Claims

1. A seat for a vehicle comprising a seat pan and a backrest, in which the backrest includes a movable element which is detachable from the backrest and attachable to the seat pan to extend the seat pan surface.

2. A seat as claimed in claim 1, further comprising a seat pan extension portion deployable to extend the seat pan surface in a direction forwardly of the seat, in which the movable element is deployable to form at least a part of the seat pan extension portion.

3. A seat as claimed in claims 1 or 2, in which the movable element comprises a headrest part of the backrest.

4. A seat as claimed in claim 1, 2 or 3, in which the movable element of the backrest comprises a subframe and a cushion.

5. A seat as claimed in claim 4, in which the seat pan comprises a seat pan frame, the subframe and the seat pan frame being provided with cooperating parts arranged for removably attaching the subframe onto the seat pan frame.

6. A seat as claimed in claim 4 or 5, in which the backrest comprises a main backrest frame, the subframe and the main backrest frame being provided with cooperating parts arranged for removably attaching the subframe onto the main backrest frame.

7. A seat as claimed in claim 5 or 6, comprising a locking arrangement for selectively locking the subframe to the seat pan frame or the main backrest frame, respectively.

8. A seat as claimed in any one of claims 5 to 7, in which the cooperating parts respectively comprise a locking pin and a corresponding latch for engaging with the locking pin.

9. A seat as claimed in claim 8, in which the latch is electrically operated, for example by remote control.

10. A seat as claimed in claim 9 in which the latch is operated by a solenoid and/or is operated by a central servo.

11. A seat as claimed in claim 8 in which the latch is manually operated.

12. A seat as claimed in any one of claims 8 to 11, in which the latch comprises a rotor latch.

13. A seat as claimed in any one of claims 5 to 7, in which the cooperating parts respectively comprise an aperture and a corresponding retractable bolt for extending through the aperture.

14. A seat as claimed in claim 13, in which the bolt is electrically operated, for example by remote control.

15. A seat as claimed in any one of claims 5 to 7, in which the cooperating parts respectively comprise a retractable locking pin and a corresponding aperture for receiving the retractable locking pin.

16. A seat as claimed in claim 15, in which the retractable locking pin is manually operated, for example by a pushbutton.

17. A seat as claimed in any preceding claim, in which the movable element is attachable to a front edge of the seat pan.

18. A seat as claimed in claim 17 when dependent on any one of claims 5 to 16, in which the subframe comprises side arms each having a free end adjacent one edge of the movable element, the cooperating part being provided adjacent the free end of each of the side arms.

19. A seat as claimed in claim 17 or 18, in which the seat pan comprises a frame comprising a transversely extending front spar.

20. A seat as claimed in claim 18 or claim 19 when dependent on claim 18, in which the spar comprises an aperture adjacent each side of the seat for receiving the free ends of the side arms.

21. A seat as claimed in claim 18, or claim 19 when dependent on claim 18, or claim 20, in which the free ends of the side arms are extendable outwardly of the subframe.

22. A seat as claimed in claim 21, in which the movable element comprises a backing plate, and one of the side arm and the backing plate is provided with rails, whilst the other is provided with corresponding channels so as to allow sliding movement of the side arms relative to the backing plate.

23. A seat as claimed in any one of claims 18 or claim 19 when dependent on claim 18, in which the spar comprises a receiving arm provided adjacent each side of the seat arranged to receive the free ends of the side arms.

24. A seat as claimed in claim 23 in which the receiving arms are pivotally attached to the front edge of the seat pan for rotational movement between a retracted position under the seat pan and a deployed position substantially coplanar with the seat pan.

25. A seat as claimed in any one of claims 1 to 16, in which the seat pan is movable forwardly from a seating position to an extended position, and the movable element is deployable adjacent a rear edge of the seat pan.

26. A seat as claimed in claim 25, in which the angle of the seat pan surface in the extended position is different from that in the seating position.

27. A seat as claimed in claim 26, in which the seat pan is supported at the side edges thereof by seat pan side frame members, and one of the seat pan side edge and the seat pan side frame member is provided with a channel, whilst the other is provided with

lugs accommodated in the channel, the channel being shaped to guide the seat pan towards a more horizontal position as it extends forwardly to the extended position.

28. A seat as claimed in any one of claims 25 to 27, in which the movable element comprises lugs provided at side edges thereof arranged to be receivable in corresponding apertures provided in the seat pan side frame members to locate the movable element in the deployed position.

29. A seat as claimed in claim 2 or claims 2 and 3, in which the seat pan extension portion comprises an extension frame deployable from the seat pan for supporting the movable element.

30. A seat as claimed in claim 29, in which the extension frame comprises a backing plate and the movable element comprises a cushion.

31. A seat as claimed in claim 29 or 30, in which the extension frame is deployable to extend from the front edge of the seat pan.

32. A seat as claimed in claim 31, in which the extension frame is deployable by a forward sliding movement from beneath the seat pan.

33. A seat as claimed in claim 31, in which the extension frame is pivotally attached to the front edge of the seat pan for rotational movement between a retracted substantially vertical position below the seat pan, and a deployed position substantially coplanar with the seat pan.

34. A seat as claimed in claim 31, in which the extension frame is pivotally attached to the front edge of the seat pan for rotational movement between a retracted substantially horizontal position beneath the seat pan, and a deployed position substantially coplanar with the seat pan.

35. A seat as claimed in claim 29 or 30, in which the seat pan is movable forwardly to an extended position and the extension frame is housed below the seat pan and deployable by a sliding movement in a rearward direction from beneath the seat pan when the seat pan is in the extended position.

36. A seat as claimed in any one of claims 29 to 35, in which the backing plate of the extension frame and the movable element each comprise cooperating fastening members such as hook and loop fasteners for removably attaching the movable element to the backing plate.

37. A seat as claimed in any preceding claim, in which the backrest comprises an outer shell for carrying an inflight entertainment unit.

38. A seat as claimed in any preceding claim when dependent on claim 2, in which the seat pan extension portion has substantially the same width as the seat pan.

39. A seat as claimed in any preceding claim, in which the moveable element has substantially the same width as the seat pan.

40. A row of seats for a vehicle comprising a plurality of adjacent seats as claimed in any preceding claim.

41. A seating system for a vehicle comprising a plurality of rows of seats, each row comprising a plurality of adjacent seats as claimed in any preceding claim.

42. A seating system as claimed in claim 41, in which the movable element or the seat pan extension portion is sized to extend the seat pan surface substantially to the rear of a seat in the row in front.

43. A seat, a row of seats or a seating system as claimed in any preceding claim, in which the vehicle is an aircraft.

Claims

1. A seat for an aircraft comprising a seat pan and a backrest, the seat comprising a seat pan extension portion deployable to extend the seat pan surface in a direction forwardly of the seat, in which the backrest comprises a movable element deployable to form at least a part of the seat pan extension portion, said movable element being further characterised in that said movable element is attached removably to the backrest.
2. A seat as claimed in claims 1, in which the movable element comprises a headrest part of the backrest.
3. A seat as claimed in claim 1, or 2, in which the movable element of the backrest comprises a subframe and a cushion.
4. A seat as claimed in claim 3, in which the seat pan comprises a seat pan frame, the subframe and the seat pan frame being provided with cooperating parts arranged for removably attaching the subframe onto the seat pan frame.
5. A seat as claimed in claim 3 or 4, in which the backrest comprises a main backrest frame, the subframe and the main backrest frame being provided with cooperating parts arranged for removably attaching the subframe onto the main backrest frame.
6. A seat as claimed in claim 4 or 5, comprising a locking arrangement for selectively locking the subframe to the seat pan frame or the main backrest frame, respectively.
7. A seat as claimed in any one of claims 4 to 6, in which the cooperating parts respectively comprise a locking pin and a corresponding latch for engaging with the locking pin.
8. A seat as claimed in claim 7, in which the latch is electrically operated, for example by remote control.
9. A seat as claimed in claim 8 in which the latch is operated by a solenoid and/or is operated by a central servo.
10. A seat as claimed in claim 7 in which the latch is manually operated.
11. A seat as claimed in any one of claims 7 to 10, in which the latch comprises a rotor latch.

12. A seat as claimed in any one of claims 4 to 6, in which the cooperating parts respectively comprise an aperture and a corresponding retractable bolt for extending through the aperture.

13. A seat as claimed in claim 12, in which the bolt is electrically operated, for example by remote control.

14. A seat as claimed in any one of claims 4 to 6, in which the cooperating parts respectively comprise a retractable locking pin and a corresponding aperture for receiving the retractable locking pin.

15. A seat as claimed in claim 14, in which the retractable locking pin is manually operated, for example by a pushbutton.

16. A seat as claimed in any preceding claim, in which the movable element is attachable to a front edge of the seat pan.

17. A seat as claimed in claim 16 when dependent on any one of claims 4 to 15, in which the subframe comprises side arms each having a free end adjacent one edge of the movable element, the cooperating part being provided adjacent the free end of each of the side arms.

18. A seat as claimed in claim 16 or 17, in which the seat pan comprises a frame comprising a transversely extending front spar.

19. A seat as claimed in claim 17 or claim 18 when dependent on claim 17, in which the spar comprises an aperture adjacent each side of the seat for receiving the free ends of the side arms.

20. A seat as claimed in claim 17, or claim 18 when dependent on claim 17, or claim 19, in which the free ends of the side arms are extendable outwardly of the subframe.

21. A seat as claimed in claim 20, in which the movable element comprises a backing plate, and one of the side arm and the backing plate is provided with rails, whilst the other is provided with corresponding channels so as to allow sliding movement of the side arms relative to the backing plate.

22. A seat as claimed in any one of claims 17 or claim 18 when dependent on claim 17, in which the spar comprises a receiving arm provided adjacent each side of the seat arranged to receive the free ends of the side arms.

23. A seat as claimed in claim 22 in which the receiving arms are pivotally attached to the front edge of the seat pan for rotational movement

between a retracted position under the seat pan and a deployed position substantially coplanar with the seat pan.

24. A seat as claimed in any one of claims 1 to 15, in which the seat pan is movable forwardly from a seating position to an extended position, and the seat pan extension portion is deployable adjacent a rear edge of the seat pan.

25. A seat as claimed in claim 24, in which the angle of the seat pan surface in the extended position is different from that in the seating position.

26. A seat as claimed in claim 25, in which the seat pan is supported at the side edges thereof by seat pan side frame members, and one of the seat pan side edge and the seat pan side frame member is provided with a channel, whilst the other is provided with lugs accommodated in the channel, the channel being shaped to guide the seat pan towards a more horizontal position as it extends forwardly to the extended position.

27. A seat as claimed in any one of claims 24 to 26, in which the movable element comprises lugs provided at side edges thereof arranged to be receivable in corresponding apertures provided in the seat pan side frame members to locate the movable element in the deployed position.

28. A seat as claimed in claim 1 or 2, in which the seat pan extension portion comprises an extension frame deployable from the seat pan for supporting the movable element.

29. A seat as claimed in claim 28, in which the extension frame comprises a backing plate and the movable element comprises a cushion.

30. A seat as claimed in claim 28 or 29, in which the extension frame is deployable to extend from the front edge of the seat pan.

31. A seat as claimed in claim 30, in which the extension frame is deployable by a forward sliding movement from beneath the seat pan.

32. A seat as claimed in claim 30, in which the extension frame is pivotally attached to the front edge of the seat pan for rotational movement between a retracted substantially vertical position below the seat pan, and a deployed position substantially coplanar with the seat pan.

33. A seat as claimed in claim 30, in which the extension frame is pivotally attached to the front edge of the seat pan for rotational movement

between a retracted substantially horizontal position beneath the seat pan, and a deployed position substantially coplanar with the seat pan.

34. A seat as claimed in claim 28 or 29, in which the seat pan is movable forwardly to an extended position and the extension frame is housed below the seat pan and deployable by a sliding movement in a rearward direction from beneath the seat pan when the seat pan is in the extended position.

35. A seat as claimed in any one of claims 28 to 34, in which the backing plate of the extension frame, and the movable element each comprise cooperating fastening members such as hook and loop fasteners for removably attaching the movable element to the backing plate.

36. A seat as claimed in any preceding claim, in which the backrest comprises an outer shell for carrying an inflight entertainment unit.

37. A seat as claimed in any preceding claim, in which the seat pan extension portion has substantially the same width as the seat pan.

38. A seat as claimed in any preceding claim, in which the moveable element has substantially the same width as the seat pan.

39. A seating system for an aircraft comprising a plurality of rows of seats, each row comprising a plurality of adjacent seats as claimed in any preceding claim.

40. A seating system as claimed in claim 39 in which the seats' movable elements are interchangeable.

41. A seating system as claimed in claim 39 or claim 40, in which the seat pan extension portion is sized to extend the seat pan surface substantially to the rear of a seat in the row in front.