(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 070 448 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
17.06.2009 Bulletin 2009/25

(21) Application number: **07123070.0**

(22) Date of filing: **12.12.2007**

(51) Int Cl.:
A47D 15/00 *(2006.01)* ***A47C 21/08*** *(2006.01)*
D04B 21/18 *(2006.01)* ***D04B 21/16*** *(2006.01)*
E06B 9/02 *(2006.01)*

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC MT NL PL PT RO SE SI SK TR
Designated Extension States:
AL BA HR MK RS

(71) Applicant: **Wu, Sung-Tsun**
Pan Chiao City,
Taipei Hsien (TW)

(72) Inventor: **Wu, Sung-Tsun**
Pan Chiao City,
Taipei Hsien (TW)

(74) Representative: **Viering, Jentschura & Partner**
Postfach 22 14 43
80504 München (DE)

(54) Structure of rail

(57) A rail includes a frame (10) and a resilient web (20). The frame (10) includes a plurality of frame bars (11). The resilient web (20) surrounds and is mounted to the frame bars (11) to form a resilient central web of stretchability among the frame bars (11). As such, a safe and comfortable rail is constructed.

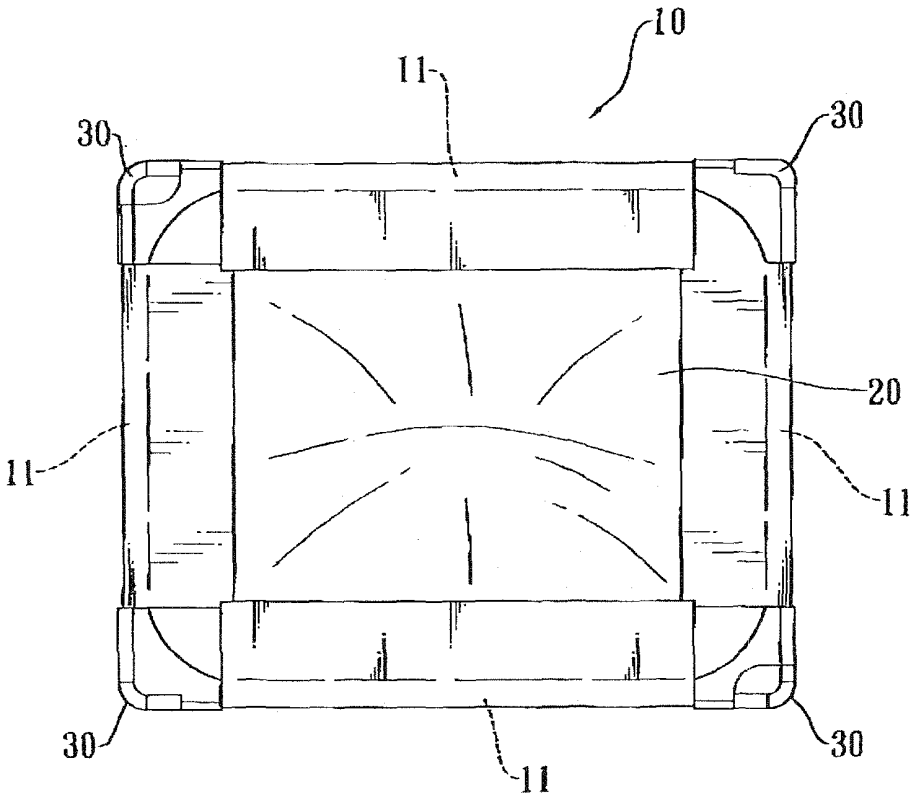

FIG. 1

EP 2 070 448 A1

Description

FIELD OF THE INVENTION

[0001] The present invention relates to a structure of rails, and in particular to a rail that is formed with a design of a frame and a resilient web to provide a barrier for protection purposes thereby ensuring a safe and comfortable environment particularly for families with babies, nurseries, sick beds, and the likes.

BACKGROUND OF THE INVENTION

[0002] A sickbed or a baby playpen is often provided with one or more rails to prevent the patient or baby from falling, in order to ensure protection of the patient and the baby. Conventionally, the rail is made by weaving wires or threads to form a net-like article. Others use a piece of cotton cloth or even curtain surrounding around a frame to form a web serving as a protection barrier. However, the material of web, the web may be air impermeable for a cloth web, or for a net-like web, the web may cause potential risk if the curiosity of a baby about the wire makes the baby play with the wires. In addition, the wires used to make the web may cause other potential risks, such as stumbling. Further, for rails comprising cotton cloth or curtain, other risk may exist when the rail falls or gets loosened by a baby's attempt to climb up the cotton cloth or curtain. The conventional web of the rail lacks extensibility and stretchability, which makes the rail incapable to resist against an external force applied thereto, and may thus trap a user in a dangerous condition.

[0003] On the other hand, a barrier or rail is also required for the door of a baby room to prevent the baby from crawling out of the baby room. Thus, a door rail is often mounted in a door frame to protect the baby. The door rail, however, is made of similar materials discussed above, namely wires, cotton cloth, and curtain. Similar potential risks exist when the baby's curiosity drives the baby to climb the rail, pull or play the wires. Further, stumbling may accidentally happen to general users. In addition, falling or collapsing of the rail may happen when the baby pulls the cloth or curtain web. Further, the conventional web of the door rail lacks extensibility and stretchability, which makes the rail incapable to resist against an external force applied thereto, and may thus trap a user in a dangerous condition.

[0004] Such dangerous conditions may create potential risks to babies due to the parent's carelessness and negligence, which makes the baby in the dangerous conditions. It is often read from newspaper reports that parents' carelessness puts their baby in dangers or even causes the death of their baby. It is thus noted that all the parents should exercise care in avoiding such tragedies.

[0005] Thus, the present invention is aimed to provide a rail that is safe and comfortable to prevent babies or children from being trapped in the above discussed risks or dangers.

SUMMARY OF THE INVENTION

[0006] An objective of the present invention is to provide a rail featuring safety and variability, which is realized by a web made of resilient fabric to allow for adjustment of dimension to be fit for bed or door frame of different sizes.

[0007] Another objective of the present invention is to provide a rail comprising a frame comprised of a plurality of frame bars to which a resilient web of stretchability is attached for distributing around an external force when the web is subjected to the application of the external force, thereby enhancing overall practicability.

[0008] A further objective of the present invention is to provide a resilient web, which comprises a resilient fabric made of resilient yarns and nylon yarns to feature four-direction stretchability with reduced risk of break of yarns, for combination with a rail to form a protection structure so as to enhance the practicability and convenience.

[0009] Yet a further objective of the present invention is to provide a resilient web that features excellent water absorbability and is easy to dry for combining with a rail to form a safety barrier.

[0010] To realize the above objectives, in accordance with the present invention, a rail is provided, comprising a frame and a resilient web. The frame comprises a plurality of frame bars. The resilient web surrounds and is mounted to the frame bars to form a resilient central web of stretchability among the frame bars. As such, a safe and comfortable rail is constructed.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] The present invention will be apparent to those skilled in the art by reading the following description of preferred embodiments thereof with reference to the drawings, in which:

[0012] Figure 1 is a perspective view of a rail constructed in accordance with the present invention;

[0013] Figure 2 is an exploded view of the rail of the present invention;

[0014] Figure 3 is a perspective view of a first embodiment of the rail of the present invention;

[0015] Figure 4 is a perspective view illustrating an application of the rail of the first embodiment of the present invention;

[0016] Figure 5 is a perspective view of a second embodiment of the rail of the present invention; and

[0017] Figure 6 is a perspective view illustrating an application of the rail of the second embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0018] With reference to the drawings and in particular to Figures 1 and 2, a rail constructed in accordance with the present invention comprises a frame 10 and a resilient web 20. The frame 10 comprises a plurality of frame bars 11 between adjacent ones of which a corner member 30 is arranged for connecting the frame bars 11 together. The resilient web 20 surrounds the frame bars 11 to form a web portion among the frame bars 11. Such a construction provides a safe and comfortable rail structure in accordance with the present invention.

[0019] The resilient web 20 is made of resilient yarns and nylon yarns, which are woven together. In an example, the resilient yarns are single filament yarns, while the nylons yarns are composite yarns comprising a plurality of filaments entangled together. An example of the composite yarns is made of 24 filaments entangled together. In an example, the ratio between the resilient yarn and the nylon yarn is 15:85 with a tolerance of $\pm$2%. The diameter (denier) of the resilient yarn can be for example 30, 40, 55, 77 or other suitable ones, while that of the nylon yarns can be for example 30, 40, 55, 70, 140, 210, 280, 560, 840 or other suitable ones. In an example, the resilient web 20 is formed by a fabric that is made by warp knitting of the yarns, wherein the yarns are subjected to lateral movement of performing the weaving, so that the resilient web formed of the fabric so made is of four-directional stretchability and thus enhanced extensibility with reduced risk of yarn breaking. Due to the nylon components of the resilient web 20, the resilient web 20 features enhanced water absorbability and is easy to dry. Alternatively, the resilient web 20 can be made of a fabric that is made by plain weaving in which warp knitting and weft knitting are alternately employed. Further alternately, the resilient web 20 can be formed in a net-like structure to ensure excellent air permeability.

[0020] Also referring to Figures 3 and 4, which shows a first embodiment of the present invention applicable to a rail of a bed or playpen for protecting an aged person or a baby from falling, the rail of the first embodiment comprises a frame 10 and a resilient web 20. The frame 10 comprises a plurality of frame bars 11 between adjacent ones of which a corner member 30 is arranged for connecting the frame bars 11 together. At least one frame bar 11 of the frame 10 includes, at a middle section thereof, an extension device 40 for selectively extending/contracting the frame 10. At joints of the lower one of the frame bars 11, transverse bars, also designated with reference numeral 11 for simplicity, are attached. Each of the joints of the lower frame bar 11 is provided with a collapse device 12, which comprises a connection block 121. The connection block 121 and an upright one of the frame bars 11 positioned thereabove are operatively coupled to an operation ring 122 and the frame bar 11, which is tubular, contains therein a spring 111 or other resilient elements and a stop block 112 operatively coupled to the operation ring 122 whereby when the operation ring 122 is moved upwards and disengages from the connection block 121, the associated transverse bar 11 is allowed to fold. In this way, the corner members 30, the frame bars 11, and the collapse devices 12 together construct a three-dimensional bed-side protection rail, as shown in Figure 3, with the resilient web 20 surrounding the frame bars 11 to form a resilient central web of stretchability among the frame bars 11 of the frame 10; and the resilient web 20 features four-directional stretchability, which gives the web enhanced extensibility with reduced risk of yarn breaking. Due to the component of nylon of the resilient web 20, the resilient web 20 features excellent water absorbability and is easy to dry. Further, the web 20 can be constructed in the form of a net to ensure excellent air permeability. Further, the transverse bars 11 extending from the jointing corners of the lower frame bar 11 allows the rail to be positioned and retained below a bed mattress 50, as shown in Figure 4, to provide a safe and comfortable bed-side rail.

[0021] Figures 5 and 6 illustrate a second embodiment of the rail structure in accordance with the present invention, which is applicable to a door frame rail to prevent a baby or a young child from leaving a room to which the door frame is mounted. The door frame rail of the present invention comprises a frame 10 and a resilient web 20. The frame 10 comprises a plurality of frame bars 11 between adjacent ones of which a corner member 30 is arranged for connecting the frame bars 11 together. One of two lateral-side frame bars 11 is provided, at opposite ends thereof, with retention devices 60 respectively, and the other one of the two lateral-side frame bars 11 is also provided with upper and lower retention devices 60. The upper retention device 60 of the lateral-side frame bar 11 is provided with an operation handle 61 for causing the retention device 60 to extend outward for tightly engaging an external wall. The lower retention device 60 is provided with a slide block 62, which is operatively coupled to a spring 63 for causing sliding of the retention device 60 to engage the external wall. In this way, the corner members 30, the frame bars 11, and the retention devices 60 together construct a three-dimensional door-frame rail, as shown in Figure 5, with the resilient web 20 surrounding the frame bars 11 to form a resilient central web of stretchability among the frame bars 11 of the frame 10; and the resilient web 20 features four-directional stretchability, which gives the web enhanced extensibility with reduced risk of yarn breaking. Due to the component of nylon of the resilient web 20, the resilient web 20 features excellent water absorbability and is easy to dry. Further, the web 20 can be constructed in the form of a net to ensure excellent air permeability. Further, the retention devices 60 mounted to the lateral-side frame bars 11 of the frame 10 allow the rail to be positioned and retained within a door frame 70, as shown in Figure 6, to provide a safe and comfortable door-frame rail.

[0022] To summarize, the present invention possesses the following features:

[0023] (1) A resilient web is mounted among frame bars of a frame and the resilient web is of four-directional stretchability with reduced risk of yarn breaking so that when subjected to the application of an external force, the resilient yarns that form the web functions to spread out and widely distribute the force to thereby provide a barrier that is both safe and comfortable to the users.

[0024] (2) The frame has a lower frame bar having joints, to which transverse bars are mounted for being positionable below a bed mattress to prevent an aged person or a baby from falling off the bed mattress thereby providing a safe and comfortable bed-side rail.

[0025] (3) Optionally, retention devices are operably mounted to lateral-side frame bars to allow the rail to be positioned and retained in a door frame that prevents a baby or a young child from unexpectedly leaving a room to which the door frame is mounted thereby providing a safe and comfortable door-frame rail.

[0026] (4) With the stretchability of the resilient web, the dimension of the frame is allowed to adjust for extension/contraction to be fit for the needs of different applications thereby expanding the applicability of the rail of the present invention and thus ensuring convenience and improvement.

[0027] Although the present invention has been described with reference to the preferred embodiments thereof, it is apparent to those skilled in the art that a variety of modifications and changes may be made without departing from the scope of the present invention which is intended to be defined by the appended claims.

Claims

1. A rail comprising:

a frame comprising a plurality of frame bars; and a resilient web surrounding and mounted to the frame bars to form a resilient central web of stretchability among the frame bars,

whereby a safe and comfortable rail is constructed.

2. The rail as claimed in Claim **1** further comprising a corner member arranged between adjacent frame bars.

3. The rail as claimed in Claim **1** or **2** further comprising an extension device arranged in a middle section of a frame bar of the frame for selectively extending/contracting the frame and wherein a transverse bar is mounted to a joint of a lower one of the frame bars of the frame by a collapse device, the collapse device comprising a connection block, which, together with a frame bar positioned thereabove, is operatively coupled to an operation ring, the frame positioned thereabove containing therein a spring and a stop block operatively coupled to the operation ring so as to form a three-dimensional side-bed rail structure.

4. The rail as claimed in Claim **1** or **2** further comprising retention devices provided at opposite ends of one lateral-side frame bar of the frames and upper and lower retention devices provided on an opposite lateral-side frame bar, the upper retention device comprising an operation handle for causing the retention device to extend outward for tightly engaging an external wall, the lower retention device comprising a slide block, which is operatively coupled to a spring for causing sliding of the retention device to engage the external wall, whereby a three-dimensional door-frame rail structure is provided.

5. The rail as claimed in Claim **1**, wherein the resilient web comprises a resilient fabric that is made of resilient yarns and nylon yarns.

6. The rail as claimed in Claim **5**, wherein the nylon yarn is formed by entangling a plurality of filaments.

7. The rail as claimed in Claim **5**, wherein the resilient yarn and the nylon yarn that form the resilient web is of a ratio of 15:85 with a tolerance of $\pm$2%.

8. The rail as claimed in Claim **5**, wherein the resilient yarn has a diameter selected from a group consisting of 30, 40, 55, and 70 denier.

9. The rail as claimed in Claim **5**, wherein the nylon yarn has a diameter selected from a group consisting of 30, 40, 55, 77, 140, 210, 280, 560, and 840 denier.

10. The rail as claimed in Claim **5**, wherein the resilient fabric is made by warp knitting.

11. The rail as claimed in Claim **1** or **5**, wherein the resilient web is made in the form of a net for air permeability.

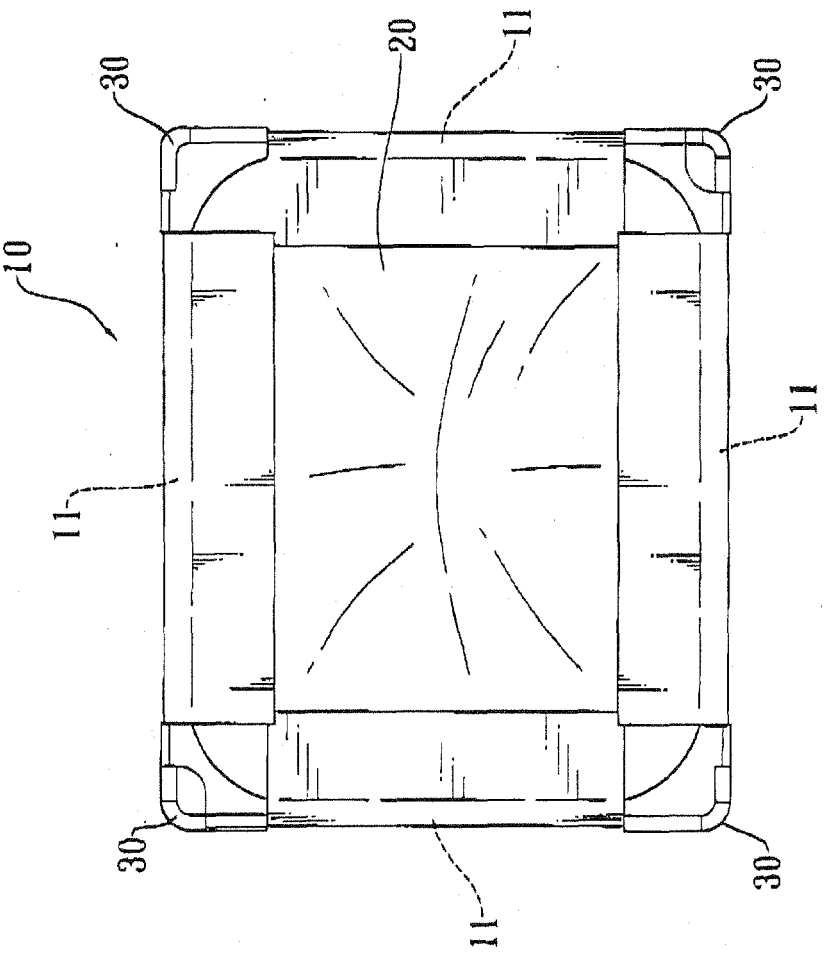

FIG. 1

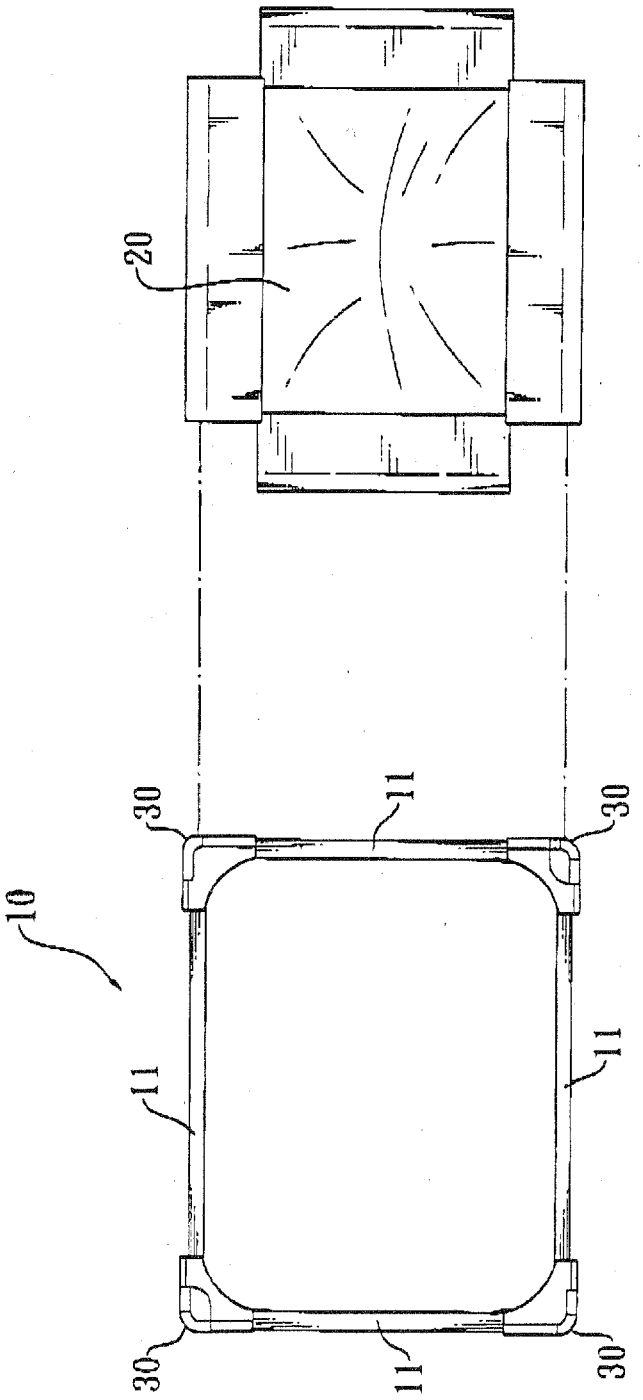

FIG. 2

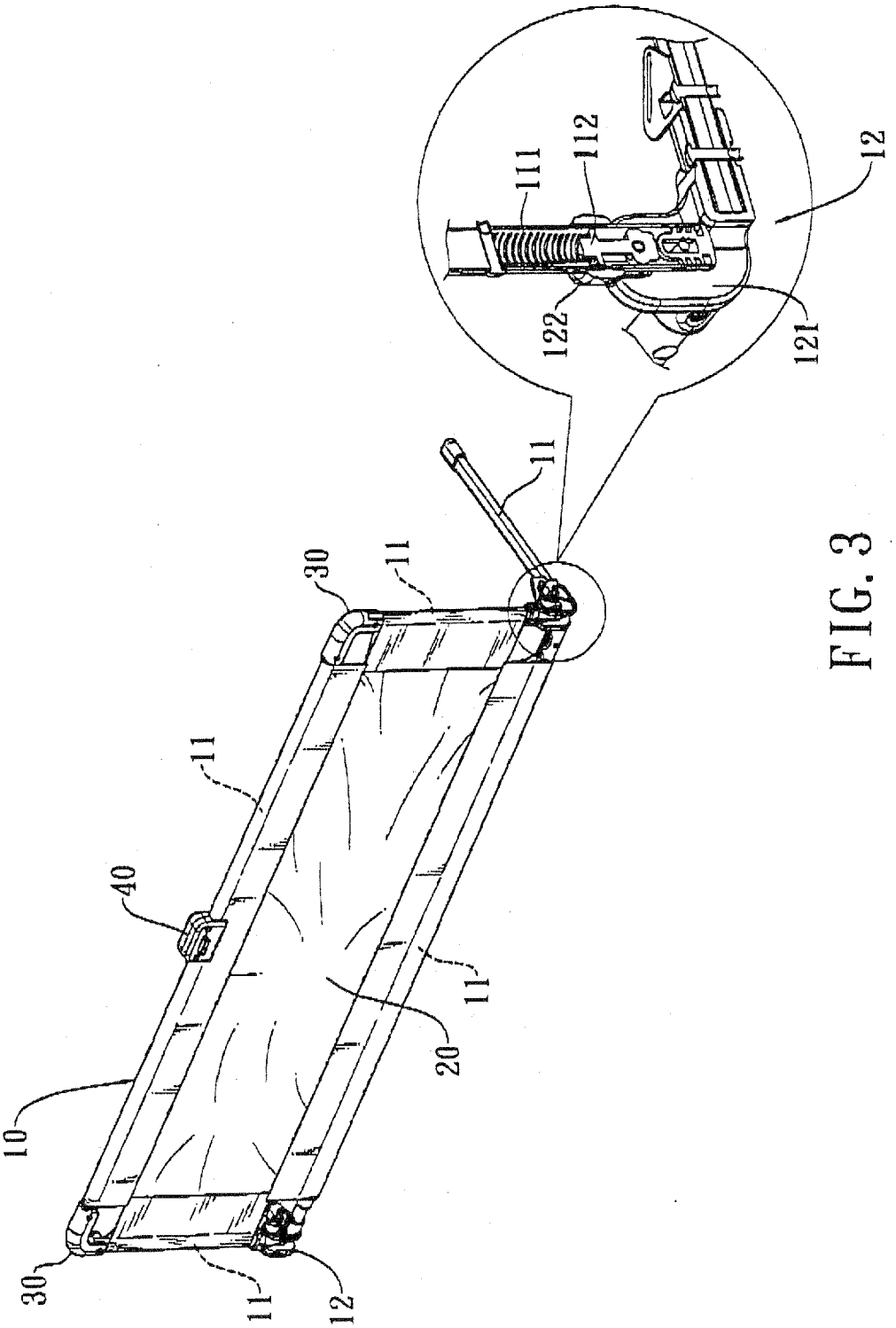

FIG. 3

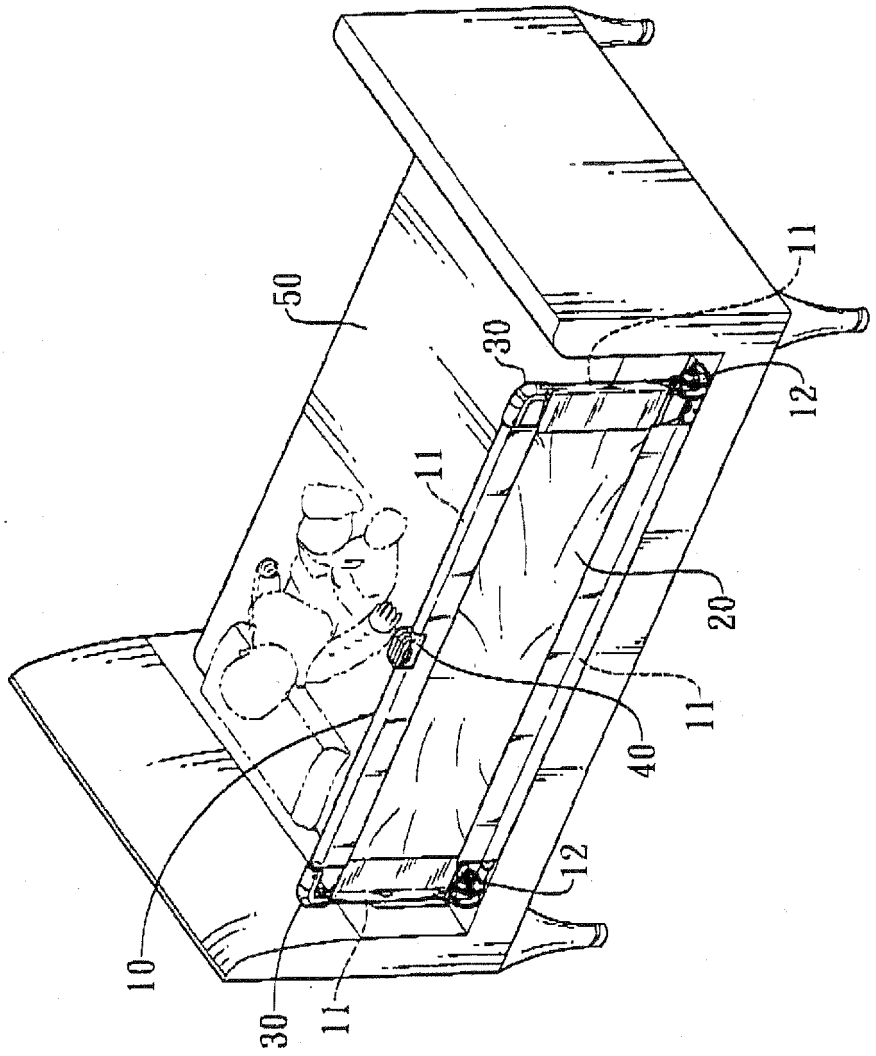

FIG. 4

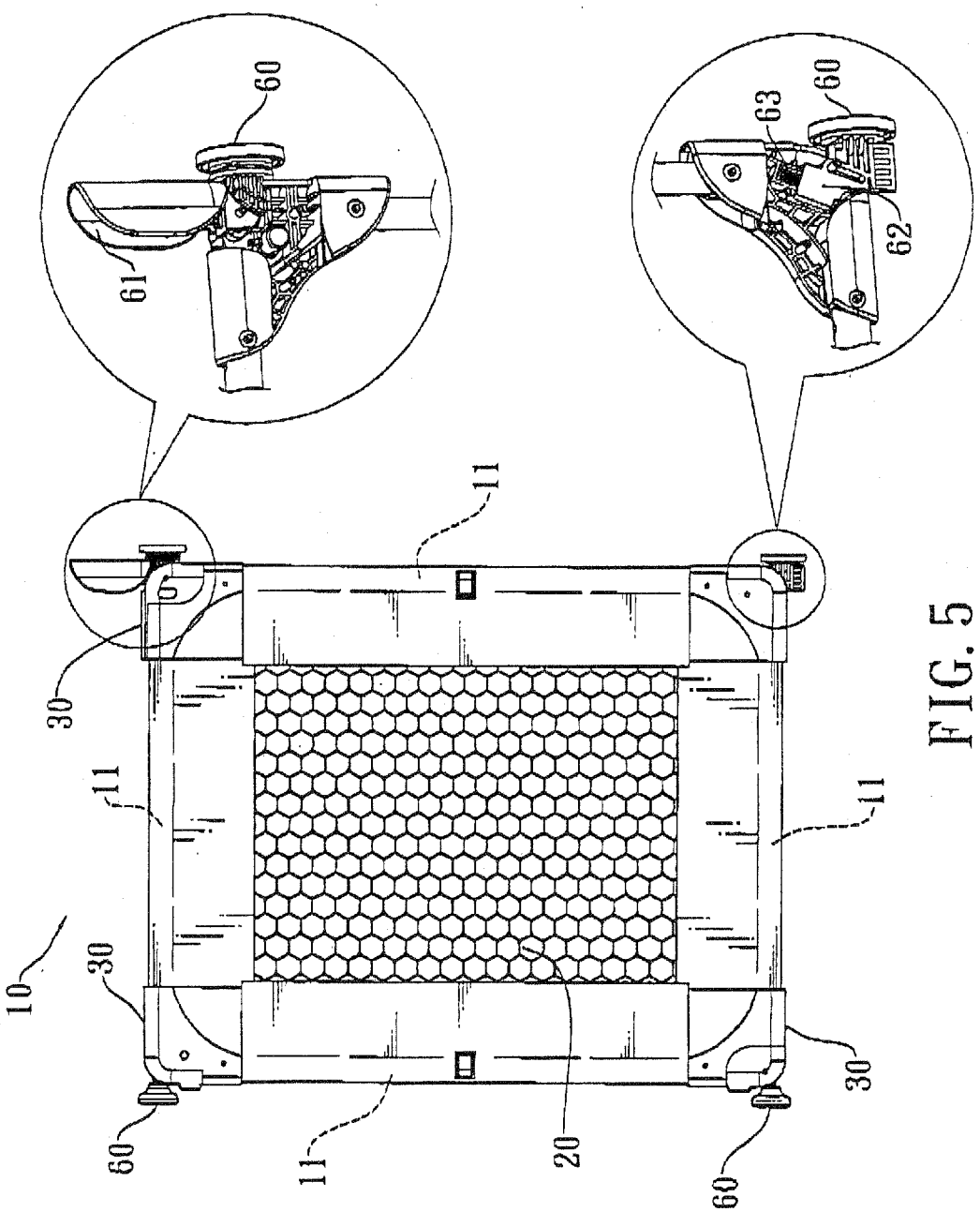

FIG. 5

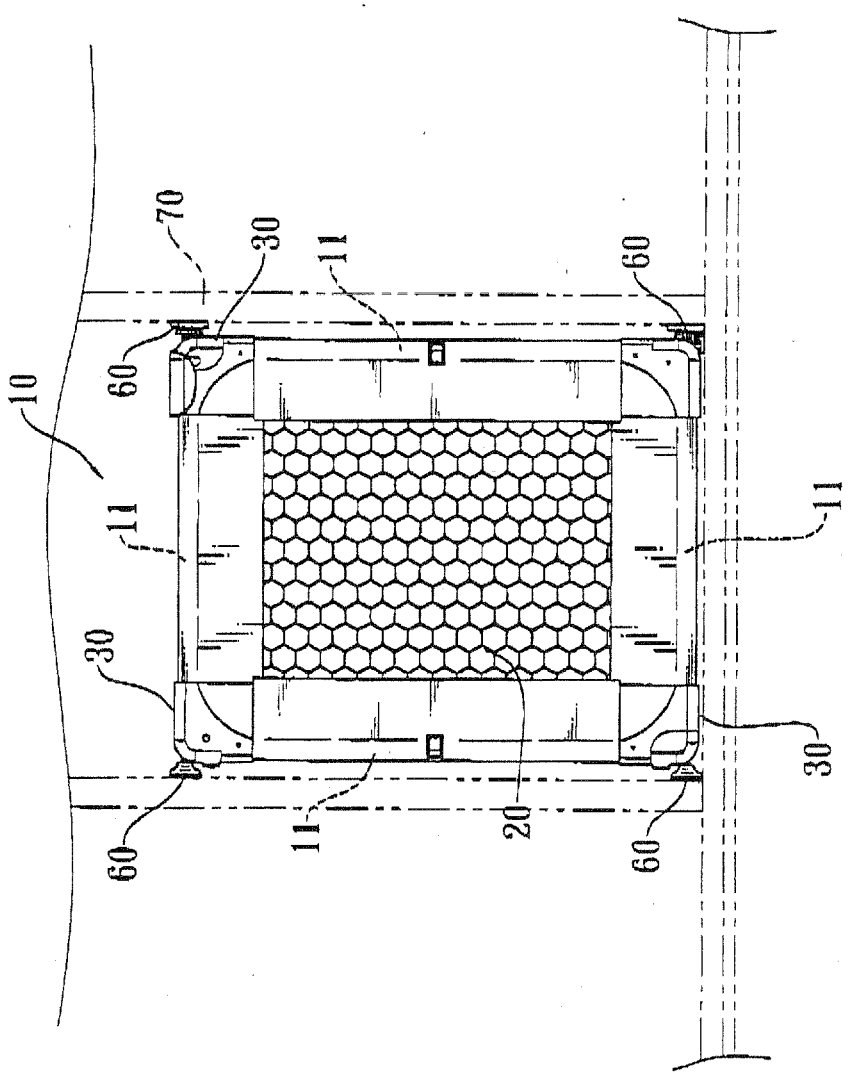

FIG. 6

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 07 12 3070

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2007/089242 A1 (BATTISTON) 26 April 2007 (2007-04-26) * paragraph [0027]; figure 1 *	1,2,5-11	INV. A47D15/00 A47C21/08
Y		3	D04B21/18 D04B21/16
Y	EP 1 593 324 A (WU) 9 November 2005 (2005-11-09) * figures *	3	E06B9/02
X	GB 2 129 473 A (BARNETT) 16 May 1984 (1984-05-16) * abstract; figure 1 *	1	
Y		4	
Y	WO 2004/079142 A (BABY DAN AS) 16 September 2004 (2004-09-16) * abstract; figure 1 *	4	
A	US 2003/101777 A1 (WILLIAMS) 5 June 2003 (2003-06-05) * paragraph [0007]; claims *	5,6,10	TECHNICAL FIELDS SEARCHED (IPC)
A	GB 2 225 716 A (BARNETT) 13 June 1990 (1990-06-13) * page 4, paragraph 2 *	11	A47D A47C A61G D04B E06B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	10 June 2008	Kis, Pál

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 07 12 3070

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

10-06-2008

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2007089242 A1	26-04-2007	NONE	
EP 1593324 A	09-11-2005	AT 352233 T	15-02-2007
		DE 602004004510 T2	08-11-2007
		DK 1593324 T3	29-05-2007
		ES 2281749 T3	01-10-2007
GB 2129473 A	16-05-1984	NONE	
WO 2004079142 A	16-09-2004	AT 377127 T	15-11-2007
		AU 2004217848 A1	16-09-2004
		DK 1601852 T3	03-03-2008
		EP 1601852 A1	07-12-2005
		ES 2294469 T3	01-04-2008
US 2003101777 A1	05-06-2003	AU 2002352788 A1	23-06-2003
		EP 1461482 A2	29-09-2004
		JP 2005511914 T	28-04-2005
		WO 03050338 A2	19-06-2003
GB 2225716 A	13-06-1990	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82