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IT 001127194 B JP 2004041628 A
US 5553336 A

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Internet

(54) Abstract Title: **Height adjustment assembly for a changing table**

(57) The apparatus is a height adjustment assembly 10, 60 for a child's changing table 12 with support tubes 22 inserted into sockets 38 at the top of a supporting structure 20 such as a play yard 14. A height adjustment fixture 11 external to the support tubes rests on top of the supporting structure and has a vertical series of recesses such as slots 16, 62 or holes and a ring 26 through which the changing table's support tube 30 slides. The changing table has an attached latching device 52, 66 that locks into the recesses 16, 62 to hold the table at several heights above the support structure. Alternate embodiments include a structure in which the height adjustment fixture (84 fig.4) contains the latching device (90) and the recesses (98) are in the changing table (86).

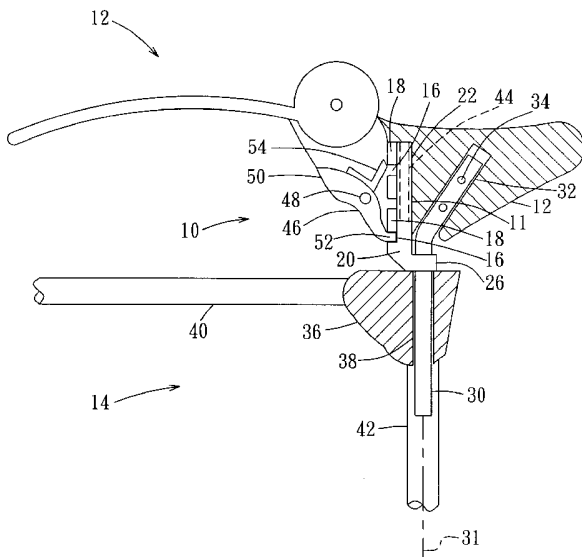


FIG. 1

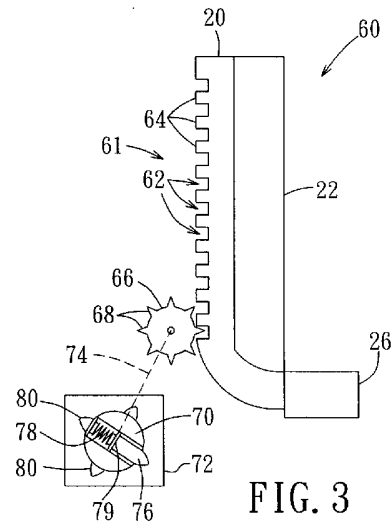


FIG. 3

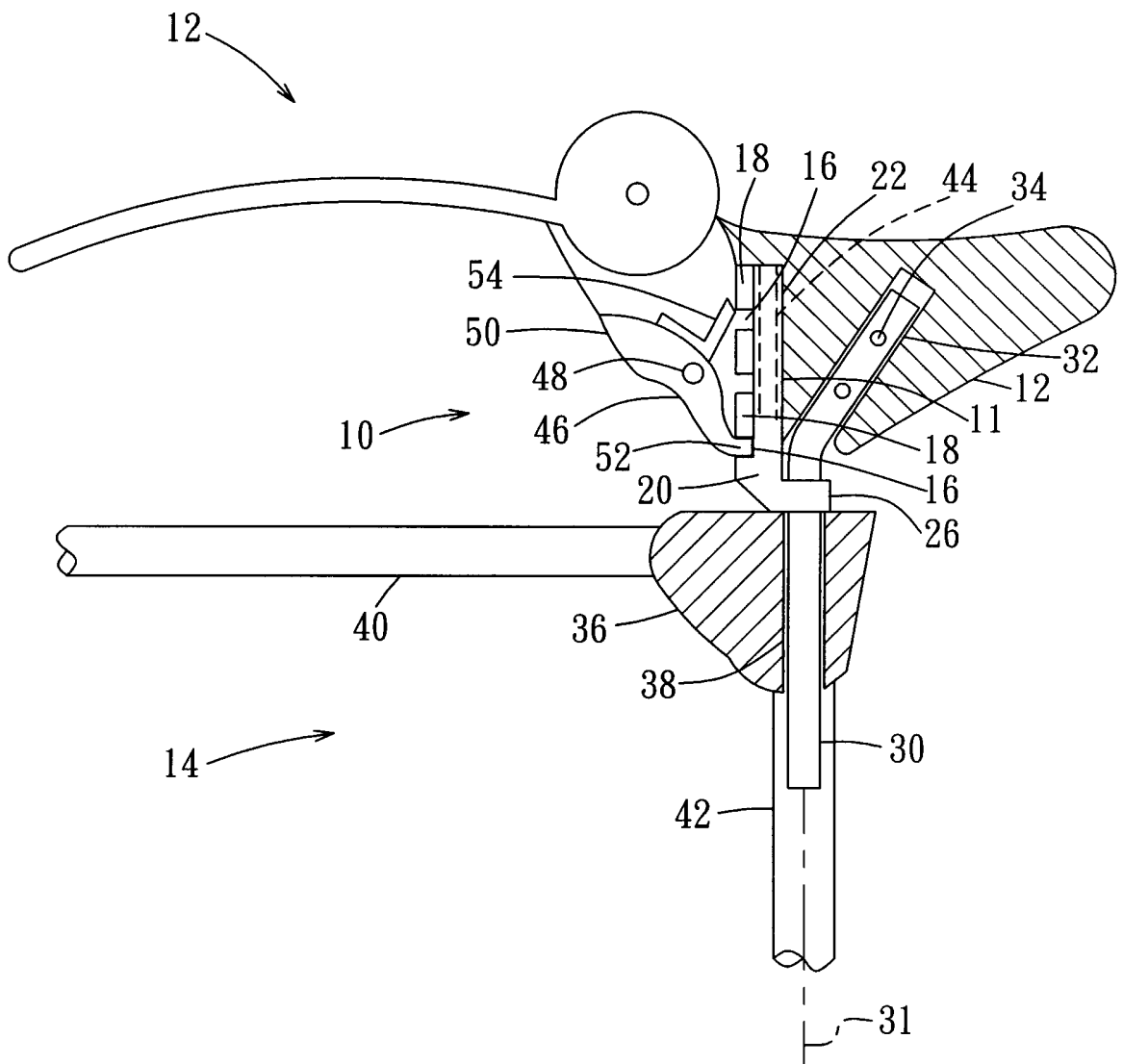


FIG. 1

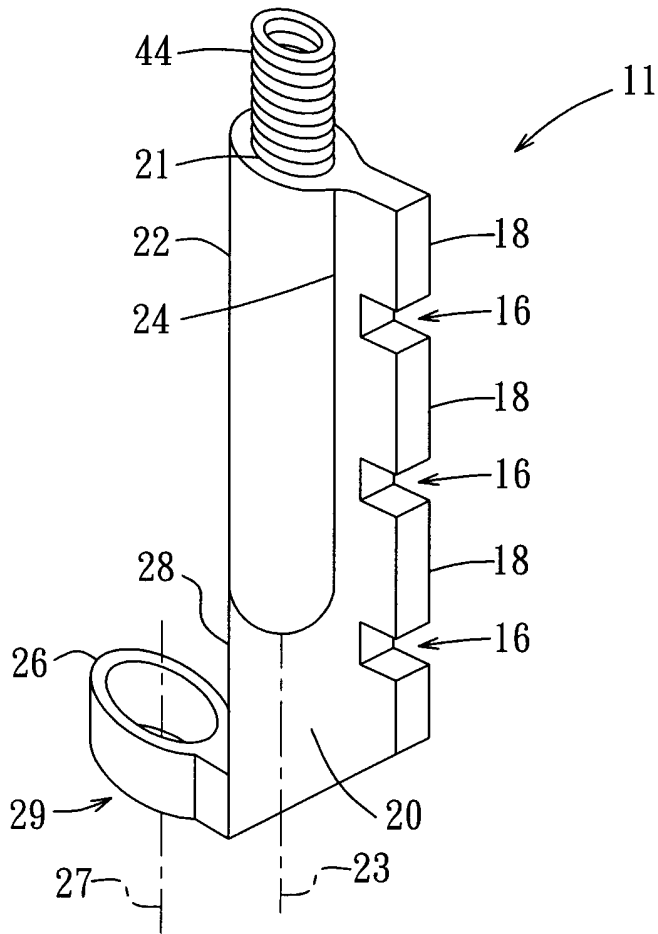


FIG. 2

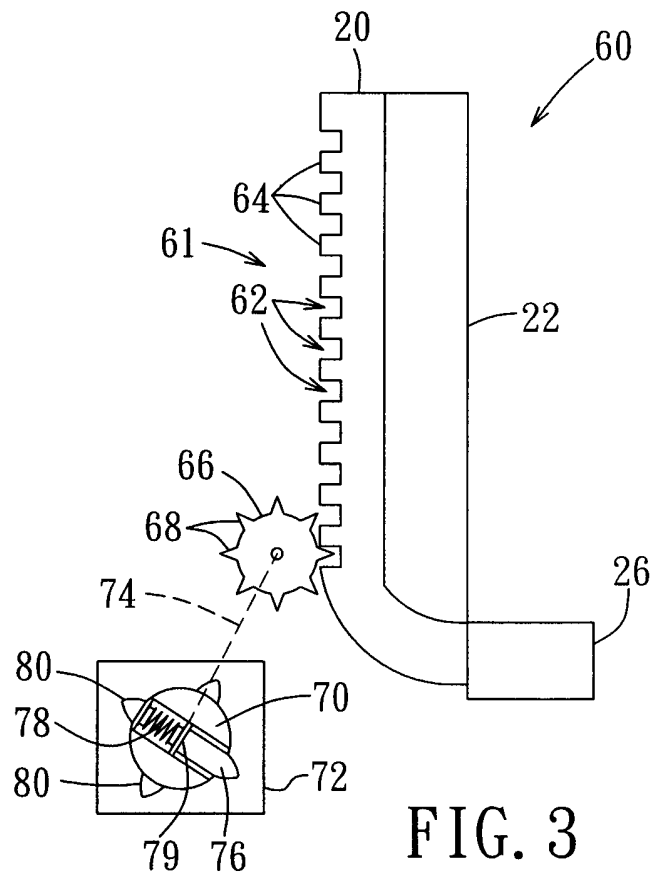


FIG. 3

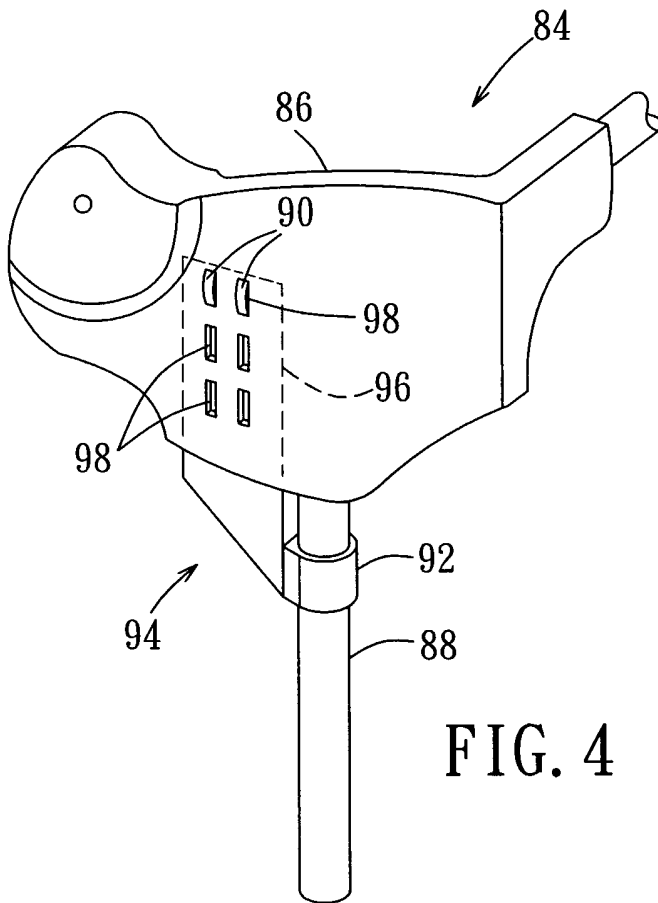


FIG. 4

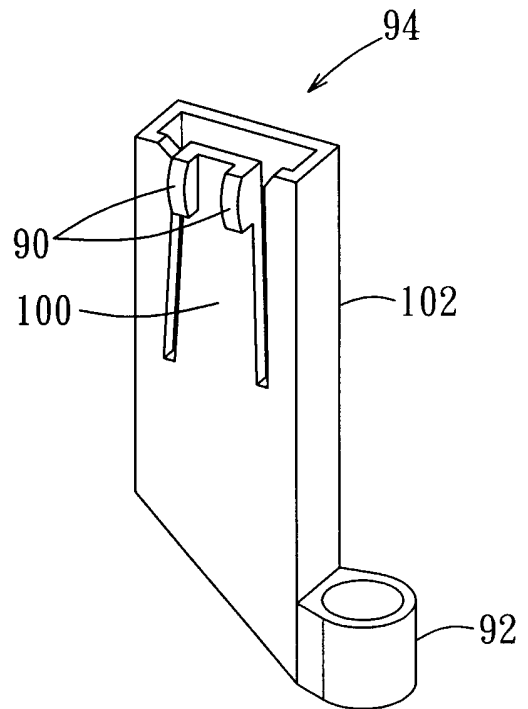


FIG. 5

HEIGHT ADJUSTMENT ASSEMBLY FOR A CHANGING TABLE

The invention deals generally with changing tables for infants, and more specifically with a height adjustment apparatus for a changing table installed on top of a structure such as a child's play yard.

5 Children's playpens, now more often called play yards, are a commonly available accessory for use with infants and small children. It is not at all unusual for parents to take a folding play yard along on a trip or visit in order to provide a space for the child to play and sleep. There is also another accessory for children that is just as vital, but not taken
10 out of the child's home as frequently. That is a changing table or bassinet.

However, there are now available some changing tables that simply attach to a play yard and therefore are not at all difficult to take out of the home along with the play yard. Most of these tables take advantage of
15 the height of the sides of the play yard and are attached to the top of the play yard sides.

U.S. Patent 5,339,470 to Shamie discloses one such combination playpen and changing table that re-hangs the bottom of the playpen from short straps attached to the horizontal top rails of the playpen in order to
20 provide a somewhat higher surface for changing the child. U.S. Patent 5,553,336 to Mariol uses a different approach by providing a complete assembly that resembles a second layer of the play yard that fits into wells on the top four corners of the play yard. Another type of changing table available is supported off one corner of a play yard, and it is rotated
25 beyond the walls of the play yard when not in use.

The problem with such arrangements is that they furnish only one height for the changing table, and that one height, which is keyed to the

existing height of the play yard walls, is usually too low for an adult to use with comfort, because adults of average height must bend down to the level of the changing table. Furthermore, any changing table with a single pre-designed height can not possibly suit all adults.

5 It would be very beneficial to have an uncomplicated changing table that attaches to the top of a play yard and is easily adjustable to accommodate adults of different heights.

 The present invention provides a simple structure for attaching a height adjustable changing table to the top of a play yard or other
10 structure. To accept the support structure of the changing table, the play yard or other supporting structure requires only that a socket with an open top be attached to an upper edge of the supporting structure. It is probably most convenient and most stable if two sockets are mounted near two upper corners of a play yard. A vertical support for the
15 changing table then fits into each socket, and both the changing table and the entire height adjustment assembly are attached to the play yard without any further modification to or addition of internal structures for either the play yard support or the changing table support.

 The changing table support is attached to the changing table
20 structure by conventional means such as rivets or screws, and the height adjustment assembly fits within the changing table structure, but the height adjustment assembly is external to both the support on the changing table and the socket on the play yard.

 The main part of the height adjustment assembly of the preferred
25 embodiment is a height adjustment fixture that contains three sections. One section is a coupling, which in the preferred embodiment is a ring that is horizontally oriented as it fits around the changing table vertical

support just below the location where the changing table support protrudes out of the changing table. An extension oriented parallel to the axis of the coupling ring is attached to and slightly offset from the coupling ring and contains the other two sections of the fixture. The
5 second section is a cylindrical tube, the axis of which is parallel to the axis of the coupling ring and the axis of the changing table support. This tube fits within the changing table, and into a cylinder integrated into the changing table structure. The tube slides within the cylinder to maintain alignment between the changing table and the third section which is a
10 rack assembly.

The rack assembly is a linear strip attached to the outside of the cylindrical tube, with the linear strip containing a series of slots and separating lands so that it resembles the rack of a gear and rack assembly. In one embodiment of the invention, a gear mounted on the
15 changing table engages the lands, and turning the gear raises or lowers the changing table.

The preferred embodiment of the invention uses a spring loaded lever that engages the slots, but permits the height of the changing table to be manually lifted or lowered when the lever is pushed to move its
20 latching end out of the slots.

The particular benefits of the height adjustment assembly of the invention are simple structure, inexpensive manufacturing, ease of use, and attachment to any supporting structure with nothing more than the addition of one or two tubular sockets at the top of the supporting
25 structure. In particular, there is no requirement to put holes in any of the tubular structure of the supporting structure or install complex locking mechanisms within the supports of either the changing table or the

supporting structure to which it is attached.

According to one aspect of this invention, a height adjustment assembly for a changing table comprises: a changing table support attached to a changing table and moveable vertically relative to a supporting structure upon which the changing table support is supported; a coupling coupled to the changing table support and permitting the changing table support to move relative to the coupling; a support structure attached to the coupling and extending from the coupling and oriented in the direction of movement of the changing table support; at least two recesses in the support structure, with the recesses aligned in the direction of movement of the changing table support; and a latching mechanism attached to the changing table and oriented to mate with the recesses on the support structure as the changing table moves to place each recess adjacent to the latching mechanism, with the latch being releasable.

According to another aspect of this invention, a height adjustment assembly for a changing table comprises: a changing table support attached to a changing table and moveable vertically relative to a supporting structure upon which the changing table support is supported; a coupling coupled to the changing table support and permitting the changing table support to move relative to the coupling; a support structure attached to the coupling and extending from the coupling and oriented in the direction of movement of the changing table support; at least two recesses in the changing table, with the recesses aligned in the direction of movement of the changing table support; and a latch attached to the support structure and oriented to mate with the recesses in the changing table as the changing table moves to place each recess

adjacent to the latch, with the latch being releasable.

Figure 1 is a partial sectional side view of the height adjustment assembly of the preferred embodiment of the invention installed within a changing table that is shown atop a play yard;

5 Figure 2 is a perspective view of the height adjustment fixture of the preferred embodiment of the invention of Figure 1;

Figure 3 is a side view of an alternate embodiment of the height adjustment assembly of the invention;

10 Figure 4 is a perspective view of another alternate embodiment of a height adjustment assembly of the invention; and

Figure 5 is a perspective view of the coupling and latch assembly of the alternate embodiment of Figure 4.

15 Figure 1 is a partial sectional side view of a height adjustment assembly 10 of the preferred embodiment of the invention installed within a changing table 12 shown atop a play yard 14, and Figure 2 is a perspective view of the a height adjustment fixture 11 of the preferred embodiment of the invention. The view of the height adjustment fixture 11 in Figure 2 is from the opposite side of the view shown in Figure 1 in order to better show the structure of the height adjustment fixture 11.

20 The height adjustment fixture 11 of Figs. 1 and 2 includes a series of at least two slots 16 alternating with lands 18 which, when installed within the changing table 12, are aligned in a vertical orientation. The slots 16 and the lands 18 are formed on a support structure 20, and a tube 22 is attached to the support structure 20 on a surface 24 opposite the lands
25 18. The height adjustment fixture 11 also includes a coupling ring 26 which is attached to the support structure 20 at the end of the support structure 20 remote from an opening 21 of the tube 22. The coupling

ring 26 is attached to the support structure 20 at a surface 28 which is the surface most remote from the lands 18, so that an axis 27 of the coupling ring 26 is parallel to an axis 23 of the tube 22 and to an axis 31 of a changing table support 30, and the coupling ring 26 has no interfering structures on either side thereof along the axis 27.

As shown in Figure 1, the clearance on both sides of the coupling ring 26 permits the height adjustment fixture 11 to be installed within the changing table 12 and perform its function although it need not be permanently attached to the changing table 12. For the changing table 12 to accommodate the height adjustment fixture 11, the changing table 12 itself needs three structures. One is the changing table support 30 which can be a basic tube structure that is used to attach most accessories to supporting structures such as the play yard 14. The changing table support 30 is attached to the changing table 12 by any conventional means, such as a hole 32 and fasteners 34.

The attachment of the changing table 12 to the play yard 14 is also conventional in that a holding fixture 36 with a socket 38 is attached to the play yard 14 at an upper location, such as adjacent to a corner where a horizontal rail 40 is attached to a vertical support 42. The socket 38 in the holding fixture 36 can then accept any simple rod or tube, such as the changing table support 30, as long as the tube is of smaller diameter than the socket 38. However, such simple holders for accessory structures provide no height adjustment since the lower part of the accessory structure would merely sit upon the holding fixture 36.

The simple structure of the height adjustment fixture 11 furnishes a vital part of the height adjustment with no modification of either the support 30 or the holding fixture 36. In the preferred embodiment shown

in Figure 1, the height adjustment fixture 11 is shown installed in the changing table 12. This is accomplished by slipping the coupling ring 26 over the changing table support 30 so that a bottom surface 29 of the coupling ring 26 rests upon the holding fixture 36. The tube 22 of the height adjustment fixture 11 then fits into a socket concentric with the tube 22 within the changing table 12 and aids in aligning the height adjustment fixture 11 with the changing table 12. The tube 22 also holds a spring 44. The spring 44 is a compression spring, which is shown with dashed lines in Figure 1 and inserted within the tube 22 in Figure 2, has its upper end against an inner surface of the changing table 12, and serves to overcome any friction between the tube 22 and its socket. The spring 44 thus assures that the height adjustment fixture 11 continues to rest on the holding fixture 36 of the play yard 14 as the changing table 12 is raised.

In regard to stability and alignment, it is worthwhile to note that the most typical installation of the height adjustment assembly 10 of the present invention is in pairs with one on each of the two supports 30 located at opposite ends of the changing table 12. The two supports 30 are installed into the holding fixtures 36 located near adjacent corners of the play yard 14. Such an arrangement provides an appropriate length for the changing table 12 and does not require any locking apparatus to prevent the supports 30 from rotating within the fixtures 36.

The height adjustment assembly 10 requires one more device attached to the changing table 12. That is a lever 46 which holds the changing table 12 in one of the height positions provided by the slots 16. The lever 46 rotates around a pivot point 48 when a lever handle 50 is pushed toward the lands 18, and as the lever 46 rotates, a latch 52

moves out of the slot 16 in which it is lodged. This permits the changing table 12 to be manually raised or lowered. When the lever handle 50 is released, a spring 54 forces the lever handle 50 away from the slots 16, thus moving the latch 52 into an available slot 16. Since height adjustment assemblies are typically installed near the ends of the changing table 12, and since the user's hands are in contact with the underside of the changing table 12 when pushing the lever handle 50, it is not at all difficult to operate two lever handles 50 simultaneously and also raise or lower the changing table 12.

Figure 3 is a side view of an alternate embodiment of the height adjustment assembly 60 of the invention. The support structure 20, the tube 22, and the coupling ring 26 of the height adjustment assembly 60 are identical to and serve the same function as the same parts of the height adjustment fixture 11 in Figs. 1 and 2, so they are identified by the same reference numerals. The difference in the height adjustment assembly 60 is in the recess and land structure. Alternating slots 62 and lands 64 of the height adjustment assembly 60 are constructed to operate as a rack 61 in conjunction with a gear 66 so that the spacing of the lands 64 must match the spacing of teeth 68 on the gear 66. The height adjustment is then accomplished by rotating the gear 66 in the appropriate direction.

The gear 66 is mounted upon and attached to the changing table (not shown in Figure 3) in a manner similar to the lever 46 of Figure 1, so that as the gear 66 literally climbs up the rack 61, the changing table is raised. This eliminates the requirement to manually lift the changing table to adjust the height.

The gear 66 can be rotated by any conventional means. One

rotating device is shown in Figure 3. A knob 70 is mounted on a surface 72 of the changing table (not shown) and drives the gear 66 by conventional linking means 74 either directly or through a reduction drive. One requirement for any height adjustment assembly is that it have some
5 sort of latching device to prevent the changing table from moving down with increased weight. The latching device is provided for the height adjustment assembly 60 at the knob 70. The knob 70 includes a latch 76 that is pushed outward by a spring 78 and moves into slots 80 to prevent both the knob 70 and the gear 66 from turning unless the latch 76
10 is pulled into the knob 70 by moving a tab 79 against the spring 78. The latch 76 is only one of many conventional devices to permit locking the knob 70. Another such device is a tab on a spring loaded shaft that mates with slots around the shaft unless moved axially to disengage the tab from the slots for turning the shaft.

15 Figure 4 is a perspective view of another alternate embodiment of a height adjustment assembly 84 of the invention with only a partial structure 86 of the changing table shown. Similar to the changing table 12 of Figure 1, the changing table structure 86 has a changing table support 88 attached so that the support 88 can be installed into a holding
20 fixture (not shown) on the supporting structure upon which it will be supported. The essential difference between the height adjustment assembly 84 and the height adjustment assembly 10 of Figure 1 is that latches 90 are integrated with a coupling 92 into a coupling and latch assembly 94. The coupling and latch assembly 94 thus minimizes the
25 number of parts and simplifies the design of the changing table structure 86. All that is required within the changing table structure 86 are a socket 96 (shown within invisible lines) within which the coupling and

latch assembly 94 fits, and holes 98 to mate with the latches 90. As with the height adjustment assembly 10 of Figure 1, the height adjustment assembly 84 permits the changing table support 88 to slide within the coupling 92 when the latches 90 are depressed, and the changing table structure 86 and the entire changing table are raised as the coupling and latch assembly 94 slides within the socket 96. Releasing latches 90 then permits them to mate with other holes 98 and hold the changing table at a different height.

Figure 5 is a perspective view of the coupling and latch assembly 94 of the height adjustment assembly 84 of Figure 4. The latches 90 are mounted upon a spring 100 so that simply pressing the latches 90 in toward the center of the support structure 102 flexes the spring 100 and releases the latches 90 from the holes 98 in the changing table structure 86 (Figure 4). This simple mechanism on a support structure 102 eliminates the need for an external latching mechanism on the changing table. It should be understood that the rectangular configuration of the support structure 102 and the use of pairs of latches 90 and twin holes 98 (Figure 4) are not vital to the function of the height adjustment assembly 84, and many other configurations of these structures can be used.

The invention thus provides a convenient and easily manufactured height adjustment for a changing table used in conjunction with a play yard or any other supporting structure, and it requires no complex modification of the supporting structure or the changing table supports because the height adjustment assembly is external to those supports.

It is to be understood that the form of this invention as shown is merely a preferred embodiment. Various changes may be made in the function and arrangement of parts; equivalent means may be substituted

for those illustrated and described; and certain features may be used independently from others without departing from the spirit and scope of the invention as defined in the following claims. For example, springs rather than the leaf spring 54 as shown can be used, or the height
5 adjustment fixture 11 can use holes or any other type of recesses within the support structure 20 instead of slots 16, and the latch can be a spring loaded retractable pin instead of the pivoting latch 52. Furthermore, neither the changing table support nor the coupling of the height
10 adjustment assembly need to have cylindrical cross sections, nor the coupling even be a ring, as long as they mate, can be assembled together, and the support can move within the coupling.

CLAIMS:

1. A height adjustment assembly for a changing table comprising:
 - a changing table support attached to a changing table and moveable vertically relative to a supporting structure upon which the changing table support is supported;
 - a coupling coupled to the changing table support and permitting the changing table support to move relative to the coupling;
 - a support structure attached to the coupling and extending from the coupling and oriented in the direction of movement of the changing table support;
 - at least two recesses in the support structure, with the recesses aligned in the direction of movement of the changing table support; and
 - a latching mechanism attached to the changing table and oriented to mate with the recesses on the support structure as the changing table moves to place each recess adjacent to the latching mechanism, with the latch being releasable.
2. The height adjustment assembly of Claim 1 wherein the coupling is a ring within which the changing table support slides.
3. The height adjustment assembly of Claim 1, wherein the recesses are slots separated by lands.
4. The height adjustment assembly of Claim 1, wherein the latching mechanism is a pivoting lever with a release handle at one end and a latch at the other end with a spring forcing the latch into the recesses in the support structure.
5. The height adjustment assembly of Claim 1, wherein the recesses are equally spaced between a series of lands and the latching

mechanism is a gear with teeth that mate with the recesses.

6. The height adjustment assembly of Claim 1, wherein the recesses are equally spaced between a series of lands, the latching mechanism is a gear with teeth that mate with the recesses, the gear is interconnected with a knob by which the gear is rotated, and the knob is interconnected with a releasable latch that prevents the gear from turning.
7. The height adjustment assembly of Claim 1, wherein the support structure includes a spring acting to separate the changing table from the support structure in the direction of movement of the changing table support.
8. The height adjustment assembly substantially as hereinbefore described with reference to and as illustrated in Figures 1 to 3 of the accompanying drawings.
9. A height adjustment assembly for a changing table comprising:
- a changing table support attached to a changing table and moveable vertically relative to a supporting structure upon which the changing table support is supported;
 - a coupling coupled to the changing table support and permitting the changing table support to move relative to the coupling;
 - a support structure attached to the coupling and extending from the coupling and oriented in the direction of movement of the changing table support;
 - at least two recesses in the changing table, with the recesses aligned in the direction of movement of the changing table support;
 - and
 - a latch attached to the support structure and oriented to mate

with the recesses in the changing table as the changing table moves to place each recess adjacent to the latch, with the latch being releasable.

- 5 10. The height adjustment assembly of Claim 9, wherein the latch is attached to a spring integrated into the support structure.
11. The height adjustment assembly substantially as hereinbefore described with reference to and as illustrated in Figures 4 to 5 of the accompanying drawings.



INVESTOR IN PEOPLE

Application No: GB0508656.6

Examiner: Gareth Davies

Claims searched: 1-8

Date of search: 31 May 2005

Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
A	-	US5553336 A (LISCO) - see figure 1.
A	-	JP2004041628 A (APRICA KUZUNISHI) and WPI Abstract Accession No. 2004-151310 [15] - see abstract and figure 2.
A	-	IT1127194 B (SOPELSA) and WPI Abstract Accession No. 1987-280326 [40] - see figure 1.

Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC^X :

A4L; A4S

Worldwide search of patent documents classified in the following areas of the IPC⁰⁷

A47D

The following online and other databases have been used in the preparation of this search report

EPODOC, WPI, TXTE, Internet