CONVERTIBLE INFANT CARE APPARATUS

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ABSTRACT

An infant care apparatus convertible between a bassinet and changing table, including a carrier removable from a support frame for transporting an infant. The carrier is placed upon the frame for use as a bassinet. The frame also supports a changing table surface exposed for use with the carrier removed. The base of the frame includes retractable wheels and rockers. The frame is releasably securable to an adult bed for co-sleeping.
CONVERTIBLE INFANT CARE APPARATUS

TECHNICAL FIELD

[0001] This invention relates to an infant care apparatus, particularly to an infant carrier supportable on a frame for use as a bassinet.

BACKGROUND

[0002] Many ideas have been advanced for how to reduce the sheer number of pieces of equipment needed to care for infants. Many parents purchase several items that are not used simultaneously but that nevertheless occupy a significant amount of space in a nursery.

SUMMARY

[0003] Various aspects of the present invention feature an infant care apparatus having an infant carrier that can be placed on a supporting frame for use as an elevated bassinet, or used separately to transport an infant.

[0004] According to one aspect of the invention, an infant care apparatus includes a structural frame defining spaced-apart rails at an upper end of the structural frame, and a carrier configured to be laterally constrained when placed between the rails. The carrier defines a compartment sized to accommodate an infant lying in the carrier while supported by the frame. The carrier is removable from the frame to expose a changing table surface between the rails. The changing table surface is secured to the structural frame and disposed below the carrier when the carrier is resting between the rails, with the rails extending above the changing table surface to form at least part of a safety rim above the changing table surface.

[0005] The apparatus preferably also includes a restraint secured to the frame and extending above the changing table surface for holding an infant during changing.

[0006] In some embodiments, the carrier includes a carrier frame having wall members extending from an infant support member to an upper rim of the carrier to define a receptacle for holding an infant, and a handle attached to the carrier frame. The handle is preferably pivotable between a carrying position in which the handle extends relatively perpendicularly from the rim, and a stowed position in which the handle approaches the rim.

[0007] In some cases the removable carrier also includes a battery-powered device, with the handle carrying a button electrically connected to the battery-powered device for activation thereof. The battery-powered device may be a light mounted on the removable carrier, or an audio speaker, as examples.

[0008] The carrier preferably includes a restraint disposed within the compartment to secure an infant within the compartment while carrying.

[0009] In some configurations, the frame has a lower end configured for rocking the apparatus upon a supporting floor. Preferably, the frame is also supported on wheels mounted on caster pivots. In some cases, the frame has retractable wheels selectively extendable for rolling of the apparatus upon a supporting floor. The wheels may be retractable to enable rocking of the apparatus upon the floor, for example.

[0010] In some instances, the frame is formed generally as a framework of connected, tubular steel members. Preferably, the frame is adjustable in height.

[0011] In some cases, the carrier has an infant support surface with a head end selectively tiltable with respect to a foot end of the infant support surface, for inclining an infant placed on the supporting surface.

[0012] Some versions of the apparatus also include means to releasably secure the apparatus adjacent a bed. For example, in some cases, the apparatus includes an anchor insertable between a mattress and mattress support of an adult bed, and at least one strap extending from the anchor. The strap preferably carries a releasable fastener for releasably securing the apparatus to the adult bed. In some cases, multiple straps are included, each separately securable to or about respective portions of the apparatus. In some cases, the anchor comprises a restraint cushion of sufficient thickness that the mattress conforms to a contour of the cushion to hold the cushion in place. In some instances, the anchor comprises a flat, flexible sheet of material insertable between the mattress and mattress support and the flat pad and having a surface that generates sufficient frictional resistance against the mattress to resist a pull-out force of at least 10 pounds.

[0013] In some embodiments, the spaced-apart rails of the frame are each elevated above opposite sides of the safety rim. In some cases, the spaced-apart rails of the frame are disposed at opposite ends of the apparatus. Preferably, the spaced-apart rails define pockets at either end of the frame to receive and laterally restrain the carrier when the carrier is placed between the rails. The spaced-apart rails may comprise tubular steel members, for example, and may be curved.

[0014] According to another aspect of the invention, an infant care apparatus includes a changing table portion and a removable carrier. The changing table portion includes a changing table frame with a receiving portion defining an aperture in an upper region of the changing table frame, and a changing table surface of a size to accommodate an infant. The changing table surface is supported by the changing table frame and arranged within the aperture, sidewalls of the receiving portion rising above an upper surface of the changing table surface. The removable carrier is of an interior size to accommodate an infant and an exterior size to fit through the aperture so as to rest in an engaged position on the receiving portion, such that placing the removable carrier in the engaged position configures the infant care apparatus as a bassinet and removing the removable carrier from the engaged position exposes the changing table surface for use as a changing table.

[0015] In some embodiments, the changing table frame includes a base having a plurality of rocking members oriented substantially perpendicular to a longitudinal axis of the changing table frame, and a plurality of longitudinal members extending between the rocking members. The rocking members each have a lower surface together defining an arc for engagement with a floor supporting the infant care apparatus for rocking. In some cases, the rocking members each include a plurality of wheels movable between a recessed position, in which the wheels are withdrawn within the arc, and an extended position in which the wheels are exposed beyond the arc for engagement against
the floor. Preferably, the rocking members each further comprise a lock engagable to secure the wheels against movement between the recessed and extended positions.

[0016] In some cases, the changing table frame is adjustable to change a height of the changing table surface with respect to the floor.

[0017] Preferably, the changing table surface includes a rigid planar member supported by the changing table frame in a substantially horizontal position. The changing table surface further may also include a pad with a non-absorbent upper surface overlying the planar member. Preferably, such a pad is detachable from the planar member for washing.

[0018] In some cases, the changing table surface is provided as part of a sling suspended from and spanning a top portion of the changing table frame. Preferably, the sling has a non-absorbent upper surface and is removable for washing.

[0019] In some embodiments, the removable carrier is collapsible between an expanded position, in which the frame forms an upper rim spanning an open receptacle for receiving an infant, and a collapsed position in which opposite sides of the rim are pivoted toward one another. Preferably, the carrier includes a lock operable to maintain the carrier in its expanded position, and releasable to fold the carrier to its collapsed position.

[0020] Another aspect of the invention features a method of securing an infant bed to an adult bed. The method includes placing an anchor mat between a mattress of the adult bed and a supporting surface on which the mattress rests, the anchor mat comprising a flexible sheet of material with an upper surface exposed for engagement against the mattress. The upper surface of the mat is configured to generate frictional resistance against the mattress to resist relative sliding of the mat against the mattress, with the anchor mat being otherwise unsecured to the mattress. The method also includes releasably connecting the infant bed to the anchor mat.

[0021] In some embodiments the infant bed is releasably connected to the anchor mat by releasable buckles secured to straps attached to the anchor mat.

[0022] In some cases the anchor mat is padded, the mattress conforming about a thickness of the anchor mat.

[0023] In some other cases the anchor mat consists essentially of a flexible sheet of material and two releasable straps secured to and extending from an edge of the sheet of material.

[0024] Preferably, the anchor mat is sized to fit completely within an area of a standard adult twin mattress, and is constructed to generate sufficient frictional resistance against the mattress to resist a pull-out force of at least 10 pounds with the mattress unloaded.

[0025] Another aspect of the invention features an infant care apparatus having an infant carrier defining therein a compartment sized to accommodate a sleeping infant, and a structural frame configured to receive and support the infant carrier to form a bassinet, and to rock upon a supporting surface while supporting the carrier. The carrier includes a restraint secureable about an infant within the compartment to retain the infant as the carrier is carried, and a handle selectively retractable from a deployed position extending above and spanning a rim of the carrier for carrying the carrier with an infant therein, to a retracted position folded toward the carrier rim.

[0026] In some cases, the carrier includes a backrest selectively movable between an inclined position and a prone position.

[0027] In some embodiments, the frame includes an upper planar surface exposed for use as a changing table surface with the carrier removed, the frame forming a rim extending above and about the planar surface.

[0028] The handle, in some configurations, is secured to opposite sides of the carrier rim at respective pivots. Preferably, the pivots are located near centers of the opposite sides of the carrier rim, such that the handle extends across a central region of the carrier in its deployed position, for carrying of the carrier solely by the handle.

[0029] In some cases, the frame includes spaced-apart carrier restraints at its upper end, the carrier being configured to engage the restraints to resist lateral movement when placed on the frame. Preferably, the carrier restraints define pockets at either end of the frame, the pockets being sized to receive lower frame members of the carrier with the carrier placed on the frame.

[0030] The infant care apparatus described below can provide many of the functions needed in the care of infants within the home, and is readily and rapidly convertible between functional uses. Space is minimized by overlapping the spatial volume needed for diaper changing (i.e., the space above the changing table surface and between the safety rails) and the spatial volume employed for containing the infant during sleeping (i.e., the space within the receptacle of the carrier), while maintaining the sleeping surface separate and distinct from the changing surface. The frame enables both functions (changing and sleeping) to be performed at a comfortable height and can be configured to both enable rocking while sleeping and stability during changing. Furthermore, the carrier can be constructed for comfortably transporting and containing infants far from the frame, the centrally-located handle enabling one-handed carrying by an adult.

[0031] The details of one or more embodiments of the invention are set forth in the accompanying drawings and the description below. Other features, objects, and advantages of the invention will be apparent from the description and drawings, and from the claims.

DESCRIPTION OF DRAWINGS

[0032] FIG. 1 is a perspective view of an infant care apparatus configured as a bassinet.

[0033] FIG. 1A is a perspective view of the apparatus of FIG. 1 with the carrier removed, in use as a changing table.

[0034] FIG. 1B is a perspective view of the carrier removed from the frame and resting upon a supporting surface.

[0035] FIGS. 2A and 2B are perspective and side views, respectively, of the frame of an apparatus similar to that of FIG. 1 but with a different wheel configuration, with the carrier removed.
FIGS. 3A and 3B are longitudinal cut-away and cross-section views, respectively, of the upper end of the apparatus configured as shown in FIG. 2A, the view of FIG. 3B being taken along line 3B-3B of FIG. 2A, with associated soft goods.

FIGS. 4A and 4B are end views of one side of the base of the apparatus, with wheels in deployed and recessed positions, respectively.

FIG. 5 is a cross-section of an end of one of the rockers of the base of the apparatus, with the wheel in a deployed position. FIG. 5A is an exploded perspective view of the rocker and wheel as shown in FIG. 5.

FIG. 5B is a perspective view of an alternative rocker end configuration. FIGS. 5C and 5D are side views of the configuration of FIG. 5B, with the wheel assembly in retracted and extended positions, respectively.

FIG. 6A is an enlarged view of a height adjustment mechanism of one of the legs of the apparatus.

FIGS. 6B and 6C are perspective views of the pin release sleeve shown in FIG. 6A, as viewed from different sides.

FIGS. 6D and 6E are cross-sectional views taken along line 6D-6D in FIG. 6A, during different stages of pin release.

FIG. 6F is a cross-sectional view taken along line 6F-6F in FIG. 6A.

FIGS. 7A and 7B are perspective and side views, respectively, of the upper end of the changing table frame with the frame of the carrier mounted thereon.

FIGS. 8A and 8B are perspective views of the carrier frame with the pivotable handle extended and stowed, respectively.

FIG. 8C is a side view of the carrier frame in a collapsed configuration.

FIGS. 9A and 9B are side and longitudinal cross-sectional views of the carrier, FIG. 9B being taken along line 9B-9B in FIG. 9B, with soft goods installed.

FIG. 10 illustrates the apparatus secured to an anchor mat to be placed under the mattress of a bed, to secure the apparatus adjacent the bed for co-sleeping.

FIG. 11 is a cross-sectional view illustrating attachment to a bed using a restraint cushion beneath the mattress.

FIG. 12 is a perspective view of the removable carrier on a stand.

Like reference symbols in the various drawings indicate like elements.

DETAILED DESCRIPTION

FIG. 1 shows an infant care apparatus 1 that can be configured for use as a changing table, a bassinet, an infant carrier, or a co-sleeper. This infant care apparatus 1 includes a changing table portion 4 and a removable carrier 8. FIG. 1A shows the infant care apparatus with the carrier removed, in use as a changing table. FIG. 1B shows the carrier 8 removed from the frame and resting upon a supporting surface.

Referring to FIGS. 2A and 2B, changing table portion 4 has a changing table frame 12 defining an aperture 14 in the upper region of the changing table frame; a changing table cover 15 with a changing table surface 16, and a receiving portion 20. Changing table surface 16 is supported by changing table frame 12 and arranged within aperture 14. Changing table frame 12 also supports receiving portion 20. Changing table frame 12 and receiving portion 20 define sidewalls 24 rising above changing table surface 16 to help prevent an infant from rolling from changing table surface 16.

Changing table frame 12 has a base 28 with two rocking members 32 connected by two longitudinal members 36 that fix the relative location of the two rocking members 32. The two rocking members are oriented substantially perpendicular to a longitudinal axis of the changing table frame. Each of the rocking members 32 has a lower surface 40 defining an arc for engagement with a floor supporting the infant care apparatus upon which an adult user can induce the frame to rock.

Although the rocking members 32 are primarily constructed of molded plastic, the remainder of the changing table frame 12 is primarily constructed of tubular steel. The rocking members 32 include receiving sockets 50 and define leg holes 51. Leg members 52 are inserted through leg holes 51 from the bottom so that the lower portions (not shown) of leg members 52 are received within rocking members 32 while the remainder of the leg members 52 extend upward from rocking members 32 as shown. The leg members 52 and the rocking members are then riveted together and lower surface 40 is attached to the rocking members 32. Base 28 is assembled by inserting the two longitudinal members 36 into the receiving sockets 50 thus providing a rectangular support structure for the changing table frame 12. Changing table frame 12 is completed by inserting the upper ends of leg members 52 into the lower ends of side frame members 54. The outer diameter of leg members 52 is chosen to be smaller than the inner diameter of side frame members 54 so that this can be accomplished. A bushing 58 is mounted on the both lower ends of each side frame member 54 in order to help protect leg members 52. Leg members 52 are positioned transversely with side frame members 54 positioned longitudinally so as to connect the two leg members 52.

FIGS. 3A and 3B show changing table cover 15 mounted on receiving portion 20 and side frame members 54 of changing table frame 12. Changing table cover 15 includes changing table surface 16, an upper section 232 of quilted material, a lower skirt 236 depending from upper section 232, securing straps 240, and securing loops 244. Stitching 248 in upper section 232 defines a fabric channel 252. During initial construction of the infant care apparatus, the steel tubing of receiving portion 20 is inserted through fabric channel 252 and then mounted on changing table frame 12 with screws or rivets. The portion of upper section 232 outside of fabric channel 252 and lower skirt 236 drapes down outside the receiving portion 20. The portion of upper section 232 inside of fabric channel 252 and lower skirt 236 drapes down within receiving portion 20 supporting changing table surface 16 in
a position slightly below the horizontal portion of side frame member 54. A planar member 256, such as a MASONITE sheet, is sewn into the fabric of changing table surface 16 to provide support for the child. As shown in FIG. 3B, a cloth-covered pad 260 overlies planar member 256 and is detachable for washing. The upper surface of pad 260 is formed of a non-absorbent material to facilitate washing the pad after use. In this example, the pad is a three-quarter inch foam mattress 260 with an inner vinyl cover 264 and a removable outer cloth cover 268. The vinyl cover 264 may be heat sealed or stitched around the foam mattress.

Securing straps 240 and securing loops 244 are attached to the bottom of changing table cover 15 along the edges of planar member 256 to provide additional support for planar member 256. During initial construction, securing straps 240 are extended over and around sidewalks 24, inserted through securing loops 244, and male and female snaps 272 are mated so as to attach securing straps 240 to securing loops 244.

In another embodiment (not shown), changing table cover 15 is provided with sewn loops attached to the bottom of changing table cover 15 along the edges of planar member 256 rather than the strap-loop combination described above. The steel tubing of receiving portion 20 is inserted through these sewn loops before being mounted on changing table frame 12 with screws or rivets. In this embodiment, upper section 232 does not include fabric channels but rather is fitted to receiving portion 20.

In another embodiment (not shown), changing table surface 16 is directly mounted to changing table frame 12. All of these embodiments would preferably include a secureable restraint (such as the releasable strap 158 shown in FIG. 1A) secured to the changing table frame 12 to restrain an infant on the changing table surface 16.

The rocking members 32 each have two wheels 44. These wheels are movable between a recessed position in which the wheels 44 are withdrawn within the arc defined by the lower surface 40 of the rockers (as shown in FIG. 4A) and an extended position in which the wheels 44 are exposed beyond the arc for engagement against the floor (as shown FIG. 4B). As shown in the cross-section of FIG. 5 and the exploded view of FIG. 5A, each wheel 44 is mounted on an axle 160 secured to a wheel housing 162 that is pivotably mounted to the rocker 32 to pivot about horizontal pin 164. Horizontal pin 164 is inserted through hole 165 in rocker 32. Rocker 32 has a fulcrum 168 supporting a release lever 166. Release lever 166 rests on fulcrum 168 and has a pin 169 that is disposed within recess 171 in rocker 32 to maintain release lever 166 in position on fulcrum 168. As end 170 of the lever is manually depressed, opposed end 172 of the lever rises, lifting pawl 174 from a slot defined in wheel housing 162 to enable rotation of housing 162 about pin 164 to move the wheel between its retracted and extended positions. As shown in FIG. 5, housing 162 defines two slots 176, one for each of the discrete wheel positions. When lever 166 is released, a spring 178 biases pawl 174 against the wheel housing. A wheel lock lever 48 is mounted to wheel housing 162 for rotation about pin 180. With lock lever 48 in the released position shown, the wheel 44 is free to rotate about its axle 160. Rotating the free end of lock lever 48 downward engages surface 182 against plunger 184, compressing spring 185 and forcing a projection 186 of plunger 184 downward to engage peripheral teeth 187 disposed within a groove about wheel 44 to resist wheel rotation.

FIGS. 5B-5D show another wheel assembly embodiment, identical to that of FIGS. 5 and 5A other than the addition of a retracted aperture cover 250 that is mounted within the rocker to rotate about pin 252. Rotation of the wheel assembly to its retracted position (see FIG. 5C) displaces cover 250 upward into the rocker. Upon extension of the wheel assembly to its rolling position (see FIG. 5D), cover 250 rotates downward to fill the opening and provide a visual extension of the curvature of the arc defined by the lower rocking surface 40 of the rocker.

In another example, regular wheel casters (see FIG. 1A) are employed at the four corners of the base of the frame, and can be configured for retraction for rocking. Casters provide the advantage of allowing free movement of each wheel in any direction for rolling. In yet another embodiment (not shown), two non-pivoting wheels (as shown in FIG. 5) are deployed at one end of the frame, and two retractable casters at the other end, to effect a ‘shopping-cart’ maneuverability.

Referring back to FIGS. 2A and 2B, frame 12 includes means for adjusting the height ‘h’ of the changing table surface 16 above the floor. Upper vertical members 54 each define a plurality of holes 56 through which a spring-biased pin of the associated lower vertical member 52 can be extended to secure the relative length of the frame leg. Referring also to FIGS. 6A and 6F, pins 60 are mounted on finger springs 190 within lower vertical members 52, such that they are biased outward through a hole in the lower vertical member. Those skilled in the art will recognize other means of adjusting the height of the changing table frame.

Spring-pin latches are notoriously difficult to release manually, particularly when multiple spring-pins must be depressed simultaneously. FIGS. 6A-6F also illustrate a useful spring pin release means. A pin release sleeve 64 is placed about each upper vertical member 54, and is free to be slid along, or rotated about, the frame leg above sleeve stop 68. To release a spring pin 60, the user slides sleeve 64 above the pin (the pin passing through an open slot 66 on one side of the sleeve), then rotates the sleeve 180 degrees and slides the sleeve down onto the pin, with pin 60 received in a partial slot 220 (see FIGS. 6B and 6C) on the opposite side of the sleeve, until the pin abuts stop surface 222 of the sleeve. The sleeve may rest on the pin in this position (as shown in FIG. 6D) when not in use. The user then rotates the sleeve 90 degrees (in a clockwise direction as shown in the figures), until the pin is directly under trigger 68, as shown in FIG. 6E. During this rotation, the pin slides along the inner surface of the sleeve, which forms a ramp to press the pin inward. When the proper rotational position for pin release has been obtained (FIG. 6E), a convex projection 224 extending inward from the distal end of trigger 68 snaps into hole 56 in the outer leg member, providing tactile feedback indicative of pin alignment and further depressing pin 60 sufficiently to clear the inner diameter of the outer leg member as the inner and outer leg members are subsequently telescoped to adjust the height of the apparatus as shown on FIG. 6F. Convex projection 224 can also be sized such that pin 60 remains engaged with outer leg member until the user exerts a slight degree of pressure on trigger 68. The pin release sleeve 64 is can be formed as a single piece
of molded plastic. Pins 60 with associated finger springs 190 are obtainable commercially as "Valco" pins.

[0065] Referring back to FIG. 1, the changing table portion 4 also has a skirt 18 and a diaper case 22. Skirt 18 has a sewn loop (not shown) through which outer portions of the receiving portion are inserted when the infant care apparatus 1 is being assembled. Skirt 18 drapes down over receiving portion 20 and the upper part of changing table frame 12 from this sewn loop. Diaper case 22 has fabric sidewalls that are sewn to a polyurethane sheet bottom, which is suspended from horizontal members 54 (see also FIG. 2B) by nylon straps and associated slip buckles (not shown) that are adjustable to reflect adjustment of height 'h' of the changing table surface 16. Similarly, nylon straps and cinch buckles may be employed to secure corners of diaper case 22 to the vertical members 52.

[0066] The removable carrier 8 is constructed with an interior size large enough to accommodate an infant and an exterior size small enough to fit through the aperture at the upper end of the receiving portion of the changing table frame, so as to rest in an engaged position on the changing table surface. The infant care apparatus is configured as a bassinet by placing the removable carrier in the engaged position shown in FIG. 1. Carrier 8 also has a separable infant restraint 198 (see FIG. 1B) with releasable buckles 260 and a canopy 200 that can be extended to shade the infant. FIGS. 7A and 7B show the relative positions of frame members of the changing table frame and carrier with the carrier installed for use as a bassinet. As shown, lower frame members 82 of the carrier nest within pockets 196 formed within arched outer loop members 194 of the receiving portion 20 of the changing table frame. Removal of the removable carrier 8 exposes the changing table surface as shown in FIGS. 3A and B. In the configuration shown, the frame of the carrier rests directly on the changing table surface. However, in some cases (not shown) the underside of either end of the carrier is configured to rest directly upon the outer loop members 194 of the changing table frame, such that the carrier is suspended over the changing table surface.

[0067] FIGS. 8A-8C illustrate the frame 78 of the removable carrier 8. Lower frame members 82 and associated support struts 84 support an upper rim 86 with U-shaped ends. An infant support surface 90 is normally sewn into a floor of a fabric liner that depends from rim 86 to contain and support the child, although the liner and other fabric materials are not shown in these views, in order to better illustrate the frame 78. Support 90 includes a head portion 90a and a foot portion 90b, each separately sewn into the carrier hammock, such that inclination of the head portion 90a can be affected by raising the associated end of the hammock, such as by an adjustable or selectively engageable hammock support strap 292 (FIG. 9B). Holes 212 through the head portion 90a of the support enable threading of an adjustable strap carrying buckle halves (not shown) for releasable engagement with mating buckle halves of the infant restraint 198 (FIG. 1B). Carrier 8 also has a handle 94 that is pivotable between a carrying position in which the handle 94 extends relatively perpendicularly from the rim (see FIG. 8A) and a stowed position in which the handle 94 approaches the rim (see FIG. 8B). Handle release buttons 102 are depressed to move the handle from the carrying position to the stowed position but are not required when moving the handle from the stowed position to the carrying position. The handle of this removable carrier 8 has buttons 100 that operate a light 96 and an audio system having a speaker (not shown). Light 96 and the speaker are positioned on the inner part of handle 94 to facilitate electrical connectivity. The contained audio system (not shown) plays any of a selected number of sounds or songs, for soothing an infant to sleep. Handle 94 can also be raised to a detent position approximately ten degrees above the stowed position so as to position light 96 above obstructions.

[0068] Upper rim 86 comprises two U-shaped tubular steel rim halves 86a and 86b that are pivotedly attached to hubs 92 at their open ends, at pins 202. Lower tubular frame members 82, which form a stable foot upon which the carrier may be placed, also pivotably and separately connect to hubs 92 at pins 204. Support struts 84 are pivotably connected to lower frame members 82 and to rim 86. As shown in FIG. 8C, these pivotable connections allow a user to collapse both ends of the carrier frame separately toward the handle with the handle in its vertical position, for transport or storage. To release each end of the carrier frame for rotation with respect to hubs 92, the user pulls lock tabs 206 away from hubs 92, such that lock tabs disengage hub slots 208 and permit the simultaneous rotation of both the associated rim half 86 and lower frame member 82 to be rotated upward toward the handle 94, where at the fully rotated position the spring-biased lock tabs engage another pair of hub slots 208 to hold the associated half of the carrier frame in its collapsed position. The operation is repeated for the other half of the carrier, the resulting configuration shown in FIG. 8C. In the collapsed position, the carrier may be carried by handle 94 and rested upon the lower ends of hubs 92. In the folded configuration shown, the carrier frame has an overall width (lateral dimension shown in the figure) of only about 220 millimeters, and a height (vertical dimension shown in the figure) of only about 510 millimeters.

[0069] As shown in FIG. 1, removable carrier 8 also has a carrier hammock 210. Referring to FIGS. 9A and 9B, carrier cover 210 is similar to changing table cover 15 (see FIGS. 3A and 3B) in having an upper section 276 of quilted material and a lower skirt 280 depending from upper section 232. Stitching 284 in upper section 276 defines a fabric channel 288. During initial construction of removable carrier 8, rim 86 is inserted through fabric channel 288 prior to being assembled with hubs 92 and support struts 84. The portion of upper section 276 outside of fabric channel 288 and lower skirt 280 drape down outside removable carrier 8. A cloth-covered pad 296 overlies the planar member and is detachable for washing. In this example, the pad is a three-quarter inch foam mattress 296 with an inner vinyl cover 300 and a removable outer cloth cover 304. The vinyl cover 300 may be heat sealed or stitched around the foam mattress. A hook and loop region 308 is provided for attachment of the canopy.

[0070] As discussed above, the infant care apparatus is configured as a bassinet by placing the removable carrier 8 in the engaged position shown in FIG. 1. In this configuration, the pivotable handle 94 will be placed in the stowed position (as shown in FIG. 7A) and the height 'h' of the changing table frame 12 may be adjusted to make it easy for an adult user to place an infant in the removable carrier 8. The user will place wheels 44 in their retracted or extended positions based on whether or not it is desired to rock the
bassinet-configured infant care apparatus. The securable restraint in the removable carrier can be used to keep the infant in the bassinet-configured infant care apparatus, as necessary.

[0071] When it is desired to use the infant care apparatus as a co-sleeper, the height of the supporting frame may be adjusted to match the height of an adjacent adult bed. As shown in FIG. 10, co-sleeper restraints 108 may be used to secure the bassinet-configured infant care apparatus to the adult bed. A flat pad 126 is placed between the mattress and box spring (not shown). Flat pad 126 is constructed of a material with a relatively compliant surface, such as a rubberized mesh screen, that is held in place by friction and by the weight of the mattress. Such material is widely available, and is known to be used as an anti-slip material under rugs, for example. Preferably, pad 126 is constructed to generate at least 10 pounds of frictional resistance to impede removal from under a conventional, unloaded mattress. Pad 126 is extremely flexible and has no significant thickness that may be felt above the mattress. Straps 118 extend from a near edge of the pad to releasable buckles 122 to secure the frame of the bassinet to the adult bed. The buckles can be quickly disconnected to move the bassinet away from the bed as needed. In FIG. 11, a restraint pillow or padded cushion 110 is inserted between a mattress 112 and a box spring 114 or other mattress support. Mattress 112 conforms to the shape of restraint pillow 110 and the weight of mattress 112 holds pillow 110 in place. Straps 118 extend from pillow 110 to loop vertical members 52 of the bassinet frame and releasably connect to mating buckle halves extending from pillow 110. The co-sleeper restraint (either pad 126 or cushion 110) can be left in place in the adult bed even when the infant care apparatus is being used elsewhere, but readily reattached to the bassinet at bedtime. Again, the securable restraint in the removable carrier can be used to keep the infant in the bassinet-configured infant care apparatus, as necessary.

[0072] Referring back to FIG. 1A, removal of the removable carrier 8 from the changing table stand exposes the changing table surface 16, thus configuring the changing table portion as a changing table. An adult user will adjust the height of the changing table frame 12 to place the changing table surface 16 at a convenient height for changing an infant. The infant can then be placed on the changing table surface 16 in preparation for changing its diaper. Although the sidewalks 24 rising above the changing table surface 16 act to as a safety rim, the securable restraint 158 mounted to the changing table portion 4 can also be employed to keep the infant on the changing table surface 16.

[0073] Referring back to FIG. 1B, the removable carrier 8 can be used separately from the changing table portion 4, to carry an infant. The pivotable handle 94 will be placed in the stowed position to make it easy for an adult user to place an infant in the removable carrier 8. This can be done with the removable carrier 8 in the engaged position with the changing table portion 4 or placed on a stable surface, such as a floor or bed. After the infant is placed in the removable carrier 8, the pivotable handle 94 will then be returned to the carrying position. The securable restraint 198 in the removable carrier will be used to keep the infant in the infant care apparatus when it is used as a carrier. As discussed above, the removable carrier 8 is collapsible for storage and/or transport when not in use.

[0074] As shown in FIG. 12, the removable carrier 8 can also be used with a separate stand 130. Stand 130 has two U-shaped frame members 134 that are pivotally attached to each other and support a stand receiving portion 138 for receiving and supporting the carrier. Each frame member 134 has a cross-bar support 140 connecting its two legs for enhanced structural stability. The two main supports are also connected by braces 142 that lock when the main supports 134 are placed in a deployed configuration as shown in FIG. 10. When the removable carrier 8 is removed from the stand 130, braces 142 can be released to collapse the upper ends of frame members 134 toward each other, producing a relatively flat configuration for transportation or storage. Each frame member 134 also has two lockable casters 146 for easy maneuverability of stand 130.

[0075] A number of embodiments of the invention have been described. Nevertheless, it will be understood that various modifications may be made without departing from the spirit and scope of the invention. Accordingly, other embodiments are within the scope of the following claims.

What is claimed is:

1. An infant care apparatus comprising:

a structural frame having spaced-apart rails at an upper end thereof; and

a carrier configured to be laterally constrained when placed on the frame between the rails, the carrier defining a compartment sized to accommodate an infant sleeping in the carrier while supported by the frame;

wherein the carrier is removable from the frame to expose a changing table surface between the rails, the changing table surface secured to the structural frame and disposed below the carrier when the carrier is resting between the rails, the rails extending above the changing table surface to form at least part of a safety rim above the changing table surface.

2. The infant care apparatus of claim 1 further comprising a restraint secured to the frame and extending above the changing table surface for holding an infant during changing.

3. The infant care apparatus of claim 1 wherein the carrier comprises a carrier frame having wall members extending from an infant support member to an upper rim of the carrier to define a receptacle for holding an infant; and

a handle attached to the carrier frame, the handle pivotable between a carrying position in which the handle extends relatively perpendicularly from the rim and a stowed position in which the handle approaches the rim.

4. The infant care apparatus of claim 3 wherein the removable carrier further comprises a battery-powered device and the handle comprises a button electrically connected to the battery-powered device for activation thereof.

5. The infant care apparatus of claim 4 wherein the battery-powered device comprises a light mounted on the removable carrier.

6. The infant care apparatus of claim 4 wherein the battery-powered device comprises an audio speaker.
7. The infant care apparatus of claim 1 wherein the carrier comprises a restraint disposed within the compartment to secure an infant within the compartment.

8. The infant care apparatus of claim 1 wherein the frame has a lower end configured for rocking the apparatus upon a supporting floor.

9. The infant care apparatus of claim 8 wherein the frame is supported on wheels mounted on caster pivots.

10. The infant care apparatus of claim 8 wherein the frame has retractable wheels selectively extendable for rolling of the apparatus upon a supporting floor.

11. The infant care apparatus of claim 10 wherein the wheels are retractable to enable rocking of the apparatus upon the floor.

12. The infant care apparatus of claim 1 wherein the frame comprises a framework of connected, tubular steel members.

13. The infant care apparatus of claim 1 wherein the frame is adjustable in height.

14. The infant care apparatus of claim 1 wherein the carrier comprises an infant support surface with a head end selectively tiltable with respect to a foot end of the infant support surface, for inclining a torso of an infant placed on the supporting surface.

15. The infant care apparatus of claim 1 further comprising means to releasably secure the apparatus adjacent a bed.

16. The infant care apparatus of claim 1 further comprising an anchor insertable between a mattress and mattress support of an adult bed; and at least one strap extending from the anchor, the strap carrying a releasable fastener for releasably securing the apparatus to the adult bed.

17. The infant care apparatus of claim 16 comprising multiple straps each separately securable to or about respective portions of the apparatus.

18. The infant care apparatus of claim 16 wherein the anchor comprises a restraint cushion of sufficient thickness that the mattress conforms about a contour of the cushion to hold the cushion in place.

19. The infant care apparatus of claim 16 wherein the anchor comprises a flat, flexible sheet of material insertable between the mattress and mattress support and the flat pad and having a surface that generates sufficient frictional resistance against the mattress to resist a pull-out force of at least 10 pounds.

20. The infant care apparatus of claim 1 wherein the spaced-apart rails of the frame are each elevated above opposite sides of the safety rim.

21. The infant care apparatus of claim 1 wherein the spaced-apart rails of the frame are disposed at opposite ends of the apparatus.

22. The infant care apparatus of claim 1 wherein the spaced-apart rails define pockets at either end of the frame to receive and laterally restrain the carrier when the carrier is placed between the rails.

23. The infant care apparatus of claim 1 wherein the spaced-apart rails comprise tubular steel members.

24. The infant care apparatus of claim 1 wherein the spaced-apart rails are curved.

25. An infant care apparatus including:

   a changing table portion comprising:
   - a changing table frame including a receiving portion defining an aperture in an upper region of the changing table frame;
   - a changing table surface of a size to accommodate an infant, the changing table surface supported by the changing table frame and arranged within the aperture, sidewalks of the receiving portion rising above an upper surface of the changing table surface; and
   - a removable carrier of an interior size to accommodate an infant and an exterior size to fit through the aperture so as to rest in an engaged position on the receiving portion, such that placing the removable carrier in the engaged position configures the infant care apparatus as a bassinet and removing the removable carrier from the engaged position exposes the changing table surface for use as a changing table.

26. The infant care apparatus of claim 25 wherein the changing table frame comprises a base having a plurality of rocking members oriented substantially perpendicular to a longitudinal axis of the changing table frame, and a plurality of longitudinal members extending between the rocking members, the rocking members each having a lower surface together defining an arc for engagement with a floor supporting the infant care apparatus for rocking.

27. The infant care apparatus of claim 26 wherein the rocking members each include a plurality of wheels movable between a recessed position, in which the wheels are withdrawn within the arc, and an extended position in which the wheels are exposed beyond the arc for engagement against the floor.

28. The infant care apparatus of claim 27 wherein the rocking members each further comprise a lock engagable to secure the wheels against movement between the recessed and extended positions.

29. The infant care apparatus of claim 26 wherein the changing table frame is adjustable to change a height of the changing table surface with respect to the floor.

30. The infant care apparatus of claim 25 wherein the changing table surface comprises a rigid planar member supported by the changing table frame in a substantially horizontal position.

31. The infant care apparatus of claim 30 wherein the changing table surface further comprises a pad with a non-absorbent upper surface overlying the planar member.

32. The infant care apparatus of claim 31 wherein the pad is detachable from the planar member for washing.

33. The infant care apparatus of claim 25 wherein the changing table surface comprises a sling suspended from and spanning a top portion of the changing table frame.

34. The infant care apparatus of claim 33 wherein the sling has a non-absorbent upper surface.

35. The infant care apparatus of claim 33 wherein the sling is removable for washing.

36. The infant care apparatus of claim 25 further including an infant restraint mounted to the changing table portion and securable to keep an infant on the changing table surface.

37. The infant care apparatus of claim 25 wherein the removable carrier comprises a carrier frame supporting an upper rim from which an infant receptacle depends.
38. The infant care apparatus of claim 37 wherein the removable carrier further comprises a handle attached to the carrier frame, the handle pivotable between a carrying position in which the handle extends relatively perpendicular to the rim, and a stowed position in which the handle is disposed adjacent the rim.

39. The infant care apparatus of claim 38 wherein the removable carrier further comprises a battery-powered device and the handle comprises a button electrically connected to the battery-powered device for activation thereof.

40. The infant care apparatus of claim 39 wherein the battery-powered device comprises a light mounted on the removable carrier.

41. The infant care apparatus of claim 39 wherein the battery-powered device comprises an audio speaker.

42. The infant care apparatus of claim 25 wherein the removable carrier is collapsible between an expanded position, in which the frame forms an upper rim spanning an open receptacle for receiving an infant, and a collapsed position in which opposite sides of the rim are pivoted toward one another.

43. The infant care apparatus of claim 42 further comprising a lock operable to maintain the carrier in its expanded position, and releasable to fold the carrier to its collapsed position.

44. The infant care apparatus of claim 25 wherein the removable carrier comprises an infant restraint securable to retain an infant in the removable carrier.

45. The infant care apparatus of claim 25 further comprising

an anchor insertable between a mattress and mattress support of an adult bed; and

at least one strap extending from the anchor, the strap carrying a releasable fastener for releasably securing the apparatus to the adult bed.

46. The infant care apparatus of claim 45 comprising multiple straps each separately securable to or about respective portions of the apparatus.

47. The infant care apparatus of claim 45 wherein the anchor comprises a restraint cushion of sufficient thickness that the mattress conforms about a contour of the cushion to hold the cushion in place.

48. The infant care apparatus of claim 45 wherein the anchor comprises a flat, flexible sheet of material insertable between the mattress and mattress support and the flat pad and having a surface that generates sufficient frictional resistance against the mattress to resist a pull-out force of at least 10 pounds with the mattress unloaded.

49. A method of securing an infant bed to an adult bed, the method comprising

placing an anchor mat between a mattress of the adult bed and a supporting surface on which the mattress rests, the anchor mat comprising a flexible sheet of material with an upper surface exposed for engagement against the mattress, the upper surface configured to generate frictional resistance against the mattress to resist relative sliding of the mat against the mattress, the anchor mat being otherwise unsecured to the mattress; and then

releasably connecting the infant bed to the anchor mat.

50. The method of claim 49 wherein the infant bed is releasably connected to the anchor mat by releasable buckles secured to straps attached to the anchor mat.

51. The method of claim 49 wherein the anchor mat is padded, the mattress conforming about a thickness of the anchor mat.

52. The method of claim 49 wherein the anchor mat consists essentially of a flexible sheet of material and two releasable straps secured to and extending from an edge of the sheet of material.

53. The method of claim 49 wherein the anchor mat is sized to fit completely within an area of a standard adult twin mattress.

54. The method of claim 49 wherein the anchor generates sufficient frictional resistance against the mattress to resist a pull-out force of at least 10 pounds with the mattress unloaded.

55. An infant care apparatus comprising:

an infant carrier defining therein a compartment sized to accommodate a sleeping infant; and

a structural frame configured to receive and support the infant carrier to form a bassinet, and to rock upon a supporting surface while supporting the carrier;

wherein the carrier includes

a restraint securable about an infant within the compartment to retain the infant as the carrier is carried; and

a handle selectively retractable from a deployed position extending above and spanning a rim of the carrier for carrying the carrier with an infant therein, to a retracted position folded toward the carrier rim.

56. The infant care apparatus of claim 55 wherein the carrier includes a backrest selectively movable between an inclined position and a prone position.

57. The infant care apparatus of claim 55 wherein the frame includes an upper planar surface exposed for use as a changing table surface with the carrier removed, the frame forming a rim extending above and about the planar surface.

58. The infant care apparatus of claim 55 wherein the handle is secured to opposite sides of the carrier rim at respective pivots.

59. The infant care apparatus of claim 58 wherein the pivots are located near centers of the opposite sides of the carrier rim, such that the handle extends across a central region of the carrier in its deployed position, for carrying of the carrier solely by the handle.

60. The infant care apparatus of claim 55 wherein the frame includes spaced-apart carrier restraints at an upper end thereof, and wherein the carrier is configured to engage the restraints to resist lateral movement when placed on the frame.

61. The infant care apparatus of claim 60 wherein the carrier restraints define pockets at either end of the frame, the pockets being sized to receive lower frame members of the carrier with the carrier placed on the frame.

62. An infant care apparatus comprising:

a structural frame adjustable in height and comprising a framework of connected, tubular steel members, the frame including curved tubular steel members forming spaced-apart rails at an upper end of the frame, the spaced-apart rails disposed at opposite ends of the
apparatus and defining pockets at either end of the frame, the frame having a lower end configured for rocking the apparatus upon a supporting floor and having retractable wheels selectively extendable for rolling of the apparatus upon the supporting floor; and

a carrier configured to be laterally constrained when placed within the pockets defined by the rails, the carrier defining a compartment sized to accommodate an infant sleeping in the carrier while supported by the frame, and including a restraint disposed within the compartment to secure an infant within the compartment;

wherein the carrier is removable from the supports to expose a changing table surface between the rails, the changing table surface secured to the structural frame and disposed below the carrier when the carrier is resting between the rails, the rails extending above the changing table surface to form at least part of a safety rim above the changing table surface.