CLAIMS

1. A theater seating assembly (1), comprising:
    a. a seat support base (110);
    b. a first seat support (100a), comprising:
        i. a first lift arm (120a) pivotally connected to the seat support base (110);
        ii. a first lift arm actuator (130a) operatively connected to the first lift arm (120a);
        iii. a first passenger seat beam rotator (140a) operatively connected to the first lift arm (120a) distally from the seat support base (110); and
        iv. a first passenger seat beam rotator actuator (141a) operatively connected to the first passenger seat beam rotator (140a), the first passenger seat beam rotator actuator (141a) operative to effect a change in passenger seat row pitch independently of rotation of the first lift arm (120a);
    c. a second seat support (100b) disposed distally from the first seat support (100a) in a mirror configuration with respect to a seat axis defined by a longitudinal distance between the first seat support (100a) and the second seat support (100b), comprising:
        i. a second lift arm (120b) pivotally connected to the seat support base (110); and
        ii. a second lift arm actuator (130b) operatively connected to the second lift arm (120b) and configured to coordinate movement of the second lift arm with the first lift arm;
        iii. a second passenger seat beam rotator (140b) operatively connected to the second lift arm (120b); and
        iv. a second passenger seat beam rotator actuator (141b) operatively connected to the second passenger seat beam rotator (140b) distally from the seat support

base (110), the second passenger seat beam rotator actuator (141b) operative to effect a change in passenger seat row pitch independently of rotation of the second lift arm (120b) cooperatively with the first passenger seat beam rotator actuator (141a);

d. a passenger seat assembly (160) operatively connected to the first passenger seat beam rotator (140a) and to the second passenger seat beam rotator (140b), the passenger seat assembly (160) disposed substantially parallel to the seat axis, the passenger seat assembly comprising a passenger seating area; and

e. a system controller (70) operatively in communication with the first lift arm actuator (130a), the second lift arm actuator (130b), the first passenger seat beam rotator actuator (141a), and the second passenger seat beam rotator actuator (141b), the system controller operative to coordinate movement of the first lift arm with the second lift arm in their respective X-Y planes while simultaneously effecting a change to a pitch angle of the passenger seat assembly and to coordinate movement of the first passenger seat beam rotator actuator (140a) with the second passenger seat beam rotator actuator (140b).

2. The theater system of Claim 1, wherein the passenger seat assembly (160) further comprises a canopy.

3. The theater system of Claim 1, wherein the passenger seat assembly (160) further comprises a shield.

4. The theater seating assembly of Claim 1, wherein

a. the seat support base (110) comprises a first edge (110a) and a second edge (110b);

b. the first lift arm (120a) is pivotally connected to the first edge at a first lift arm seat support base end (121a);

c. the second lift arm (120b) is pivotally connected to the second edge at a second lift arm seat support base end (121c);

d. the first lift arm actuator (130a) is further operatively connected to the seat support base and operative to effect movement of the first lift arm in a first X-Y plane defined by the seat support base and the first lift arm;

e. the second lift arm actuator (130b) is further operatively connected to the seat support base and operative to cooperatively effect substantially identical movement of the second lift arm in a second X-Y plane defined by the seat support base and the second lift arm to the movement of the first lift arm in the first X-Y plane, the second X-Y plane substantially parallel to the first X-Y plane;

f. the passenger seat assembly (160) is movably disposed intermediate the first lift arm (100a) at a first attachment arm end (121b) disposed opposite the first lift arm seat support base end (121a) and the second lift arm (100b) at a second attachment arm end (121d) disposed opposite the second lift arm seat support base end (121c), the passenger seat assembly defining a passenger seat row axis disposed longitudinally between the first lift arm and the second lift arm; and

g. the first passenger seat beam rotator (140a) and the second passenger seat beam rotator (140b) are further operative to change a pitch angle of the passenger seat about the passenger seat row axis.

5. The theater system of Claim 4, wherein movement of the first lift arm (100a) is limited to movement within the first X-Y plane and movement of the second lift arm (100b) is limited to movement within the second X-Y plane.

6. The theater system of Claim 4, wherein:

    a. the first lift arm actuator (130a) is pivotally connected to the first lift arm (120a) and pivotally connected to the seat support base first edge (110a); and

    b. the second lift arm actuator (130b) is pivotally connected to the second lift arm (120b) and pivotally connected to the seat support base second edge (110b).

7. The theater system of Claim 6, wherein:

    a. the first lift arm actuator (130a) further comprises a plurality of arm actuators pivotally connected to the seat support base proximate the seat support base first edge and to the first lift arm; and

    b. the second lift arm actuator (130b) further comprises a plurality of arm actuators pivotally connected to the seat support base proximate the seat support base second edge and to the second lift arm, the first passenger seat beam rotator actuator and the plurality of arm actuators operative to cooperatively effect changes to the pitch angle of the passenger seat assembly (160) that maintain the same pitch angle of the passenger seat assembly (160) at the first lift arm relative to the seat support base with respect to the pitch angle of the passenger seat assembly (160) at the second lift arm relative to the seat support base.

8. The theater system of Claim 1, wherein:

a. the first passenger seat beam rotator actuator (140a) is pivotally connected to the seat support base (110) proximate the first lift arm seat support base end (121a) and further comprises:
    i. a pitch link (145);
    ii. a lower crank (142) pivotally connected to the first passenger seat row rotator (141a) at a first lower crank end and pivotally connected to the pitch link (145) at second lower crank end; and
    iii. an upper crank (143) pivotally connected to at a first attachment arm end (121b), disposed opposite the first lift arm seat support base end, at a first upper crank end and pivotally connected to the pitch link (145) at a second upper crank end; and
b. the second passenger seat beam rotator actuator (140a) is pivotally connected to the seat support base (110) proximate the second lift arm seat support base end (121b) and further comprises:
    i. a pitch link (145);
    ii. a lower crank (142) pivotally connected to the second passenger seat row rotator (140b) at a first lower crank end and pivotally connected to the pitch link (145) at second lower crank end; and
    iii. an upper crank (143) pivotally connected to a second attachment arm end (121b), disposed opposite the second lift arm seat support base end, at a first upper crank end and pivotally connected to the pitch link (145) at a second upper crank end.

9. The theater system of Claim 1, wherein the passenger seat row rotator (150) further comprises:

a. a passenger seat row rotator pitch crank (152) pivotally connected to an arm of the at least one of the first lift arm and the second lift arm proximate an attachment arm end (121b,121d), disposed opposite the first lift arm seat support base end, of its respective arm of the at least one of the first lift arm and the second lift arm; and

b. a passenger seat row rotator actuator (151) pivotally connected to the arm of the at least one of the first lift arm and the second lift arm at a first end of the passenger seat row rotator actuator (151) and pivotally connected to the passenger seat row rotator pitch crank (152) at a second end of the passenger seat row rotator actuator (151).

10. The theater system of Claim 1, wherein the passenger seat assembly (160) further comprises:

a. a seat beam (161);

b. a passenger seating area (162) connected to the seat beam;

c. a first seat beam hanger (600) pivotally connected to the first lift arm proximate a first lift arm attachment end (121b) at an upper seat beam hanger end (601) and to an end of the seat beam closest to the first lift arm;

d. a second seat beam hanger (600) pivotally connected to the second lift arm proximate a second lift arm attachment end (121d) at an upper seat beam hanger end (601) and to an end of the seat beam closest to the second lift arm.

11. The theater system of Claim 10, wherein:

a. the passenger seat assembly (160) comprises a first passenger seat assembly (160) and a second seat assembly (160); and

b. each seat beam hanger (600) of the seat beam hangers (600) further comprises:

i. an upper seat beam hanger crank (602) pivotally connected to the arm attachment end (121b,121d) of its respective arm;

ii. a lower seat beam hanger crank (604);

iii. a seat beam hanger link (605) pivotally connected at a first seat beam hanger link end to the upper seat beam hanger crank and pivotally connected at a second seat beam hanger link end to the lower seat beam hanger crank, the upper seat beam hanger crank and the lower seat beam hanger crank operative to maintain substantially identical rotation of the first passenger seat assembly (160) and the second seat assembly (160) with respect to each other about their respective passenger seat row axis.

12. The theater system of Claim 1, further comprising a first lift arm travel limiter (131) disposed on the first seat support base end proximate where the arm actuator (130) is operatively connected to the seat support base, the first lift arm travel limiter (131) configured to stop movement of the first lift arm (120a) in the first X-Y plane.

13. The theater system of Claim 1, wherein the seat support base (110) comprises:

a. a first seat support base (110a) connected to the first lift arm (120a) at the first lift arm seat support base end (121a); and

b. a second seat support base (110b) connected to the second lift arm (120b) at the second lift arm seat support base end (121c).

14. The theater system of Claim 1, wherein each of the first passenger seat beam rotator (141a) and the second passenger seat beam rotator (141b) further comprises a rotator arm (32), the rotator

arm (32) further comprising a rotator arm limiter (32e) configured limit angular travel of the rotator arm (32) about its rotator arm actuator joint (32c) in a plane defined by the lift arm (20).

15. A method of providing a theater experience using a theater seating assembly comprising a seat support base (110); a first seat support (100a) which comprises a first lift arm (120a) pivotally connected to the seat support base (110), a first lift arm actuator (130a) operatively connected to the first lift arm (120a), a first passenger seat beam rotator (150) operatively connected to the first lift arm (120a) distally from the seat support base (110), and a first passenger seat beam rotator actuator (141a) operatively connected to the first passenger seat beam rotator (140a) where the first passenger seat beam rotator actuator (141a) is operative to effect a change in passenger seat row pitch independently of rotation of the first lift arm (120a); a second seat support (100b), disposed distally from the first seat support (100a) in a mirror configuration with respect to a seat axis defined by a longitudinal distance between the first seat support (200a) and the second seat support (200b), comprising a second lift arm (120b) pivotally connected to the seat support base (110) and a second lift arm actuator (130b), operatively connected to the second lift arm (120b) and configured to coordinate movement of the second lift arm with the first lift arm, a second passenger seat beam rotator (140b) operatively connected to the second lift arm (120b), and a second passenger seat beam rotator actuator (141b) operatively connected to the second passenger seat beam rotator (140b) distally from the seat support base (110) where the second passenger seat beam rotator actuator (140b) is operative to effect a change in passenger seat row pitch independently of rotation of the second lift arm (120b) and cooperatively with the first passenger seat beam rotator actuator (140a); a passenger seat assembly (160) operatively connected to the first passenger seat beam rotator (140a) and to the second passenger seat beam rotator (140b) where the passenger seat assembly (160) is disposed substantially parallel to the seat axis and

where the passenger seat assembly comprises a passenger seating area; and a system controller (70) operatively in communication with the first lift arm actuator (121a), the second lift arm actuator (121b), the first passenger seat beam rotator actuator (141a), and the second passenger seat beam rotator actuator (141b) where the system controller is operative to coordinate movement of the first lift arm with the second lift arm in their respective X-Y planes while simultaneously effecting a change to a pitch angle of the passenger seat assembly and to coordinate movement of the first passenger seat beam rotator actuator (141a) with the second passenger seat beam rotator actuator (141b), the method comprising:

a. positioning the first lift arm and the second lift arm, and rotating the passenger seat assembly, to a passenger boarding position sufficient to allow a passenger to sit in the passenger seat assembly;
b. using the system controller to substantially synchronously control the left and right lift arms and via their associated lift arm actuators to effect a motion between each lift arm and its associated lift arm rotator to adjust an angular relationship between the two by adjusting an angular relationship between a first lift arm lowered position to a second lift arm raised position at a first predetermined set of times; and
c. rather than pivoting the passenger seat assembly with a rotating floor, using the passenger seat beam rotators to alter positions of the passenger seat assembly while a raising and lowering function is taking place.