United States Patent [19]

Gregory

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[45] **Oct. 30, 1973**

[54] **ADJUSTABLE BED**

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[52] **U.S. Cl.** **5/2,** 5/110

[51] **Int. Cl.** **A47b 83/00,** A47c 19/16

[58] **Field of Search** 5/2, 13, 17, 28, 5/110, 111, 112, 99, 357

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Primary Examiner—Paul R. Gilliam

Attorney—Cushman, Darby & Cushman

[57] **ABSTRACT**

A bed comprises a main portion and two extension portions, one at each end of the main portion and pivotable to positions underlying the main portion, when not required for use. A cage is provided, which in the folded position of the bed can be attached to it to form a cot, and which on its own can form a play-pen. When the bed is in the extended position, panels of the cage can be attached to it to form safety panels.

5 Claims, 24 Drawing Figures

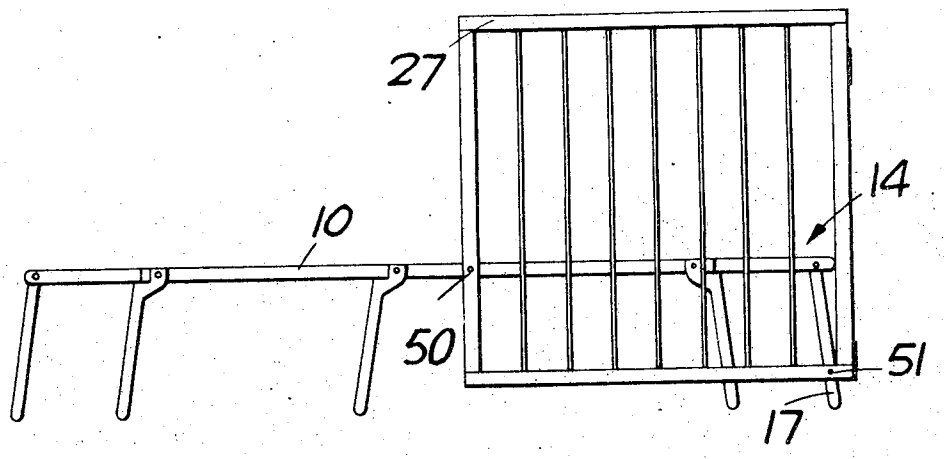


Fig. 1.

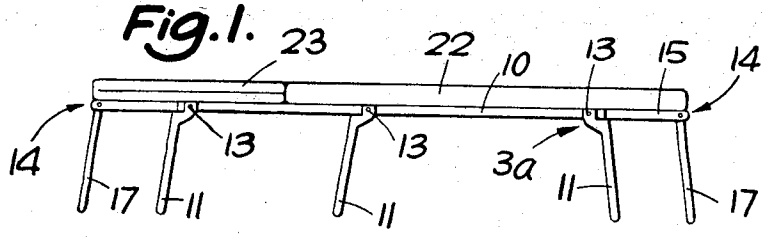


Fig. 2.

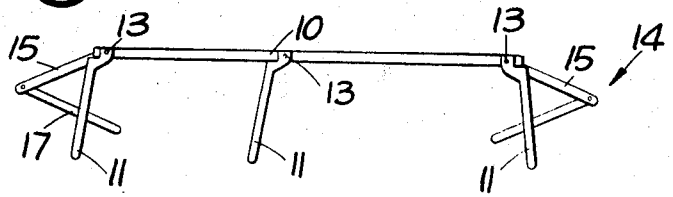


Fig. 3.

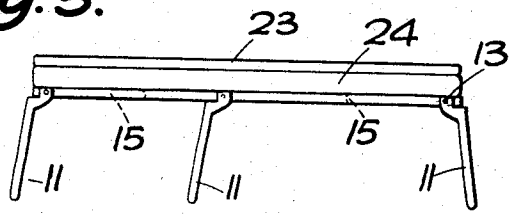


Fig. 3a.

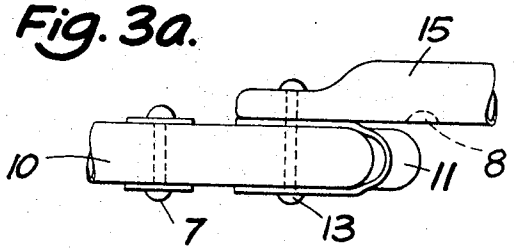


Fig. 4.

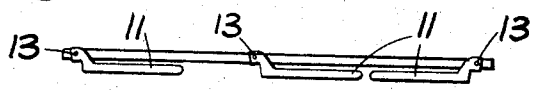


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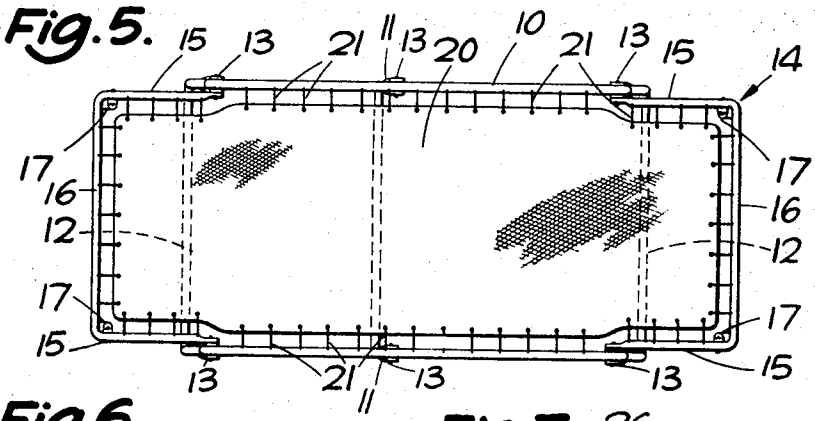


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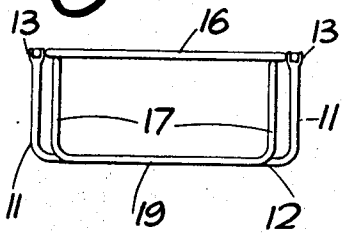


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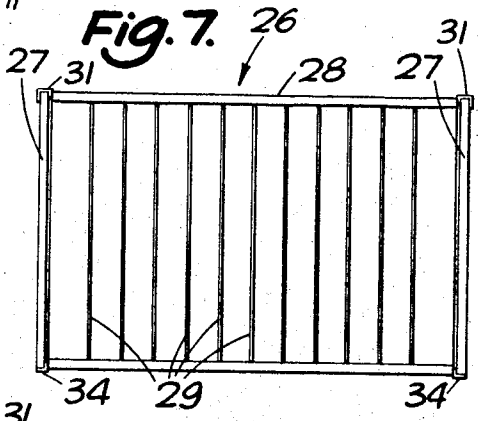


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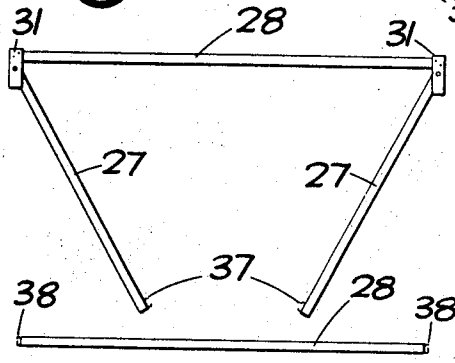


Fig. 10a.

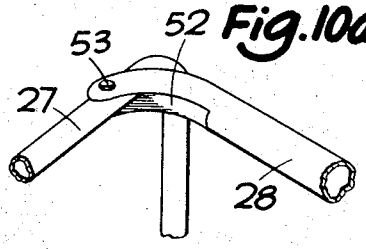


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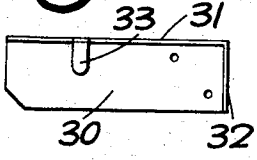


Fig. 10.

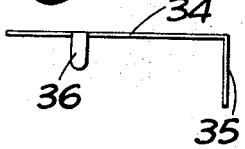


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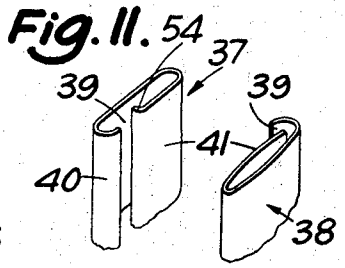


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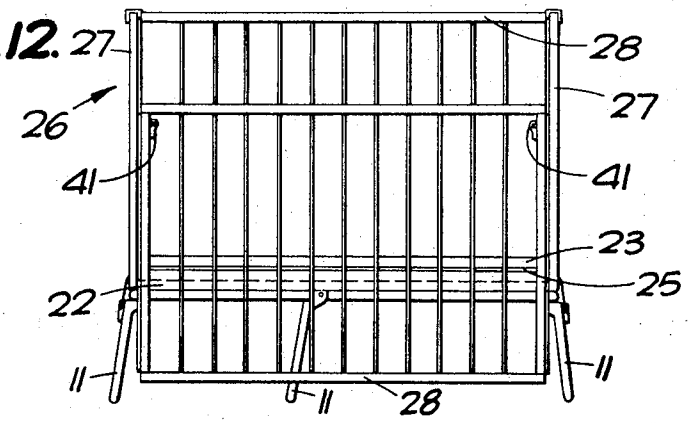


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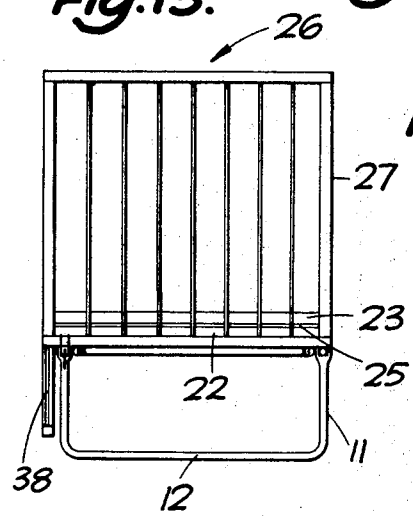


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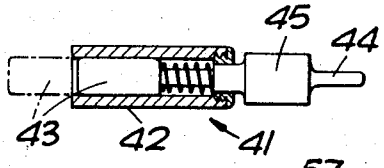


Fig. 14a

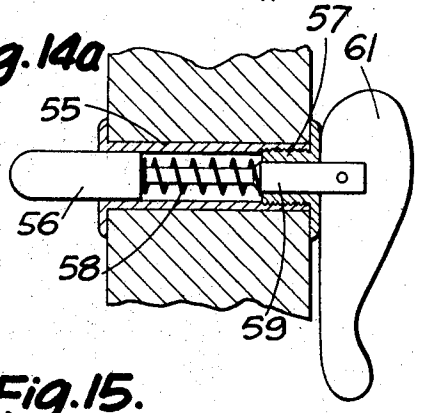


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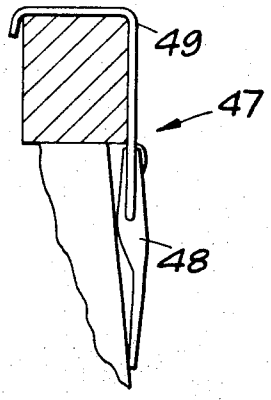


Fig. 15a.

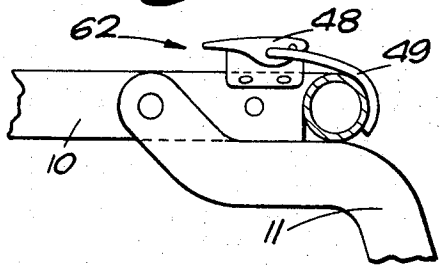


Fig. 16.

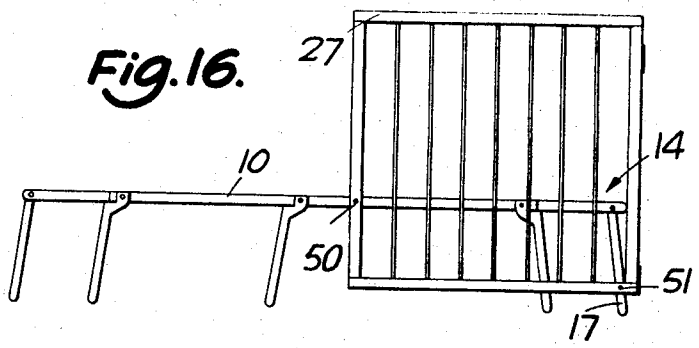


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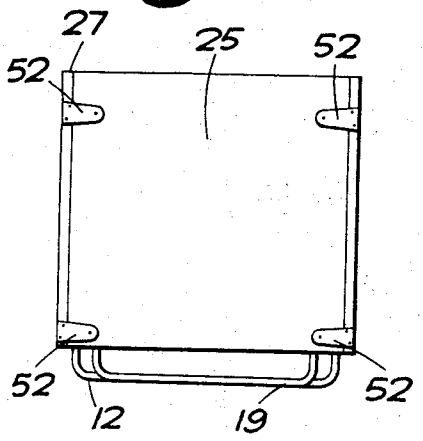


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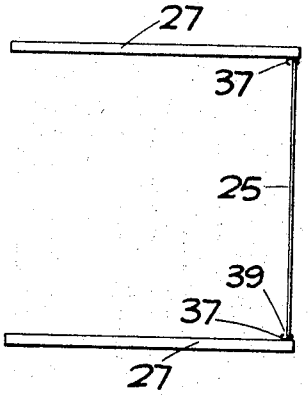


Fig. 19.

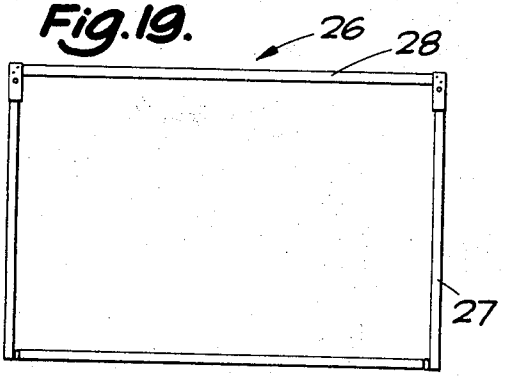
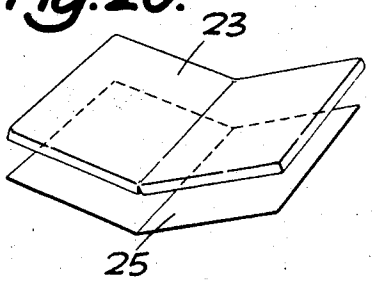


Fig. 20.



ADJUSTABLE BED

This invention relates to adjustable beds.

According to the invention an adjustable bed comprises a main structure having a substantially flat upper surface and supported on legs towards the ends thereof and a pair of additional structures pivotally connected at the ends of the main structure and pivotally movable between a collapsed position in which they lie beneath the main structure and and extended position in which the upper surfaces thereof form continuations of the upper surface of the main structure, means being provided to retain the additional structures in the extended position.

Preferably the means to retain the additional structures in the extended position comprise legs pivotally connected to the structures so that they can lie adjacent the structures when in said collapsed position.

There may be provided a pair of resilient mattresses of similar breadth, one being half the thickness of the other, the two mattresses being so dimensioned as, in the collapsed position of the bed, to lie on top of one another to cover the upper surface of the main structure and in the extended position to lie in end-to-end abutting relationship with the thinner mattresses folded in half across its length, to form together a substantially continuous mattress covering the surfaces of the main structure and the additional structures.

Preferably the additional structures are together substantially one half the length of the main structure and the resilient mattresses are of the same length so that in the collapsed position of the bed the two mattresses are substantially co-extensive when covering the flat upper surface.

There may be provided a flat board for insertion between the two mattresses and the surface of the main structure in said collapsed position.

The flat board may be formed from two parts hinged together, so that in a closed position the two parts are substantially co-extensive with one another and with the two mattresses when the fluid board is inserted between them.

Preferably a cage is provided around the surface of the main structure in said collapsed position, the cage comprising a plurality of connected frames detachably connected to the main structure to form a vertical wall around its upper surface.

Preferably the cage is detachably secured to the main structure by means of clips.

The main structure may be substantially rectangular in plan and the cage may be formed from four connected frames arranged around the periphery of the main structure.

One of said frames is preferably movable relatively to the others in a vertical plane between a raised position in which said one frame is in vertical alignment with the other frames and a dropped position below the vertical level of the other frames.

Releasable detent means are preferably provided on said one frame whereby said one frame may be held in a number of intermediate positions between the raised position and the dropped position.

The connected frames may comprise a pair of longer side frames and a pair of shorter end frames, one of the side frames being movable relatively to the other frames and the two end frames being pivotally connected to the other side frame for pivotal movement relatively thereto about a vertical axis.

The pivotal connections between the end frames and the side frame may be demountable so that all the frames may be separated from one another.

In one embodiment of the bed, a pair of side retaining structures are connected along both sides of the main structure towards one end thereof when the additional structures are in their extended position.

In this case, the side retaining structures may be connected by a head board extending across one end of one extended additional structure between two vertical edges of the side structures.

Preferably said side structures comprise end frames of the kind described above when disconnected from the main structure and the two side structures.

Preferably the head-board comprises the flat board disclosed above when removed from the surface of the main structure and connected between the two side structures.

The invention also includes within its scope a rectangular retaining cage comprising a plurality of vertical connected frames enclosing an area, said frames being frames of any of the kinds described above when detached from said bed.

In this embodiment of the invention, a mattress may be enclosed by said cage, said matress being one or both of the mattresses of the kind described above, when removed from said bed.

The following is a more detailed description of one embodiment of the invention, by way of example, reference being made to the accompanying drawings in which:

FIG. **1** is a side elevation of a bed in an extended position;

FIG. **2** is a side elevation of the bed with the end portions in a partially collapsed position;

FIG. **3** is a side elevation of the bed converted into a cot;

FIG. **3***a* is a detail plan view of the region **3***a* of FIG. **1**;

FIG. **4** is a side elevation of the bed in a collapsed position;

FIG. **5** is a plan view of the bed;

FIG. **6** is an end elevation of the bed;

FIG. **7** is a side elevation of a part of a cage;

FIG. **8** is a plan view of the cage;

FIG. **9** shows a top hinge;

FIG. **10** shows a bottom hinge;

FIG. **10***a* is a perspective view of an alternative hinge;

FIG. **11** is a perspective partial view of a pair of slides;

FIG. **12** shows a side elevation of the cage fitted to the cot;

FIG. **13** is an end elevation of the cage fitted to the cot;

FIG. **14** shows a releasable detent means;

FIG. **14***a* shows an alternative form of releasable detent means;

FIG. **15** shows one form of clip;

FIG. **15***a* shows an alternative form of clip;

FIG. **16** shows a pair of side panels attached to the bed;

FIG. **17** is an end elevation of the bed showing a head-board;

FIG. **18** is a plan view of the side panels and headboard;

FIG. 19 shows a playpen; and

FIG. 20 shows a floor for the playpen.

With reference to FIGS. 1 to 6, the bed is constructed from a main structure comprising a pair of parallel longitudinal members 10 which are supported by a pair of legs 11 at their ends and at their centers. As best seen in FIG. 6, each pair of legs 11 are in one piece with their lower ends connected by a bar 12. The pairs of legs can pivot about horizontal axes 13 between an extended position, as shown in FIG. 1, and a closed position, as shown in FIG. 4, in which they lie substantially parallel with the members 10.

At each end of the longitudinal members 10 is a subsidiary structure 14. Each subsidiary structure 14 comprises a pair of arms 15 pivotally connected to the longitudinal members 10 for rotation about the same horizontal axis 13 as the end legs 11. The outer ends of the arms are connected by a bar 16 and a pair of legs 17 are pivotally connected towards the ends of the arms 15 for rotation about a horizontal axis 18. Each pair of legs 17 is formed in one continuous piece with a lower connecting bar 19 joining the ends of the legs, as shown in FIG. 6. All of the structure members may be made from metal. In an alternative construction, the end legs 11 may be pivoted about the bolt 7; this allows longer arms 15.

As shown in FIG. 5, an area of woven material 20 is suspended from the two longitudinal members 10, the arms 15, and the end bars 16, by means of springs 21 to provide a bed surface. In an alternative construction, no springs are used but the material 20 is attached directly to the framework.

With the two subsidiary structures 14 in their extended position, as shown in FIG. 1, the bed is approximately 6 feet in length and is covered by a mattress comprising a thick block of resilient material 22, which is the same width as the bed and the same length as the longitudinal members 10 and a folded thinner resilient block 23. The thinner block 23 is formed from two blocks each the width of the bed and half the length of the thicker block 22. The two thin blocks are joined together by a strip of material which allows them to be folded so that they overlie one another to form a single block of the same thickness as the thicker block 22. This block 23 covers the remainder of the surface of the bed to form a substantially continuous mattress with the thicker block 22 extending the whole length of the bed.

As shown in FIG. 2, the bed may be converted into a cot, or shorter bed, by folding the end legs 17 of the subsidiary structures 14 to a position in which they lie adjacent the arms 15 and in the same parallel plane as the arms 15. The arms 15 are then pivoted about the horizontal axis 13 through a 180° until they are parallel with the longitudinal members 10, as shown in FIG. 3. They may be fixed in this position by a catch or by releasable detent means, as shown in FIG. 3*a*, and comprising a bolt 7 fixed in the member 10, the head of which is engageable in a recess 8 in the arm 15.

A mattress for the cot is provided by extending the thinner block 23 to its full length and placing it on top of the thicker member 24 to form a single mattress covering the whole surface area of the cot. It is often desirable to provide a slightly harder sleeping surface in a cot, and for this purpose a base board 25, as shown in FIG. 13, may be provided between the thinner resilient block 23 and the thicker resilient block 22.

The legs 11 may be folded upwardly beneath the longitudinal arms 10 and substantially parallel thereto, so that the bed may be easily stored, as shown in FIG. 4.

With reference to FIGS. 7 to 15, a cage 26 is provided around the cot which comprises two end panels 27 and two side panels 28. The panels 27, 28 are all formed from a rectangular framework with bars 29 extending between the horizontal members. The framework is preferably of wood, and then the end panels are connected to one of the side panels by a pair of hinges shown in FIGS. 9 and 10. The top hinges comprise a pair of plates 30, 31 disposed at right angles to one another with an end plate 32 joining them. One of the plates 31 is provided with a pin 33 extending perpendicularly from its surface. The bottom hinge comprises a single flat plate 34 with a second plate 35 extending at right angles from one end and a pin 36 extending perpendicularly from its surface. As shown in FIG. 8, top hinges are connected to the upper ends of one side panel 28 with the plates 31 extending perpendicularly from it. The bottom hinges are connected to the side panel 28 in a similar manner. The two end panels 27 are each provided with a pair of axially aligned vertical holes towards one end of their horizontal framework members which engage with the two pins 33, 36. Thus the end panels 27 can pivot relatively to the side panel 28. Also, the side panel 28 can be disengaged from the end panel by lifting it relatively to the end panel 27 when the bottom hinge will bend allowing disengagement of the two top pins 31. The bottom pins 36 can then be disengaged and the panel 28 removed.

In an alternative structure the framework is made of metal, and in this case a bolted hinge arrangement, as shown in FIG. 10*a*, is used. In this construction, the framework of the side panel 28 is formed with forked ends 52 which fit over the end panels 27 and are secured to them by removable bolts 53.

The other side panel 28 is connected to the end panel 27 by a pair of engaging slides 37,38 allowing relative movement between the side panels 28 and the end panels 27. The slides are shown in FIG. 11 and comprise tubular members of elongated cross-section with a slot 39 cut along their length to leave a shorter flange 40 and a longer flange 41 on each slide. The two longer flanges 41 engage with each other so that the flange 41 of one slide lies within the other slide. In this way, the side panel 28 may be moved between a dropped position in which the side panel 28 engages with the surface on which the cot is stood and a raised position in which it is in alignment with the end panels 27, as best seen in FIG. 12.

The slide 37 has the edge of its flange 41 turned into form a lip 54. This engages the flange 41 of the other slide 38, to press it against the rear wall of the slide 37 and thus prevent rattling. The slide 38, which is connected to the side panel 28, is provided with a number of holes (not shown) extending through the wall thereof opposite the flange 41 at longitudinally spaced positions. The slide 37, which is connected to the end panels 27 is also formed with a number of longitudinally spaced holes (not shown) which extend through the flange 41. A spring loaded catch 42, as shown in FIG. 14, is mounted on each vertical framework member on the side panel 28 and is formed with a barrel 42 within which slides a pin 43 connected to a handle portion 44. A part 45 of the pin 43 is flattened so that when the pin 43 is drawn into the barrel by use of the handle

44 it compresses a spring 46. The pin 43 may then be held in the released position by turning the handle 44 through 90° so that the flattened portion 45 engages with the barrel 42. The pin 43 in its extended position, passes through any pair of corresponding holes on the two slides 37,38. In this way, the side panel 28 may be held in the limiting positions of its movement relatively to the end panels 27 or in a number of intermediate positions. An alternative form of catch is shown in FIG. 14*a*, and comprises a barrel 55 within which slides a pin 56. The barrel 55 is screwed to a bush 57, and a spring 58 is held between the bush and the pin, urging the pin outwardly. The pin 56 is attached to a rod 59, which passes through the bush 57 and is pivotally joined to a lever 61. The lever is so shaped that as it is rotated counter-clockwise from the position shown it bears on the bush 57 and draws out the rod 59, thus retracting the pin 56.

The cage 26 is attached to the cot structure by means of clips 47, as shown in FIG. 15, comprising a pivot arm 48 connected at one end for pivotal movement relatively to the cot structure and having a wire hook 49 pivotally connected to the lever arm 48 at a certain distance along its length. The wire hook is shaped to engage with the bottom horizontal members of the panels 27,28 to hold them in engagement with the structure, and employs an 'over-centre' locking action. An alternative clip 62 is shown in FIG. 15*a*, and is essentially similar in its operation to the clip 47, like parts being given like reference numerals. The clip 62 is mounted on top of one of the side members 10, and is shown as engaging a tubular metal cage element rather than a wooden one; in fact either type of clip is applicable to either a wooden or a metal cage. The clip 47, being mounted outside the cage 26, is rather difficult to engage or disengage if the cot is up against a wall, whereas the clip 62 is mounted inside the cage. It might be thought that siting the clip inside the cot could lead to discomfort or to a child accidentally releasing it, but the mattress lying over the clip is in fact an adequate safeguard. As further alternatives, the wire hook 49 may be replaced by a solid hook which engages a hole formed in an upright member of the cage panels, or replaced by a clip engaging with a stud on the upright member of the cage panels.

When the bed is in its extended position, a head-board and side panels may be provided at one end of the bed. The side panels are the end panels 27 of the cot cage 26 which are fixed to the longitudinal members 10 by a wing nut and bolt 50 and are connected to the leg 17 of the subsidiary structure 14 by a second wing nut and bolt 51, as shown in FIG. 16. With reference to FIGS. 17 and 18, the head-board is the base board 25, which is placed between the two resilient blocks 22,23 in the cot arrangement, now raised into a vertical position. The base board 25 is connected between the side panels 27 by means of four plates 52 secured to the side panels 27 and to the base board 25. For wooden side panels the plates 52 are secured by screws, but if the panels are metal then the plates may be hook-shaped, being screwed only to the base board 25.

As best seen in FIG. 18, the base board is located relatively to the side panels 27 by sliding it into the longitudinally extending slots 39 formed in the slides 37 mounted on the side panels 27, the clips 54 providing a suitable bearing surface.

The cage 26 may be used to form a playpen, as shown in FIGS. 19 and 20. The four panels 27,28 are placed on a surface surrounding the base board 25 which, like the thinner resilient block is formed in two hinged parts. The thinner resilient block 22 is opened out and placed on top of the opened out base board 25 to provide a resilient play area within the cage 26.

I claim

1. A bed of adjustable length providing in a shorter length a cot and in a longer length a bed comprising:
   - a main structure which has a substantially flat upper surface that defines the bed surface and legs towards the opposite ends thereof that support the main structure;
   - a pair of additional foldable structures each one of which is pivotally connected to respective ones of the opposite ends of the main structure and movable between an extended position, wherein the main structure is lengthened, and a collapsed position, wherein during movement to said collapsed position each foldable structure folds so as to be parallel but beneath the opposite ends of the main structure, each of said foldable structures being comprised of a pair of arms pivotally connected to the main structure and support means pivotally connected to each of the arms for supporting the latter parallel to the main structure when in the extended position, the relative lengths of the arms and the support means being such as to provide additional support for bed material at the opposite ends of the main structure in said collapsed position.

2. The bed as defined in claim 1, wherein said support means is a generally U-shaped member.

3. A bed as claimed in claim 1 wherein there are provided a pair of resilient mattresses of similar breadth, one being half the thickness of the other, the two mattresses being so dimensioned as, in the collapsed position of the additional structures, to lie on top of one another to cover the upper surface of the main structure and in the extended position to lie in end-to-end abutting relationship with the thinner mattress folded in half across its length, to form together a substantially continuous mattress covering the surfaces of the main structure and the additional structures; and
   - the additional structures are together one half the length of the main structure and the resilient mattresses are of the same length so that in the collapsed position of the bed the two mattresses are substantially coextensive when covering the flat upper surface.

4. A bed as claimed in claim 1 wherein a cage is provided around the surface of the main structure in said collapsed position, the cage of the additional structures comprising a plurality of connected frames detachably connected to the main structure to form a vertical wall around its upper surface; and
   - the cage is detachably secured to the main structure by means of clips.

5. A bed as claimed in claim 1 wherein a cage is provided around the surface of the main structure in said collapsed position, the cage of the additional structures comprising a plurality of connected frames detachably connected to the main structure to form a vertical wall around its upper one of said frames which frame is movable relative to the others in a vertical plane between a raised position in which said one frame is in

vertical alignment with the other frames and a dropped position below the vertical level of the other frames; and

releasable detent means are provided on said one

frame whereby said one frame may be held in a number of intermediate positions between the raised position and the dropped position.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,768,105 Dated October 30, 1973

Inventor(s) Francis Xavier Gregory

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

In the heading:

Please add:

-- [30] Foreign Application Priority Data

July 22, 1970 Great Britain.....35575/70

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(SEAL)
Attest:

McCOY M. GIBSON JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents

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