The present invention relates to infants' cradles, cribs or similar furniture articles and concerns itself with attachable or accessory apparatus for imparting rocking motion thereto for the purpose of quieting restless infants and lulling them into sleep.

Authorities in child and infant training methods believe that pacification, to be least disturbing and yet effective, should consist in slow measured bouncing motion in preference to swaying, rocking or rolling motions. Additionally, conventional cradle and crib structures include sideward constraining guards with support slides, and customarily do not provide enough space to permit the mattress and bedding components to be displaced sidewardly within the surrounding structure to afford ample motion to them to the extent needed for giving the necessary effect. For these and other reasons it is now proposed to disclose an attachable device that can be installed by the makers of such furniture or even by the purchaser thereof without special tools or need of skill. Such accessory, moreover is designed to generate a rhythmic vertical bounce or motion for imparting to the mattress and support spring thereof the precise characteristics to induce sleep and calm restlessness without disturbing digestion or having other undesirable side effects.

Thus, a primary object of the invention is to provide a means which lends itself to attachment to a wide variety of commercial crib and cradle structures without needing significant skill, special tools or appreciable time.

Another object of the invention is to provide such an apparatus which will produce a placating or soothing motion constrained to vertical or bouncing effects and hence adaptable for installation upon established commercial designs of infants' beds and cribs where sidewise space clearance is inadequate for other directions of motion.

Another object of the invention is to provide a cradle activating apparatus which may be prepared as a merchandising package of gift-size proportions for sale to households who already possess the infant's furniture item solely or as part of a nursery ensemble and who desire to adapt such to power agitation.

Briefly, the invention comprises an attachable apparatus for infants' cribs or cradles for imparting vertical reciprocal motion to the mattress and its supporting frame. To this end, it includes means for springably supporting, from the head and foot boards of a conventional cradle frame, the head and foot ends of a mattress support frame. A first beam element which includes endwise disposed and longitudinally adjustable embracing clamps is adapted for attachment transversely to the mattress supporting frame at a suitable position intermediate the ends of the frame. A second beam element also including endwise disposed clamping means is adapted to be secured to the longitudinal rials of an infant's crib beneath the position of said first beam element. Finally, a motorized power train is mounted upon said second beam element and which provides a vertical connecting rod that receives reciprocal motion and imparts such motion to the first beam as well as to the mattress and its support frame.

For a better understanding of the features and purposes of this invention reference will now be had to the detailed description following hereinafter as well as to the illustrations of the accompanying drawings, in both of which, like reference numerals designate corresponding parts throughout, and in which:

FIG. 1 is a miniature perspective view of a representative commercial baby crib structure onto which may be applied a reciprocating apparatus in accordance with the present invention.

FIG. 2 is a transverse sectional view of the device shown in FIG. 1, taken along line 2—2 thereof with certain features of the attachment apparatus applied.

FIG. 3 is a longitudinal sectional view taken along the line 3—3 of FIG. 2.

FIG. 4 is a fragmentary transverse sectional view similar to FIG. 2, on an enlarged scale but with the power unit shown in section and the attachment hardware more fully detailed.

FIG. 5 is a detailed sectional view like FIG. 4 but featuring a variant form of reciprocal motion translating mechanism.

FIG. 6 is another detail sectional view like FIG. 4 but featuring a further variant form of motion translating mechanism.

FIG. 7 is a fragmentary sectional view taken along line 7—7 of FIG. 3 but featuring a modified form of mattress and spring suspension.

FIG. 8 is a detail sectional view taken along line 8—8 of FIG. 2 featuring the construction of one of the resilient spring suspension units which supports each corner of the mattress and its spring frame, and FIG. 9 is a view which resembles generally FIG. 8 but illustrates a variant form of mounting the mattress frame to one of said spring suspension units.

In the accompanying drawings the reference 11 designates generally a head board which is opposed by a similarly proportioned foot board 12, which with the slidably adjustable side barriers 13 and 14 together form enclosures surrounding the mattress 15 and the space above the latter for accommodating the infant occupant of a crib or cradle furniture article. Conventionally the slidable barriers 13 and 14 are constrained by means of guide rods 16 of which one is fastened to each of the corner posts 17 that constitute part of the head and foot boards, so that each barrier may be disposed in an elevated or in a depressed position. Also secured to the corner posts, but at relatively lower elevations are a set of multiple apertured securing escutcheons 18, of which the apertures 19 are preferably keyhole shaped and among the set of them, arranged at corresponding levels.

Alternatively, these escutcheons may be provided with some form of support projections instead of the apertures, as shown in copending application Ser. No. 657,686, filed Aug. 1, 1937, and now abandoned, it being understood that such forms are conventionally provided for the purpose of securing receiving the ends of transverse rails or of ear formations that extend from the mattress support frame. In the present teaching these escutcheons are utilized for supporting a pair of angle brackets 21, in accordance with the preferred form of construction, as shown best in FIG. 8, or for supporting the hanger brackets 22, FIG. 7, as contemplated in the modified form. In each of these cases the attachment bracket is provided with a headed projection 23 which is adapted to enter through the keyhole enlargement and be slid down to the reduced width portion of any hole 19 at which the mattress level is desired to be established.

In the case of angle brackets 21, which may be joined together as at 24, to form a combined type of unit at each end of the crib, the horizontal portion of the brackets 21 is provided with a hole through which extends a central bolt 25. This member passes through the coil spring 26 longitudinally as well as through both cylindrical shell guards 27 and 28. FIG. 8 shows one manner in which an angle bar 29, or any other type of struc-
natural form of which the mattress frame may be made, is secured to the top cylindrical shell 28. For this purpose, a pair of sidewardly extending ears 31, integral with shell 28, are provided with holes through which bolts 32, that pass through the frame forms 29, may be aligned and therewith made fast. In FIG. 9 is shown how, by means of the clamp brackets 33 which embrace the end sections of a mattress frame 29, the assembly may be supported from the bottom shell 27. In this teaching, the top shell 28 is advantageously provided with suitable means, such as the ears 34, for holding the bar sections 35 of brackets 36. As with the brackets 21 of the alternates, the projections 23 are used for fastening the brackets 36 to the corner posts 17.

It will be noted that in the form of the invention shown in FIG. 8, the shell covered springs 26 are disposed beneath the mattress 15, while in the form shown in FIG. 9 they are disposed above this member. In both instances the action imparted by the motion transforming the mechanism effects compression of the springs 26, either during the upstroke or during the downstroke. It is also noteworthy that the installation of the spring and guard shell assemblies 26—28, both as regards their attachment of the posts 17 as well as to the mattress frame 29, is such as to be readily effected with no additional tools, and that such installations, once made produce a secure and rugged device which is safe against all conditions that may be contemplated.

Another form of spring suspension for the mattress assembly is featured in FIG. 7, where the end sections of the mattress frame 29 are encompassed by a pair of bracket components 38 and 39, each one of which includes a web receiving extremity adapted to the horizontal as well as the vertical webs of the angle metal of which the frame is made. The two components 38 and 39 are then clamped together by means of an eyebolt 41, which thereby functions to grip the mattress frame between them securely and in addition the eye of the bolt functions as a free pivotal connection with the lower loop of a related spring coil 42. Thus suspended from four stretch spring arms at its corners, the mattress assembly is buoyantly responsive to vertical reciprocal stimulation as will now be described.

Intermediate the ends of the frame 29, and preferably at its mass center, there may be applied a transversely extending beam element 44, which may be an angle member or a channel, FIGS. 3 and 4. In order to facilitate this arrangement for householders who acquire the present apparatus for posterior application, the beam element 44 whether made of angle or channel shaped stock, is provided at both its ends with one or more elongated holes 45, through which may be passed suitably fitting threaded bolts 46 for securing to such beam ends the hooked clamping or embracing members 47. The latter are shaped to receive within their hooked extremities 48 a composite of standard or conventional bar or tubular stock material from which the mattress frames 29 are made. A flattened U-shaped configuration such as shown in FIG. 4, is found to afford this universal feature. A longer side section of the embracing member 47, designated 51 is also provided with one or more elongated holes 52, registerable with the holes 45 of the beam element 44, but because of the holes elongations, affording thereby a mode of adjusting the hooked extremities longitudinally for the purpose of clamping grips the mattress frame therebetween.

To one of the upstanding webs 53, of beam element 44 is pivotally articulated as at 54 the free end of a connecting rod 55, whose other end is pivoted to an arm 56 carried by the crank disc 57, preferably by means of an adjustable stud bolt 58. A series of three elongated holes in the face of disc 57 each located at a different radius from its center of rotation may alternatively accommodate bolt 58 and in this way the stroke of rod 55 is varied for the purpose of modifying the amplitude of the crib agitating motion.

This motion is originated by an electric motor 61, which drives a train of gears or transmission system symbolically represented by the worm and pinion set 62 in FIG. 4. The motor and its transmission 61—62 are advantageously combined into a unitary form, such as by inclusion within housing 63 or support casing 64. In this manner may be achieved not only compactness and facility of installation, but also the important object of safety because of the more protective consequences which flow from being able to shield moving mechanical parts from curious fingers, than is possible when even limited exposure of mechanism is permitted.

The common housing 63 may include a mounting base 64, provided with holes to accommodate bolts 65 whereby the housing is made fast to a transverse beam element 66, generally similar to beam 44 described above, and correspondingly provided with like means 67 and bolts 68 for effecting length adjustments and securing snug clamping engagement with the side rails 71 of the bed. Thus, it is to be noted that both the spring suspension means by which the mattress is yieldably floated, as well as the motion imparting mechanism involving the mattress frame 29 and 71 are adapted to power mechanization by simple and facile adjustments that even unskilled persons may be able to perform with but minor instructions or guidance.

In FIG. 5 is illustrated another form of power translating mechanism which comprises in addition to the motor driven disc 57 and its carried stud pin or bolt 58, a journaled pitman 73 which has intermediate its opposite arms a box cam or loop 74 which receives the pin 58. As the disc rotates, the pin 58 riding within the described loop 74 imparts to and fro motion to the pitman 73, which again may be adjusted for amplitude by relocating the pin 58 in one of a series of holes in disc 57. By journaling the arms of the pitman 73 within opposed bearings of the housing 63, the pitman may be restricted to safe parallel motion.

Another form of power unit construction is taught in FIG. 6, where the reduced speed driven disc 57 correspondingly is provided with a free pivotally connected rod 58. In this case, however, the pin functions as a cam lifter acting upon the third class lever 76 in a cyclic or periodic manner with a brief rest interval between strokes but having nonetheless the safety features of enclosing all parts that incur impingement during their function. Lever 76 is pivoted at 77 and its free end is connected to a connecting rod 78 which is guided through an aperture 79 in the enclosure body.

Operation

With a mattress and frame assembly suspended on a set of springs 42 or 26 as above described, motion transmitted in a vertical direction thereto produces a soft cushioned bounce which is constrained to the lateral definition of its bounding components. This prevents interference with the side barresses as well as safeguarding against injuring the occupant in the event that he extends his hands beyond the borders of the mattress area. It is to be noted that both of the general types of suspension springs are designed so that they are compatible with horizontal level adjustment as conventionally provided in many commercial embodiments of infants' beds and cribs.

The sagitating or motion imparting mechanisms featured in the disclosures of FIGS. 4 to 6 are so designed that their installation may be had with an ordinary screwdriver and pair of pilers or wrench. The length of stroke and hence amplitude of vibratory motion is a factor that may be controlled by adjusting the crank disc pin 58 in respect to its location in one of the disc holes. Any discrepancies in the height variations between the mattress frame level and the bed rail 71 levels can be compensated.
for by making any of the connecting rods 55, 73 or 78 of two sections with length adjustment of suitable kind between them.

While the invention has been explained and described with certain structural embodiments of disclosure, it will be understood, nevertheless, that certain departures therefrom are susceptible of being made within the spirit or scope of this contemplation. It is not intended, therefore to be limited by the particular language of the foregoing specification nor by the illustrations of the accompanying drawings except as indicated in the appended claims.

1. A collapsible apparatus for imparting vertical reciprocal motion to the mattress and its supporting frame of an infant's crib which comprises: means for springingly suspending the head and foot ends of a mattress supporting frame for vertical movement and for restraining the same against lateral movement, a first beam element including endwise disposed longitudinally adjustable clamps for attaching said beam beam transversely to said mattress supporting frame intermediate the ends of said frame, a second beam element including endwise disposed longitudinally adjustable clamps for attaching said second element transversely to the longitudinal rails of an infant's crib beneath said first element, and a motor driven power train mounted upon said second beam element including a vertical reciprocal motion transmission rod connecting said train with said first beam element for boring said mattress and its supporting frame.

2. A conversion kit for making a stationary infant's crib or cradle into a motorized bouncing implement for jilting disturbed infants into quietude which comprises: a series of springs means each for sustaining one corner of a cradle mattress and its support under vertical resilience, each of said spring means comprising a pair of hollow members each closed at one end and disposed in mutually inverted relation with one of the members telescoping over the other of same, each of said spring means further having a coil spring within the associated hollow members which bias the closed end of one of the hollow members away from the adjacent end of the other of same, a bracket associated with each of said spring means for securing it to the head or foot board of a crib at predetermined levels, a power driven unit including a motor, speed reduction transmission and vertical reciprocating motion transmission device for converting the rotary high speed output of said motor into slower rhythmic vertical reciprocal undulations, means for clampingly attaching said power driven unit to a stationary portion of the crib's structure, and additional means for attaching said vertical motion translating device to said cradle mattress and its support.

3. The combination set forth in claim 2 in which said additional means is comprised of a beam element adapted to extend transversely across the width of the cradle mattress support and to provide a connection with said power driven unit vertical motion translating device intermediate its extremities, and support clampingly bracketed securable to said beam element at each of its ends in longitudinally variable relationship for thereby adapting said beam element to different widths of cradle mattress supports.

4. In combination with an infant's crib or similar article which includes head and foot board sections, longitudinally extending frame members extending generally transversely of said head and foot sections along opposite sides of the crib at the lower portion thereof, a crib mattress and support frame therefor, and elevation adjusting supports means at the corners of the crib frame, the improvement comprising individual bracket means engageable with said elevation support means at various levels, springs means interconnecting the bracket means and the corners of said mattress support frame for resiliently supporting the mattress for vertical resilient rectilinear movement with respect to said bracket means, a first beam element extending transversely across the medial portion of said mattress frame, a second beam element extending transversely between said longitudinally extending frame members in the median portion of the crib and below said first beam element, and motor means carried by said second beam element and including a vertically reciprocating member extending upwardly from said motor means and connecting with said first beam element to reciprocate the same up and down.

6. An infant's crib comprising: a crib frame having head and foot sections with vertical corner posts at the sides thereof, longitudinally extending frame members extending generally transversely of said head and foot sections along opposite sides of the crib at the lower portion thereof, a crib mattress, a support frame for the crib mattress, each of said vertical corner posts having vertically spaced elevation adjusting means, bracket means associated with each corner post, one of the bracket means and the elevation adjusting means of the corner posts having projecting means and the other having projection engaging means which engage with the projecting means to support the bracket means at different elevations on the corner posts, means interconnecting the bracket means and the corners of said mattress support frame for resiliently supporting the mattress for vertical rectilinear movement with respect to said bracket means at said different elevations, motor support means carried by said crib frame below said crib mattress support frame, and motor means carried by said support means and including a vertically reciprocating rod extending upwardly from said motor means and coupled to said crib mattress support frame for any of a number of different elevations thereof to reciprocate the same up and down.

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