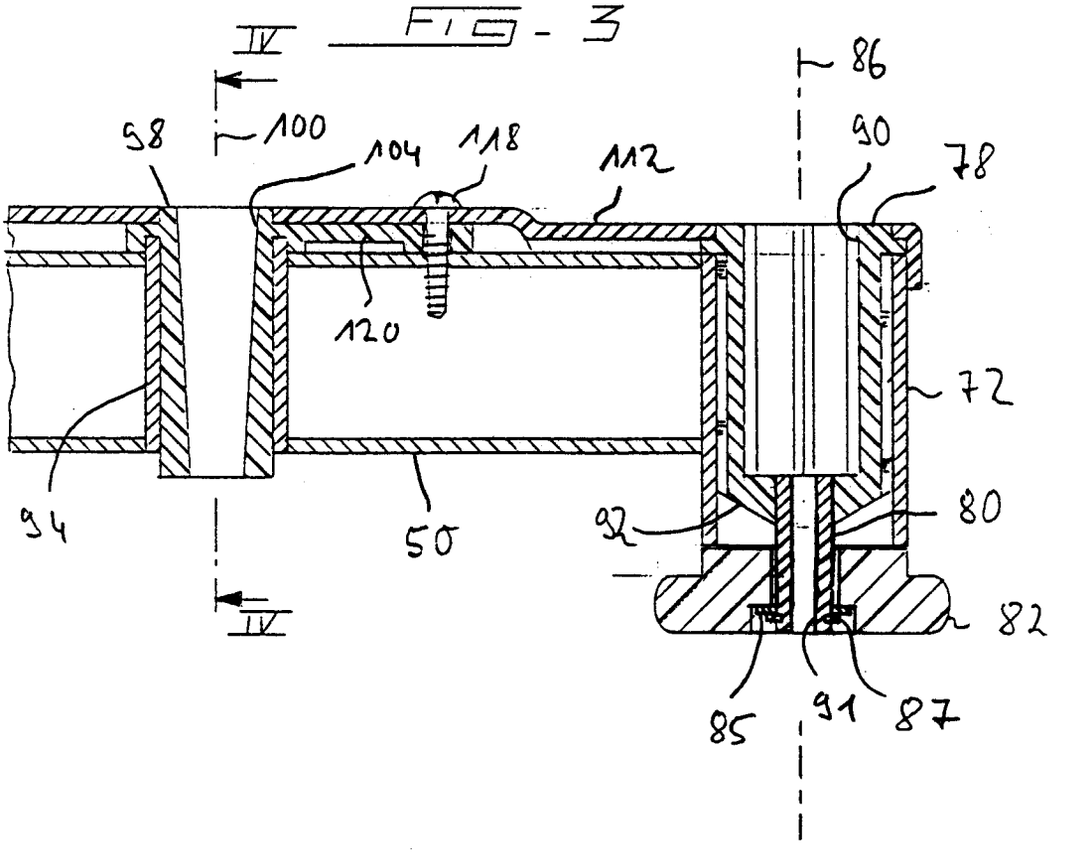
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FIG - 5

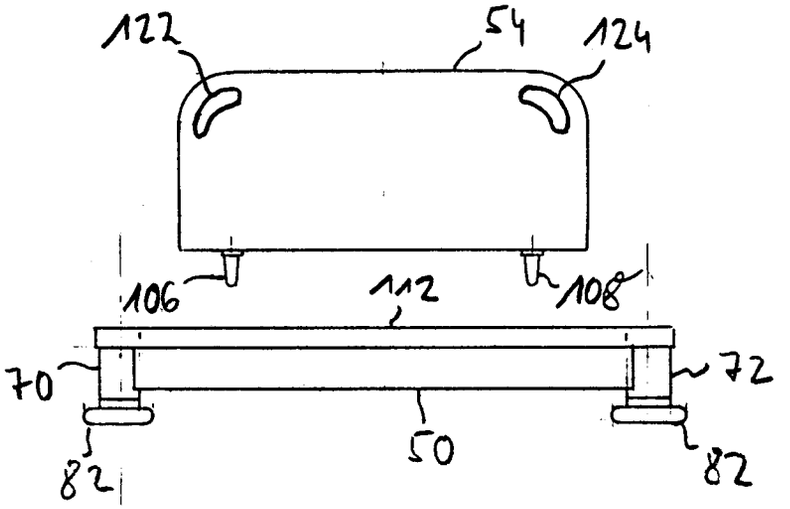

FIG - 6

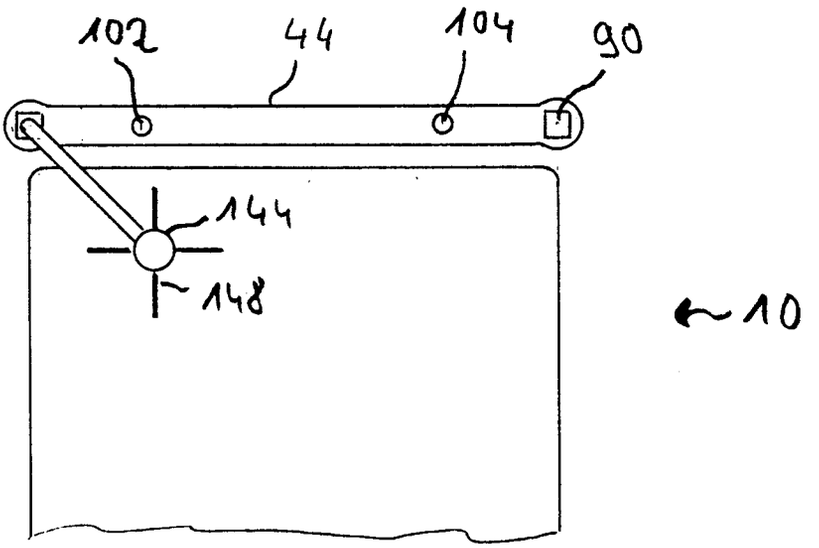

FIG - 7

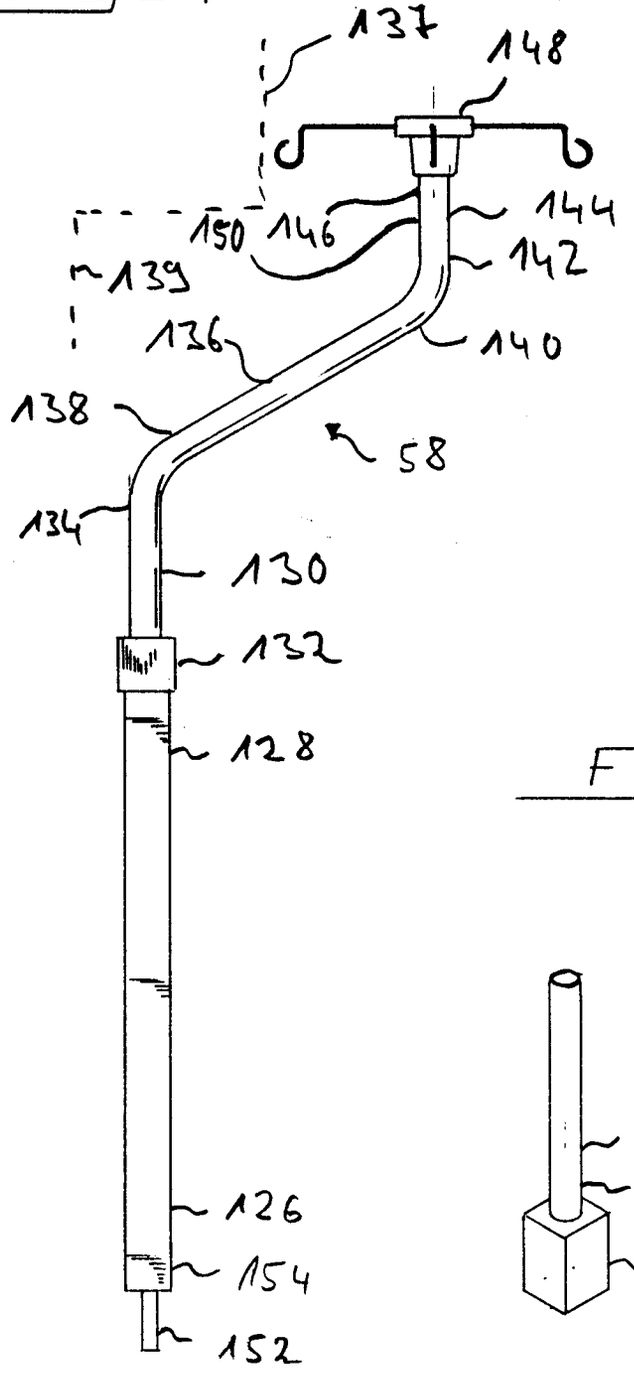
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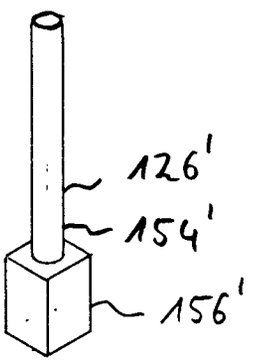
FIG - 8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European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 93 11 9609

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	GB-A-2 252 237 (FERASPEN)	1,6,7, 16,17	A61G7/05 A61G7/012
A	* page 5, line 7 - page 6, line 6 * * page 7, line 5 - line 21; figures 1,5-9 *	2-5	
A	DE-A-40 32 105 (WISSNER) * column 2, line 11 - line 29; figure 1 *	1-5	
X	DE-U-92 10 504 (MÜLLER)	1,6,7, 16,17	
A	* page 5, line 24 - page 7, line 4; figures 1-3 *	8,9, 12-14, 18,19	
A	FR-A-1 098 707 (BRETON) * page 1, column 2, line 12 - line 21; figure 1 *	6,20-26	
A	US-A-3 514 794 (POFFERI) * column 3, line 7 - line 31; figures 1,4-6 *	1,6,16	TECHNICAL FIELDS SEARCHED (Int.Cl.6) A61G A61M
A	US-A-5 094 418 (MCBARNES, JR.) * abstract; figures 1,3 *	6,20-26	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
BERLIN	10 May 1994	Monne, E

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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