

CLAIMS

1. An infant care apparatus comprising:

a base;

a drive mechanism coupled to the base and having a first motion assembly and a second motion assembly, wherein the first motion assembly has a first motor dependent from the base and the second motion assembly has a second motor separate and distinct from the first motor;

a vibratory mechanism connected to the base and arranged so as to cooperate with the drive mechanism, the vibratory mechanism having a vibration motor separate and distinct from the first and second motors of the drive mechanism;

a movable stage movably mounted to the base and operatively coupled to the first motion assembly so that the first motor imparts, via the first motion assembly, a first cyclic motion in a first direction to the movable stage, and to the second motion assembly so that the second motor imparts, via the second motion assembly, a second cyclic motion to at least part of the movable stage in a second direction independent of the first cyclic motion in the first direction imparted by the first motion assembly and to the vibratory mechanism so that the vibration motor vibrates the movable stage;

an infant support coupled to the movable stage so that the second cyclic motion and first cyclic motion is imparted to the infant support, and the infant support is configured to move cyclically in both the first direction and the second direction relative to the base; and

a controller communicably coupled to the drive mechanism, and configured so as to move the infant support in a selectably variable motion profile with selectable vibration modes selected, with the controller, from different selectably variable motion profiles and selectably different vibration modes for each of the different selectable variable motion profiles.

2. The infant care apparatus of claim 1, wherein the controller is configured to configured so as to move the infant support with separate impetus separately imparted on the infant support by the first cyclic motion and second cyclic motion respectively driven by the first and second motors, in both the first direction and the second direction with the selectably variable motion profile.

3. The infant care apparatus of claim 1, wherein the controller is configured to effect selection of the selectably variable motion profile by separate variance of motion characteristic of the separate respective first cyclic motion and second cyclic motion determined from a common selection input to the controller selecting the selectably variable motion profile

4. The infant care apparatus of claim 1, wherein at least part of the movable stage isolates the drive mechanism from the base.

5. The infant care apparatus of claim 1, wherein each of the different selectably variable motion profiles is deterministically defined by a selectably variable velocity characteristic of at least one of the first and second cyclic motions respectively of the first and second motion assemblies, and a selectably variable velocity characteristic of at least

one of the first and second cyclic motions respectively of the first and second motion assemblies.

6. The infant care apparatus of claim 5, wherein the selectably variable velocity characteristic of at least one of the first and second cyclic motions respectively of the first and second motion assemblies, and the selectably variable velocity characteristic of at least one of the first and second cyclic motions respectively of the first and second motion assemblies are selected with the controller from the common selection input to the controller.

7. The infant care apparatus of claim 1, wherein each of the different selectably variable motion profiles includes at least one of horizontal and vertical movements.

8. The infant care apparatus of claim 1, wherein the first motion assembly comprises:

the first motor having a drive shaft; and

a slide crank assembly comprising a gearing assembly coupled to the drive shaft of the first motor and a crank member coupled to the gearing assembly and the movable stage;

wherein operation of the first motor causes rotation of the slide crank assembly, thereby imparting the first cyclic motion to the movable stage.

9. The infant care apparatus of claim 1, wherein the second motion assembly comprises:

the second motor having a drive shaft;

a worm gear assembly coupled to the output of the drive shaft; and

a vertical yoke having a first end coupled to an output shaft of the worm gear assembly,

wherein operation of the second motor causes rotation of the vertical yoke, thereby imparting second cyclic motion to the infant support.

10. The infant care apparatus of claim 9, wherein the second motion assembly further includes a dual scissor mechanism coupled to a second end of the vertical yoke configured to support the infant support.

11. The infant care apparatus of claim 1, wherein a first encoder having a single slot is coupled to a first drive shaft of the first motor and a second encoder having a single slot is coupled to a second drive shaft of the second motor.

12. The infant care apparatus of claim 11, wherein the controller determines position information of the infant support based at least in part on information from the first encoder and the second encoder.

13. A method comprising:

providing a base of an infant care apparatus;

providing a drive mechanism connected to the base and arranged so as to cooperate with the drive mechanism, the drive mechanism having a first motion assembly and a second motion assembly, wherein the first motion assembly has a first motor dependent from the base and the second motion

assembly has a second motor separate and distinct from the first motor;

providing a vibratory mechanism connected to the base and arranged so as to cooperate with the drive mechanism, the vibratory mechanism having a vibration motor separate and distinct from the first and second motors of the drive mechanism;

providing a movable stage movably mounted to the base and operatively coupled to the first motion assembly so that the first motor imparts, via the first motion assembly, a first cyclic motion in a first direction to the movable stage, and to the second motion assembly so that the second motor imparts, via the second motion assembly, a second cyclic motion to at least part of the movable stage in a second direction independent of the first cyclic motion in the first direction imparted by the first motion assembly and to the vibratory mechanism so that the vibration motor vibrates the movable stage;

providing an infant support coupled to the movable stage so that the second cyclic motion and first cyclic motion is imparted to the infant support, and the infant support is configured to move cyclically in both the first direction and the second direction relative to the base; and

moving, with a controller communicably coupled to the drive mechanism, the infant support in a selectably variable motion profile with selectable vibration modes selected, with the controller, from different selectably variable motion profiles and selectably different vibration modes for each of the different selectable variable motion profiles.

14. The method of claim 13, wherein a first encoder is coupled to a first drive shaft of the first motor and a second encoder is coupled to a second drive shaft of the second motor.

15. The method of claim 14, wherein the first encoder and the second encoder each include no more than one slot.

16. The method of claim 14, further comprising determining, with the controller, position information of the infant support based at least in part on information from the first encoder and the second encoder.

17. The method of claim 13, wherein each of the different selectably variable motion profiles is predetermined, the method further comprising selecting, by a user, one of the selectably variable motion profiles.

18. An infant apparatus having an infant support, the infant apparatus comprising:

a base; and

an infant support coupling arranged so as to releasably couple the infant support to the base, the infant support coupling including:

a movable support movably connected to the base and disposed so as to form a support seat that engages and supports the infant support on the base, with the movable support in a first position relative to the base, and

actuatable grip members configured to actuate between a closed position and an open position to capture and release the infant support to the base, the actuatable grip members being automatically actuatable between the closed and open

positions by action of the movable support moving to the first position.

19. The infant apparatus of claim 18, wherein the actuatable grip members are disposed with respect to the infant support to effect grip.

20. The infant apparatus of claim 18, wherein the infant support is free of grip.

21. The infant apparatus of claim 18, wherein the movable support includes cams that cam the grip members from the closed position to the open position and from the open position to the closed position.

22. An infant apparatus comprising:

an infant support;

a base; and

an infant support coupling arranged so as to releasably couple the infant support to the base, the infant support coupling including:

a movable support movably connected to the base and disposed so as to form a support seat that engages and supports the infant support on the base, and

a cam lock mechanism configured to lock the infant support to the base.

23. The infant apparatus of claim 22, wherein the cam lock mechanism comprises:

a cam lever pivotally coupled to the base, the cam lever having a cam surface;

a slider moveable mounted within the base, the slider being configured to interface with the cam surface of the cam lever; and

a locking arm coupled to the slider so as to move with the slider as a single unit, where pivoting movement of the cam lever causes reciprocating movement of the locking arm to effect locking the infant support to the base and unlocking of the infant support from the base.

24. The infant apparatus of claim 22, wherein:

the infant support includes an articulated span member having a locking post extending therefrom; and

the cam lock mechanism includes a locking arm that engages the locking post to lock the infant support to the base.

25. The infant apparatus of claim 24, wherein the infant support includes an infant seat and two rocker supports coupled to the infant seat, where the articulated span member extends between and couples the two rocker supports to each other.

26. The infant apparatus of claim 24, wherein the articulated span member comprises:

a span member base from which the locking post extends; and

an articulated support pivotally coupled to the span member base, wherein the articulated support engages the span member base so as to lock the articulated support in one of a plurality of predetermined angular positions relative to the base so as to

adjust a recline position of the infant support relative to the base.

27. The infant apparatus of claim 26, wherein:

the span member base includes a pivot-lock arm; and

the articulated support includes a plurality of pivot stop apertures each configured to accept the pivot-lock arm therein, where the pivot lock arm is configured to be selectably retracted from one pivot stop aperture and inserted into another pivot stop aperture so as to lock the infant support in a predetermined recline position corresponding to a selected one of the pivot stop apertures.

28. An infant care apparatus having an infant support, the infant care apparatus comprising:

a base;

the infant support having a frame with a seat configured for supporting an infant, the frame being configured to form a rocker with rocker rails; and

an infant support coupling arranged to releasably couple the infant support and the base so as to mount and dismount the infant support to the base, wherein the infant support coupling depends from the rocker rails and has an integral recline adjustment mechanism of the rocker;

wherein the base has an actuatable grip that engages the infant support coupling, the grip being configured to actuate between a closed position and an open position to capture and release the infant support to the base, wherein

the grip actuation is separate and distinct from recline adjustment of the rocker.

29. The infant care apparatus of claim 28, wherein the rocker rails are fixed relative to the seat.

30. The infant care apparatus of claim 28, wherein the recline adjustment mechanism is disposed to adjust at least one of rocker rail incline and seat incline with respect to base.

31. The infant care apparatus of claim 28, wherein the recline adjustment mechanism has an adjustment handle, separate and distinct from a grip actuation handle configured to actuate the actuable grip.

32. A method for an infant care apparatus having a base and an infant support having a frame with a seat configured for supporting an infant, the frame being configured to form a rocker with rocker rails, the method comprising:

releasably coupling the infant support to the base with an infant support coupling so as to mount and dismount the infant support to the base, wherein the infant support coupling depends from the rocker rails and has an integral recline adjustment mechanism of the rocker; and

adjusting, with the recline adjustment mechanism, at least one of rocker rail incline and seat incline with respect to the base separate from releasably coupling the infant support to the base;

wherein the base has an actuable grip that engages the infant support coupling, the actuable grip being configured to actuate between a closed position and an open position

to capture and release the infant support to the base, wherein the grip actuation is separate and distinct from recline adjustment of the rocker.

33. The method of claim 32, wherein the rocker rails are fixed relative to the seat.

34. The method of claim 32, wherein the recline adjustment mechanism has an adjustment handle, separate and distinct from a grip actuation handle configured to actuate the actuatable grip.