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(54) Foldable frame for furniture

(57) The invention which is the subject of this application relates to a foldable bed which can be moved between a folded position and an unfolded position with improved ease over conventional foldable beds and also allows the mattress of the bed to be made of the same length as the frame which supports the same without the mattress protruding beyond the end of the frame when folded. The frame comprises at least two frame parts, and typically each of the frame parts is pivotally movable with respect to a mounting plate, typically one provided on each side of the bed frame.

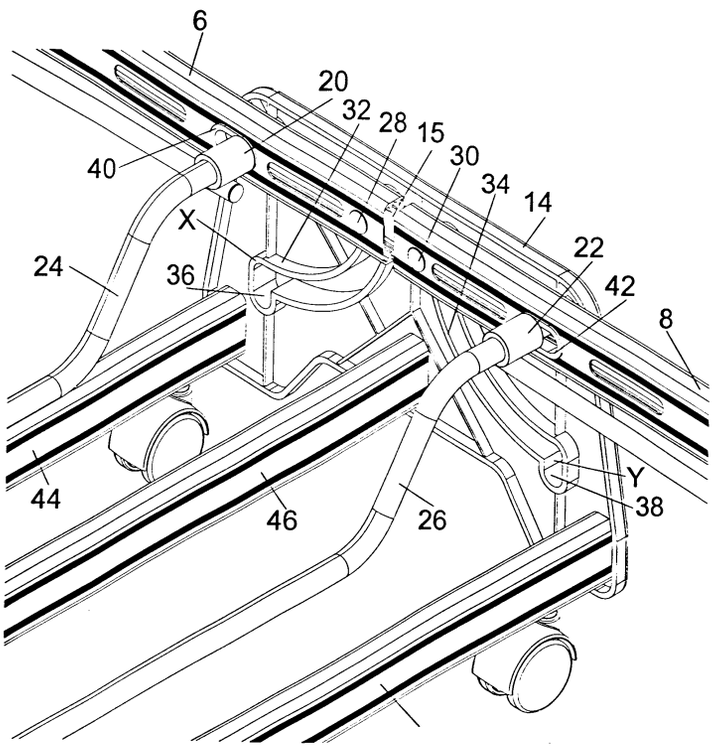

FIGURE 3

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Description

[0001] The invention to which this application relates is a foldable frame for furniture, typically a bed which comprises a bed frame and a mattress supported on said frame and of the type whereby the bed can be folded between a position in which the frame is substantially flat for use and a folded storage position.

[0002] The provision of foldable beds is well known and conventionally, the bed frame is a rectangular loop of tubular metal provided with two spaced breaks along each of the two long sides of the frame. The breaks are typically spaced apart and include hinge brackets so that when folded, the bed frame is substantially U-shaped in side view. Almost all bed manufacturers utilise this type of foldable frame and there are several disadvantages. A first disadvantage is that when the frame is in the folded position, ties or other additional retaining means are required to be provided to maintain the free ends of the bed frame in a locked position to prevent the same from falling down and causing potential injury. A second problem is that as the frame is U-shaped when folded, the mattress is trapped within the frame and is required to be provided of a shorter length than the length of the frame when the bed is in a flattened in use position, to prevent the mattress from protruding from the free ends of the frame when in a folded position. Furthermore, the conventional bed frames are manufactured from tubular metal which is required to be painted or otherwise coated and, the frames can be relatively heavy.

[0003] The aim of the present invention is to provide a bed which can be folded between in use and storage conditions and in which, firstly, the free ends of the bed when folded, are held in a folded position without the need for additional retaining means, a mattress of equal length to the bed frame when in a flattened condition can be accommodated within the bed frame when in folded condition and, if required, plastics or other lightweight or suitable materials can be used to manufacture the same.

[0004] In a first aspect of the invention there is provided a bed comprising a frame for supporting a mattress thereon, said frame including two parts which are movable between a folded, storage condition in which the two parts lie substantially parallel and an in use condition in which the two parts lie substantially in line characterised in that at least one of said frame parts is pivotable about a pivot assembly with respect to at least one mounting plate between defined first and second positions which limit the pivotal movement of the at least one frame part.

[0005] In one preferred embodiment said at least one frame part and mounting plate are mutually engaged via at least one track assembly formed between the same.

[0006] In one embodiment there are provided at least two mounting plates, one positioned at a first side of the frame parts and engaged therewith and the second mounted at an opposing side of the frame parts and engaged therewith. Typically each mounting plate is provided with first and second track assemblies, a first frame part mounted for movement along the first track assembly and a second frame part mounted for movement along the second track assembly. Thus each of the frame parts is pivotally movable with respect to the two mounting plates, one on each side of the frame.

[0007] In an alternative embodiment two mounting plates arc provided in a set at each side of the frame parts, each mounting plate having one track formed thereon.

[0008] In whichever embodiment the mounting plates arc held in a fixed position with respect to the other mounting plates. Typically, whatever embodiment is adopted on one of the mounting plates is repeated on the opposing mounting plate at the other side of the frame so as to allow for smooth movement of the frame part(s) about the mounting plates.

[0009] Typically each of said mounting plates includes two pivot assemblies, one for each of the frame parts, and two track assemblies, one for each of said frame parts. In one embodiment the mounting plates include the slots for said track arrangements, said slots including an arcuate portion and depending away from one another and the length of said slots define the extent of pivotal movement of the respective frame parts about the respective pivot assemblies with respect to the mounting plate.

[0010] Typically the track assembly comprises a slot along which a member can slidably move and typically the shape of said first and second slots, when provided on the same mounting plate are symmetrical about a vertical axis positioned between the same. Typically there is provided a member or a slot on the frame part for movement with respect to the other of a member or slot on the mounting plate. In a preferred embodiment the movement of the frame part is guided by the member connected to the frame part moving along a slot in the mounting plate. In one embodiment the slot is provided with a portion which, when the frame part is in or approaching a storage condition, allows the member to move to a locked position in the slot thereby retaining the frame part in the storage condition.

[0011] Typically to allow the frame parts to be held in the storage condition there is provided at the pivot assembly between the frame part and the mounting plate, a slot which allows linear movement of the frame part with respect to the mounting plate to lock the same in the storage condition.

[0012] Typically the position of the slot on the mounting plate is offset from the pivot assembly for the frame part which is movable along the said slot and this is repeated for the other frame part mounted on the mounting plate.

[0013] Preferably the mounting plate is positioned at approximately the centre of the length of the bed when in the in-use condition so that the two frame parts are

of substantially equal length.

[0014] In one embodiment each frame part is movable along the track assembly between a first position in which the frame part is held in the in use condition and a second position at which the frame part is in the storage condition.

[0015] In accordance with the invention the mattress is provided to be of at least the same length as the frame when in the use condition and when in a storage condition the mattress at the point of folding is received in a gap defined between the spaced ends of the frame parts at the mounting plates. Thus, when the frame is used for a bed, the frame is formed and movable so that when in a folded, storage condition, the mattress does not protrude from the free end of the frame in the folded position. This is achieved by the use of the pivot points and track assemblies on the mounting plates on either side of the frame parts which join the frame parts together and when the frame parts are moved to a folded condition, there is a space defined between the pivoted ends of the frame parts and into which space the folded mattress can pass so as to accommodate a portion of the mattress and thereby prevent the ends of the mattress from protruding beyond the free ends of the folded frame as is the case with conventional folding bed frames.

[0016] Preferably each frame part includes at least one foldable leg portion which can be folded outwardly to support the frame part in an in use condition and are stowable adjacent the frame parts to which they are attached for storage.

[0017] In one embodiment at least one of the foldable legs of the bed is connected to the track assembly for that frame part to which it is attached such that movement of the leg causes movement of the frame part with respect to the mounting plate.

[0018] Typically the mounting plate includes support means thereon to support the mounting plate in a fixed position with respect to a support surface on which the same lies. The support means can be legs, castors, wheels or the like.

[0019] In a further aspect of the invention there is provided a frame for an item of furniture said frame including two parts which are movable between a folded condition in which the two parts lie substantially parallel and an in use condition in which the two parts lie substantially in line characterised in that each of said parts is pivotable with respect to at least one mounting plate and said frame parts and mounting plate are mutually engaged via a track assembly formed between the same.

[0020] A specific embodiment of the invention is now described with reference to the accompanying drawings wherein:-

Figure 1 illustrates an elevation of a bed according to the invention in an in use position;

Figure 2 illustrates a bed according to the invention of Figure 1 in a storage condition;

Figure 3 illustrates a detailed view of one of the mounting plates and frame members according to the invention;

Figure 4 illustrates a sectional end view along line A-A of Figure 3 showing the mounting plate of Figure 3 but with the frame part in a storage but unlocked position; and

Figure 5 illustrates the mounting plate and frame part of Figure 4 in a locked position.

[0021] Referring now to Figure 1 there is illustrated a bed according to one embodiment of the invention which comprises a mattress 2 which is supported by a frame 4 which in this case is formed of two parts 6 and 8, each of said parts having a leg 10, 12 with support struts 60,62 and the said parts are shown in broken lines abutting at a break point in the frame 15 and are held in position via mounting plates 14, one of which is shown with the other positioned at the other side of the frame parts in the same manner. The frame includes a series of slats 63 which are mounted between the frame side members at spaced intervals so as to provide a support for the mattress 2.

[0022] Figure 2 illustrates the bed in a folded condition in which the parts of the frame 4, 6 and 8, are shown in an upright position and pivoted about the mounting plate 14. It is also shown how the mattress 2 is folded with the frame members and, as it can be accommodated between the space defined between the parts 6 and 8 of the frame at the break 15 then the mattress 2 can be the same length as the frame when in an in use position as shown in Figure 1 and still does not protrude beyond the edges 16 and 18 of the frame parts 6 and 8 when in a folded position. This was not previously possible with conventional folding bed frames. The legs 10 and 12 can be moved to a stowed position in which they are substantially in line with the frame parts 6,8.

[0023] If the frame is moved from the position of Figure 2 to the in-use position of Figure 1 to the erected condition the legs 10,12 are moved outwardly from the frame members 16,18 as indicated by arrows 64,66.

[0024] Figure 3 illustrates a detailed view of an inside face of one of the mounting plates 14 and shows the arrangement between the frame parts 6 and 8, only the ends of which are shown, and the mounting plate. The mounting plate allows the pivotal movement of the frame parts between the folded storage condition and an in use condition. Figure 3 show the frame parts in an in use condition and it will be seen that the frame parts 6,8 are in line and that the ends of the frame parts 6,8 at the break point 15 are adjacent one and other. The frame parts are pivotally movable about respect to pivot assemblies 20, 22 on the mounting plate to allow movement between the folded and in use conditions. Elongate members 24, 26 are attached to the mounting plate 14 as shown and pass across the width of the frame to

attach in the same manner with a mounting plate at the other side of the frame which acts in the same manner as the mounting plate shown. The parts 6 and 8 can therefore pivotally move about the members 24, 26 respectively about the pivot assemblies 20,22 on the mounting plate. The mounting plate in this embodiment also includes two track assemblies, one for each of the frame parts and which although preferred to allow smooth movement of the frame parts with respect to the mounting plates may not always be required to be provided. Said track assemblies are formed by members 28 and 30 in engagement with respective arcuate slots 32, 34.

[0025] As shown, when the parts 6 and 8 are in the in use condition, the members 28 and 30 lie at one end of the slots 32,34 respectively. If the bed is to be moved to the storage condition the pivotal movement of the frame parts about the pivot assemblies 20,22 respectively, causes and is guided by, the members 28 and 30 moving along the slots to the respective positions marked X and Y in the slots 32, 34 and, in this position, the frame parts 6 and 8 lie in the substantially vertical planes as shown in Figure 2. However, when in positions X and Y the frame parts arc free moving and therefore slot portions 36, 38 are provided which depend from the arcuate portion of the respective slots and into which the members 28 and 30 fall. Slots 40, 42 arc also provided, in this embodiment at the pivot assemblies 20,22 which allows the frame parts 6,8 to slide at the same time at the pivot assemblies 20, 22 into a locking position. This slot arrangement allows the frame parts 6 and 8 to be held and locked in the vertical storage condition without the need for additional retaining means and this is a considerable advantage over conventional folding beds.

[0026] The additional cross rails 44 to 48 arc provided to act as strengthening members for the mounting plates so as to support the pivotal movement of the frame parts 6 and 8 and these pass between the said mounting plates. The cross rail 46 also acting as a stop for the mattress to prevent the same from slipping any further through the gap in the frame parts when in the folded position.

[0027] Figures 4 and 5 illustrate further the arrangement between one of the members 24 with the mounting plate 14 and frame part 6. In Figure 4, the frame part 6 is in a vertical, folded position but in an unlocked condition whereupon the member 24 lies at the bottom of the slot 40 and the member 28 lies at the top of the slot portion 36 in the mounting plate 14 ie at position X. Figure 5 illustrates the frame part 6 still in a vertical plane but having moved to a locked, retained condition with the member 24 having slid to the top of the slot 40 and the member 28 on the frame 6 having slid to the bottom of the slotted portion 36 on the mounting plate 14. To release the frame parts from the locked position one embodiment provides levers to connect the legs 10, 12, of the bed to or to act as the members 28, 30.

[0028] In one embodiment, not shown, when the members 28, 30 lie in the slots 36, 38 when the bed is in a folded condition, movement of the legs 10, 12 from the folded to extended positions can be connected to cause a lever to move the members 28, 30 from the locking slots 36, 38 to the positions X and Y and therefore allow the frames to then be moved to the in use positions along the arcuate slots without the need for the user to manipulate the members in the slots directly.

[0029] Thus it will be appreciated that the arrangement of this invention allows the frame parts to be held in a folded position without the need for further retaining members, allows a mattress to be used which is of substantially the same length as the length of the frame in a flat in use position and without the end of the mattress protruding from the free ends of the frame parts when in a folded position, allows the frame to be formed from only two parts, with only one break in the frame, and allows, if required, the parts of the frame to be manufactured from suitable materials such as plastics, aluminium or the like thereby reducing the need for painting and hence reducing the cost and possibly also the weight of the bed. Thus the bed and in particular the frame of the current application represents a distinct and significant invention.

Claims

1. A bed comprising a frame for supporting a mattress (2) thereon, said frame including two parts (6,8) which are movable between a folded, storage condition in which the two parts lie substantially parallel and an in use condition in which the two parts lie substantially in line characterised in that at least one of said frame parts (6, 8) is pivotable about a pivot assembly with respect to at least one mounting plate (14) between defined first and second positions which limit the pivotal movement of the at least one frame part.

2. A bed according to claim 1 characterised in that there are provided at least two mounting plates, one positioned at a first side of the frame parts and engaged therewith and the second mounted at an opposing side of the frame parts and engaged therewith.

3. A bed according to claim 2 characterised in that said at least one frame part is engaged with at least one of the mounting plates via a track assembly formed between the same.

4. A bed according to claim 3 characterised in that each mounting plate is provided with first and second track assemblies, a first frame part mounted for movement along the first track and a second frame part mounted for movement along the second track.

5. A bed according to claim 2 characterised in that said mounting plates are held in a fixed position with respect to the other mounting plates.

6. A bed according to claim 4 characterised in that the shape of said first and second track assemblies on the mounting plate is symmetrical about a vertical axis positioned between the same.

7. A bed according to claim 1 characterised in that the mounting plate is positioned at approximately the centre of the length of the bed when in the in-use condition and each of the frame parts are pivotally movable with respect thereto so that the two frame parts are of substantially equal length.

8. A bed according to claim 3 characterised in that each frame part is movable along the track between a first position in which the frame part is held in the in use condition and a second position at which the frame part is in the storage condition.

9. A bed according to claim 3 characterised in that the track assembly comprises a member or a slot on the frame part engaged for movement with respect to the other of a member or slot on the mounting plate.

10. A bed according to claim 9 characterised in that the movement of the frame part is guided by the member on the frame part moving along a slot in the mounting plate.

11. A bed according to claim 10 characterised in that the slot is arcuate in form.

12. A bed according to claim 10 characterised in that the slot is provided with a portion which, when the frame part is in a storage condition, allows the member to move to a locked position thereby retaining the frame part in the storage condition.

13. A bed according to claim 3 characterised in that each frame part is pivotable about a pivot assembly on the mounting plate, and said pivot assembly is spaced from the track assembly for said frame part.

14. A bed according to claim 1 characterised in that at the pivot assembly there is provided a slot which allows limited movement of the frame part with respect to the mounting plate to move the frame part between a position in which it is retained in the storage condition and a position where the frame part can be moved to the in -use condition.

15. A bed according to claim 1 characterised in that each of said mounting plates includes two pivot assemblies, one for each of the frame parts, and two track arrangements, one for each of said frame parts.

16. A bed according to claim 15 characterised in that the mounting plates include the slots for said track arrangements, said slots including an arcuate portion and depending away from one another and the length of said slots define the extent of pivotal movement of the respective frame parts with respect to the mounting plate.

17. A bed according to claim 1 characterised in that the mattress is provided to be of at least the same length as the frame when in the in use condition and when in a storage condition the mattress at the point of folding is received in a gap defined between the spaced ends of the frame parts.

18. A bed according to any of the preceding claims characterised in that each frame part includes at least one foldable leg portion which can be folded outwardly to support the frame parts in an in use position and are stowable adjacent the frame parts to which they are attached for storage.

19. A bed according to claim 18 characterised in that at least one of the foldable legs of the bed is connected to the track arrangement for that frame part to which it is attached such that movement of the leg causes movement of the frame part with respect to the mounting plate.

20. A bed according to claim 1 characterised in that the mounting plate includes supports means thereon to support the mounting plate in a fixed position with respect to a support surface on which the same lies.

21. A frame for an item of furniture said frame including two parts (6,8) which are movable between a folded condition in which the two parts lie substantially parallel and an in use condition in which the two parts lie substantially in line characterised in that each of said parts (6, 8) is pivotable with respect to at least one mounting plate (14) and said frame parts and mounting plate mutually engaged via a track assembly formed between the same.

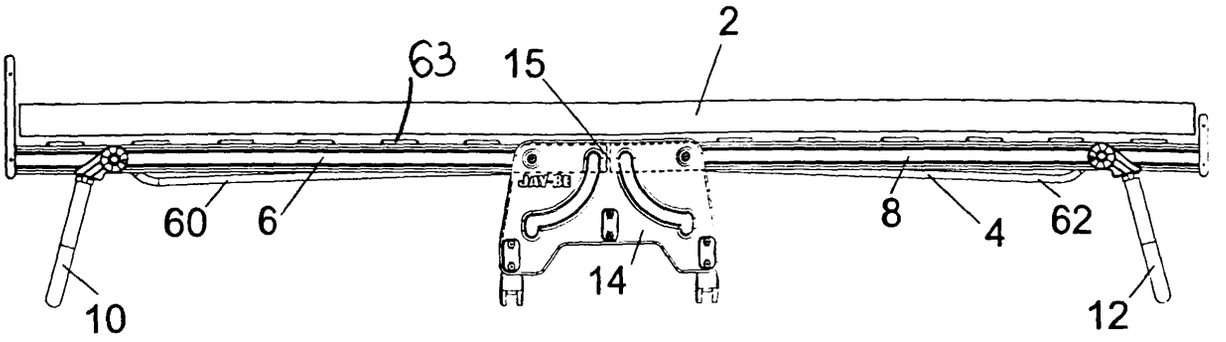

FIGURE 1

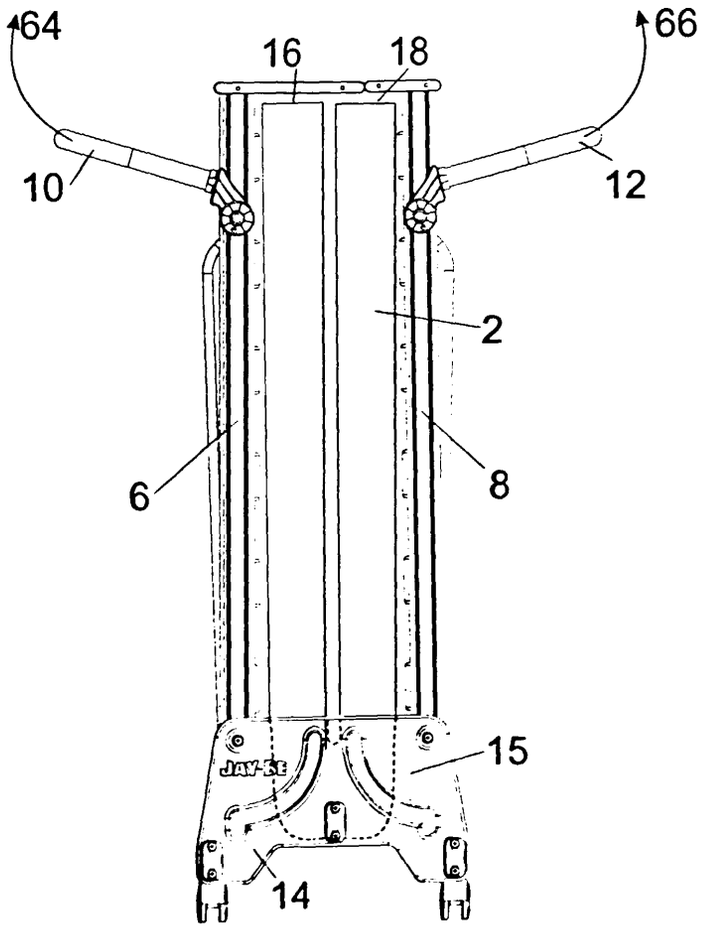

FIGURE 2

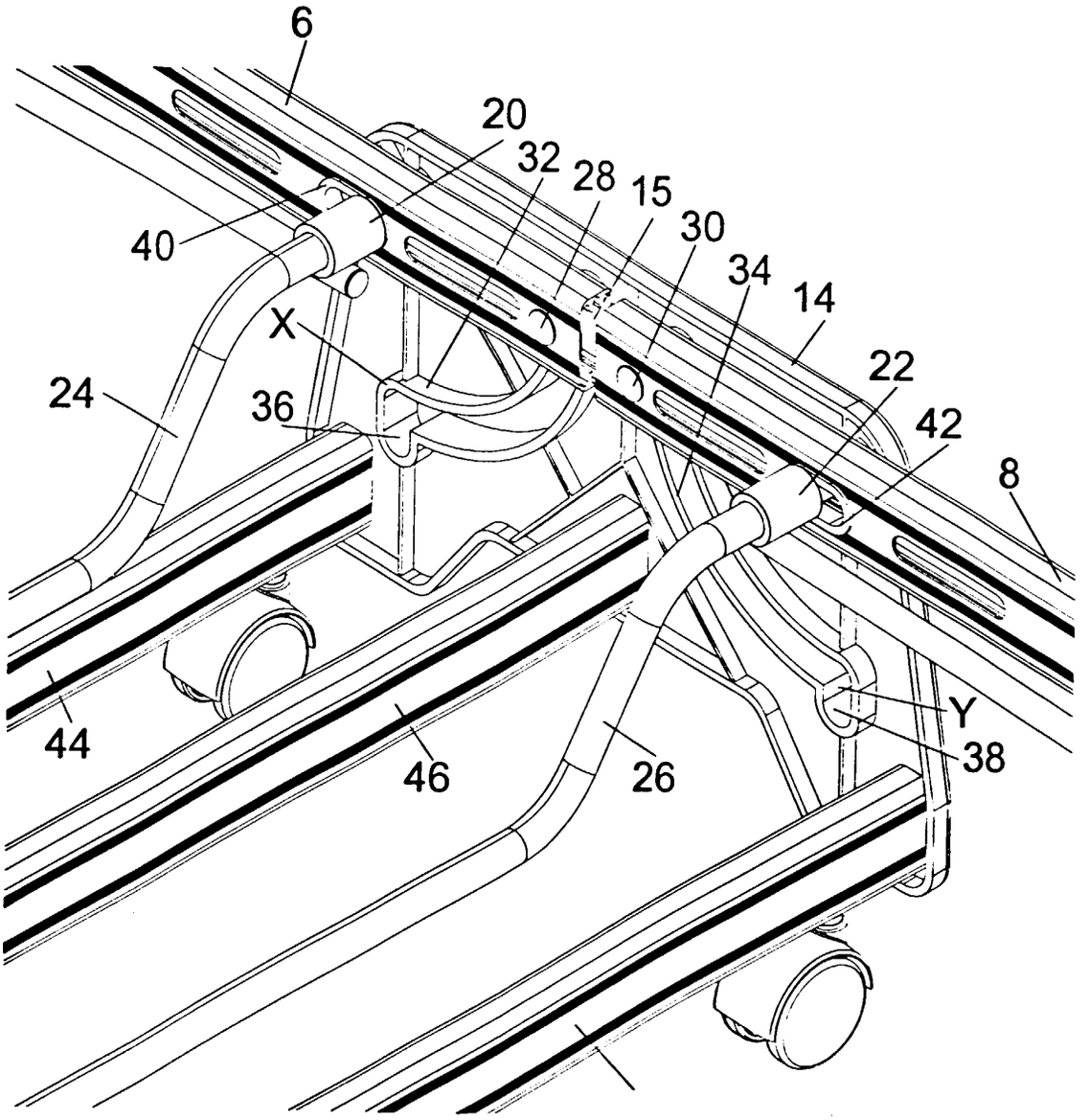

FIGURE 3

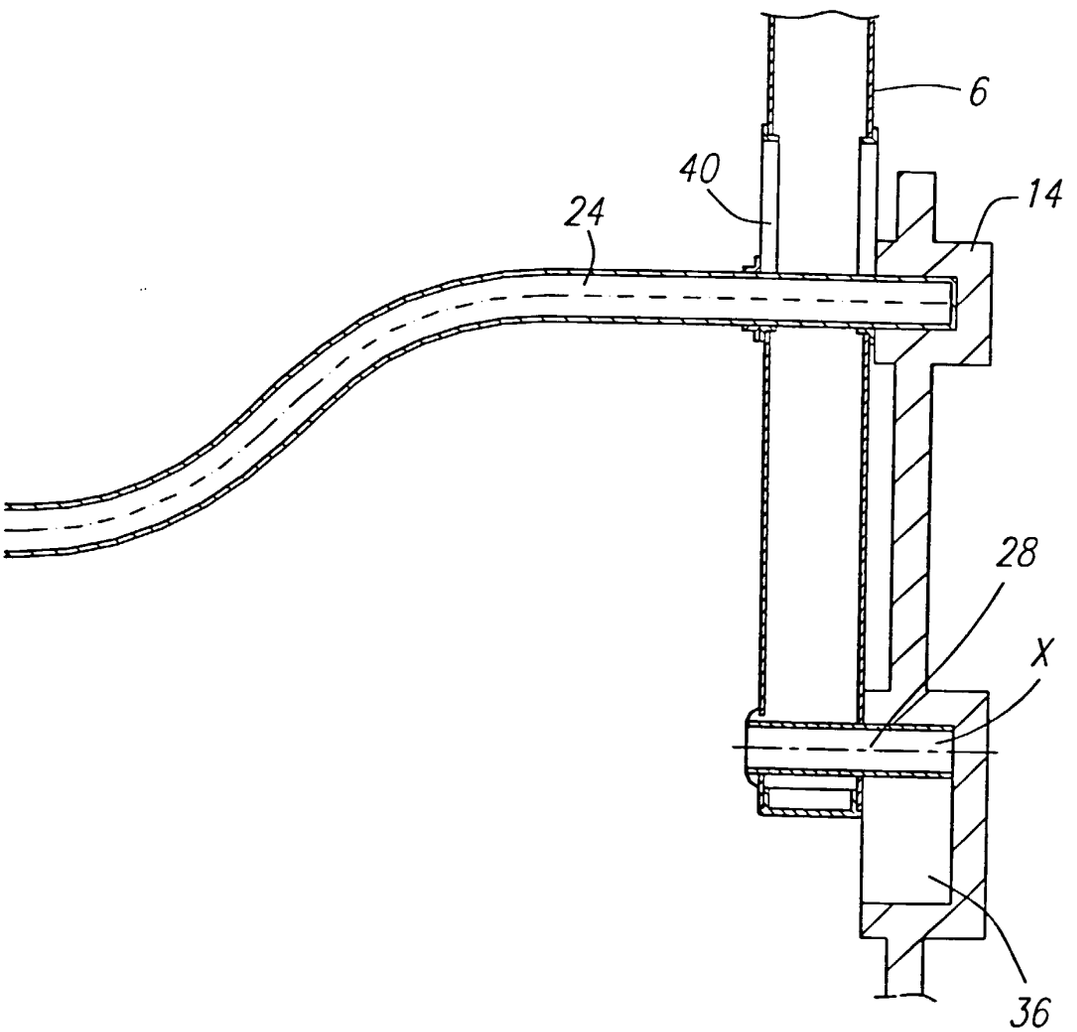

FIG. 4

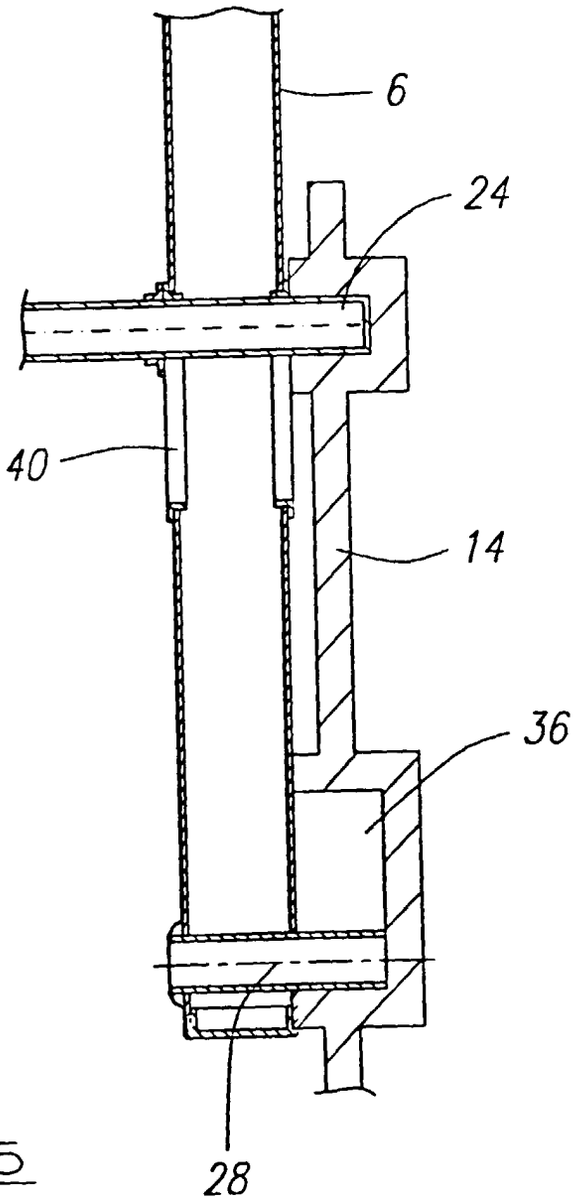

FIG. 5

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 00 30 1677

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.7)
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			TECHNICAL FIELDS SEARCHED (Int.Cl.7) A47C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	14 June 2000	Joosting, T

CATEGORY OF CITED DOCUMENTS

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14-06-2000

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