



US 20170295934A1

(19) **United States**

(12) **Patent Application Publication**
FISHER

(10) **Pub. No.: US 2017/0295934 A1**

(43) **Pub. Date: Oct. 19, 2017**

(54) **RECLINABLE SEAT**

(52) **U.S. Cl.**

(71) Applicant: **CAMATIC PTY LTD**, Wantirna South VIC (AU)

CPC *A47C 1/0342* (2013.01); *A47C 7/62* (2013.01); *A47C 7/56* (2013.01); *A47C 1/024* (2013.01); *A47C 7/38* (2013.01); *A47C 7/506* (2013.01)

(72) Inventor: **Adam FISHER**, Wantirna South VIC (AU)

(57) **ABSTRACT**

(21) Appl. No.: **15/131,551**

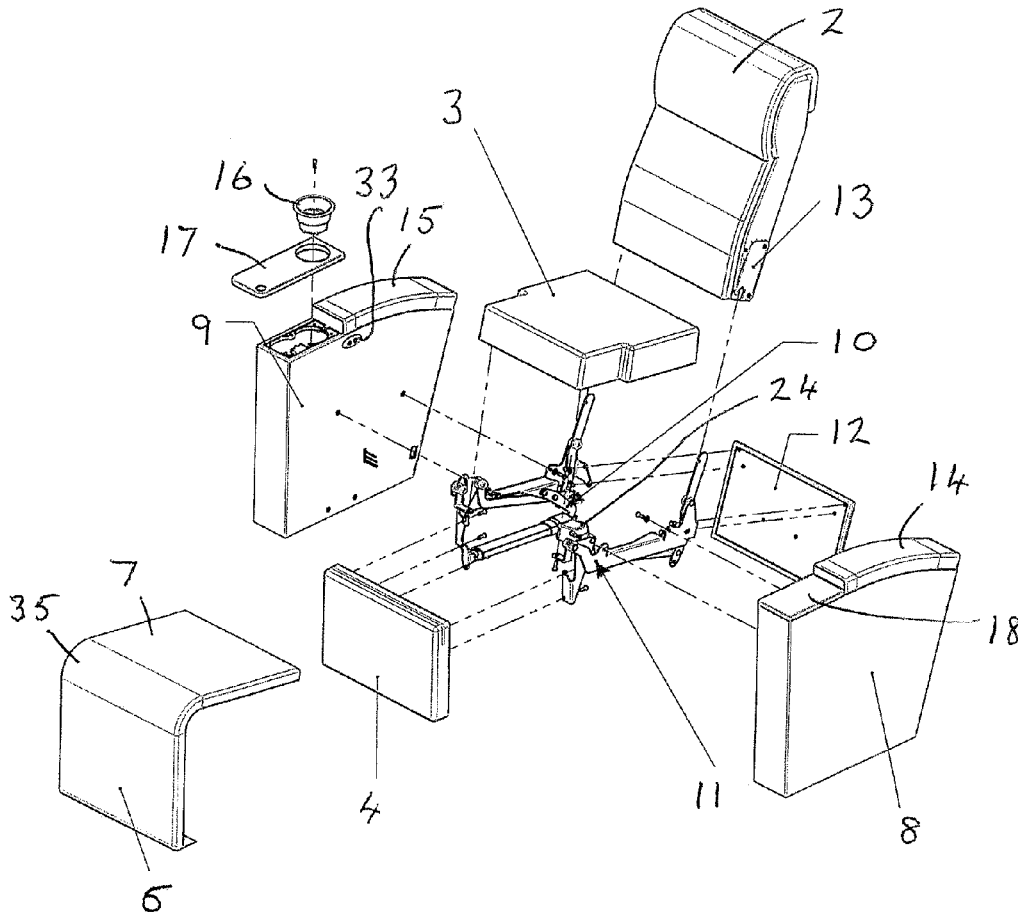
A reclining chair is provided which has a seat rest, a backrest; a footrest; two side arm portions; and a reclining mechanism arranged to move at least one of the backrest and the footrest from a substantially upright position into a reclined position. The reclining mechanism is mounted to the side arm portions. The reclining mechanism includes an extendable member which acts on a footrest support to move the footrest from a substantially upright position to a reclined position. A linkage bar may be provided to connect the footrest support to a backrest support so that a single driving mechanism causes movement of the footrest into the reclined position and simultaneously causes movement of the backrest into a reclined position. Alternatively, the linkage bar may be omitted so that only the footrest is reclinable. Other advantageous features include adjustable substantially upright and reclined positions for the backrest, a tiltable seat rest, a tiltable headrest and a removable container for rubbish or other objects located under the seat rest.

(22) Filed: **Apr. 18, 2016**

Publication Classification

(51) **Int. Cl.**

<i>A47C 1/034</i>	(2006.01)
<i>A47C 7/50</i>	(2006.01)
<i>A47C 1/024</i>	(2006.01)
<i>A47C 7/38</i>	(2006.01)
<i>A47C 7/62</i>	(2006.01)
<i>A47C 7/56</i>	(2006.01)



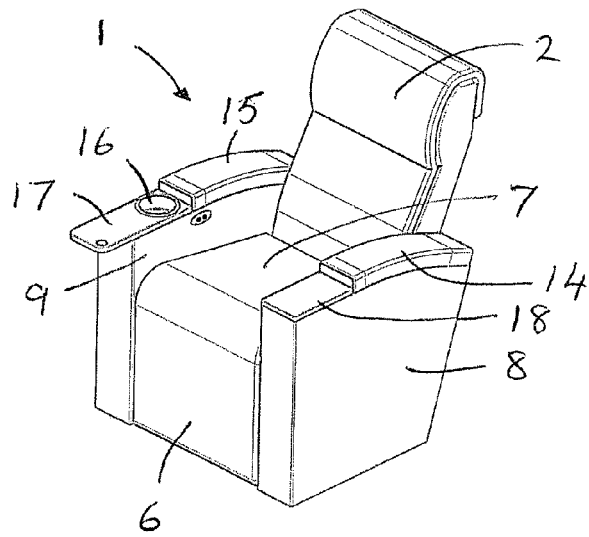


FIG. 1

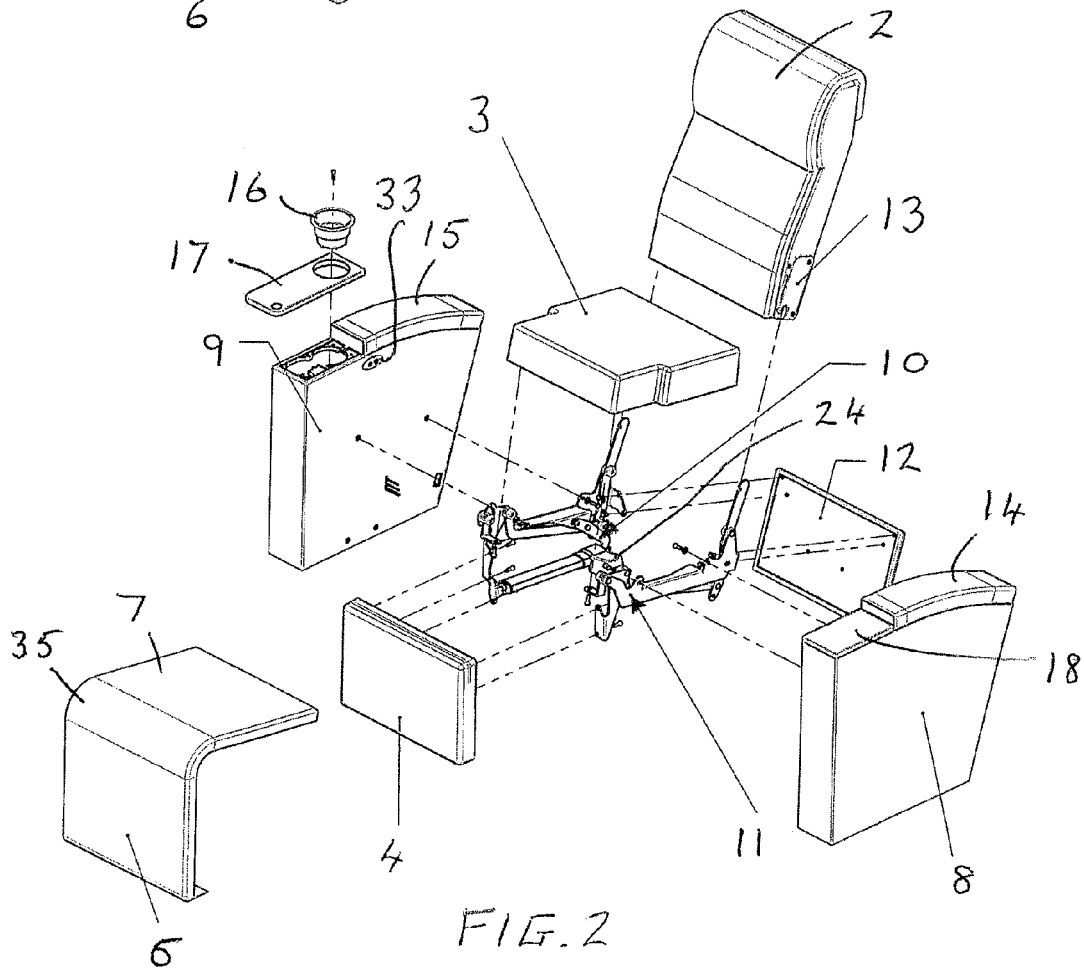


FIG. 2

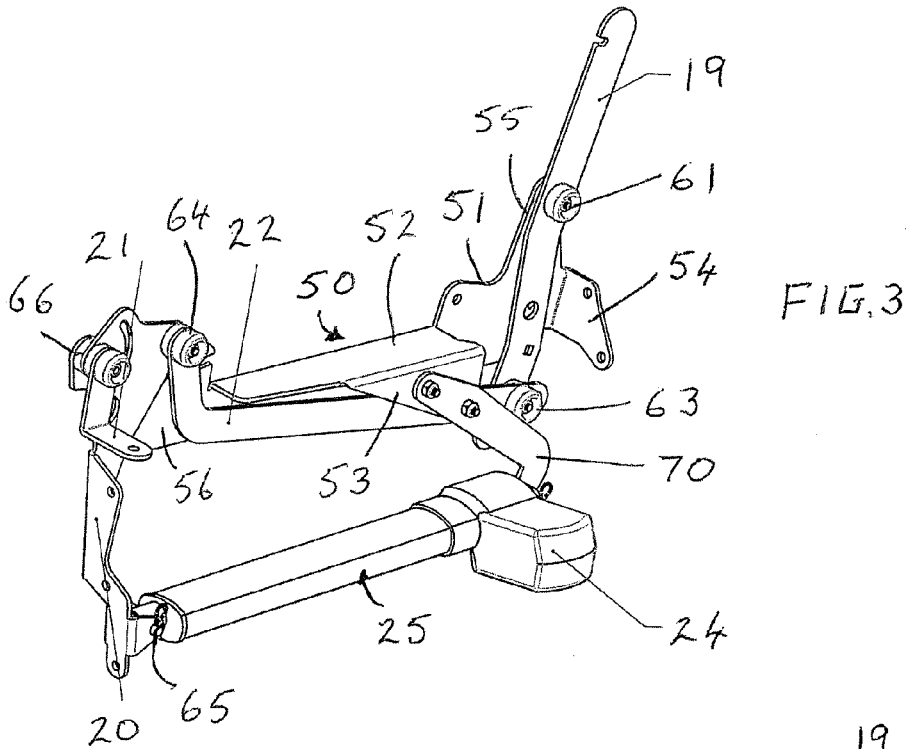


FIG. 3

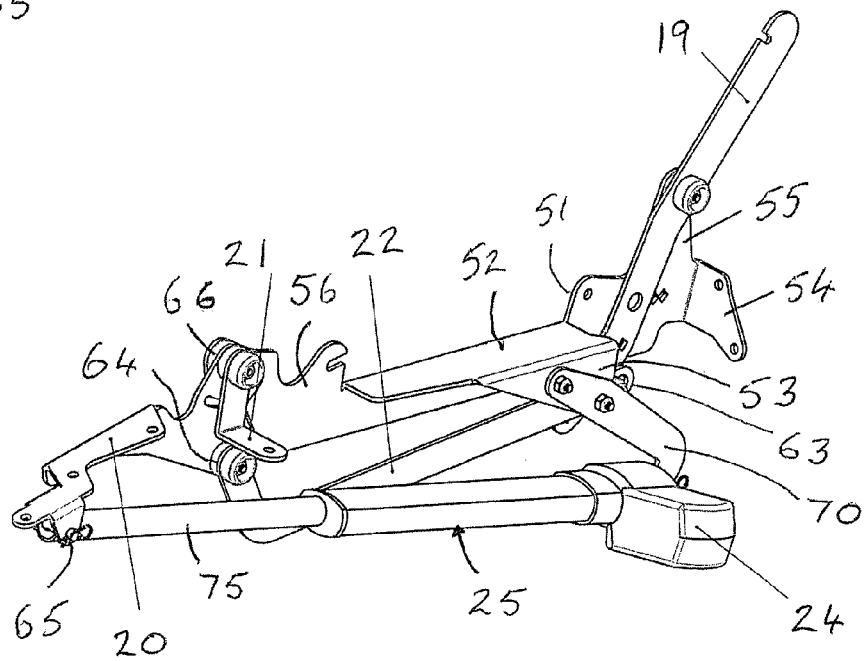


FIG. 4

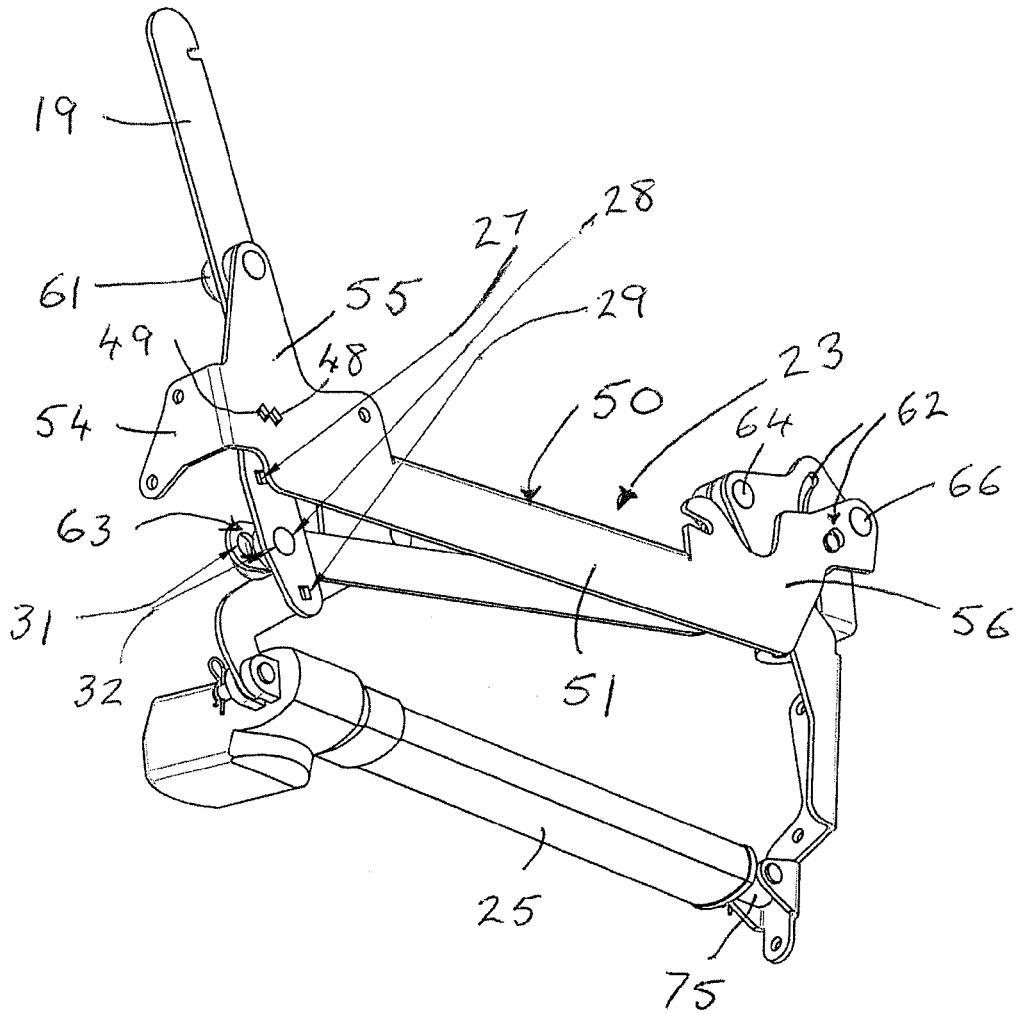
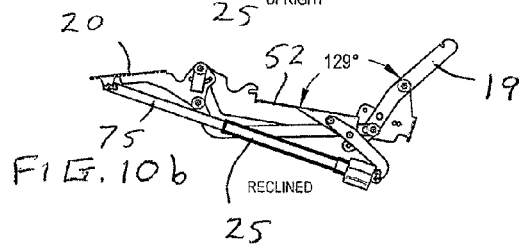
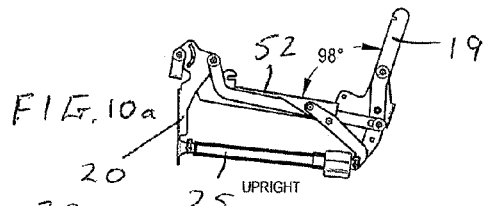
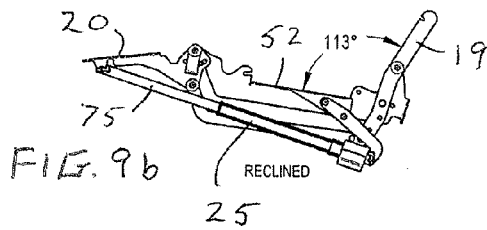
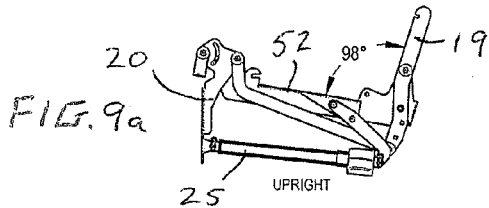
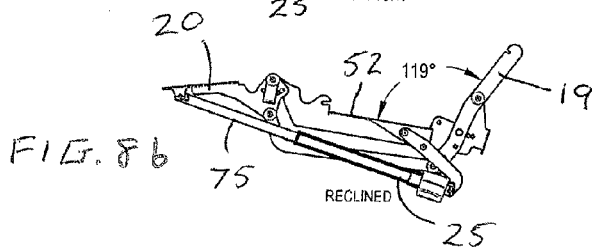
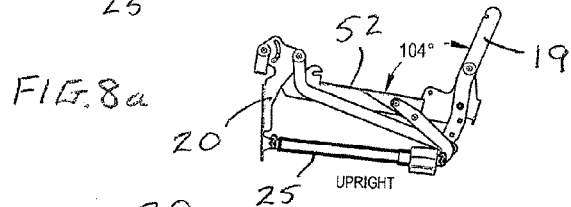
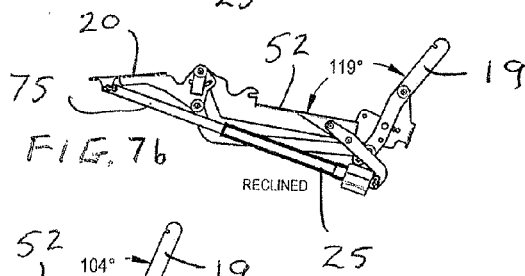
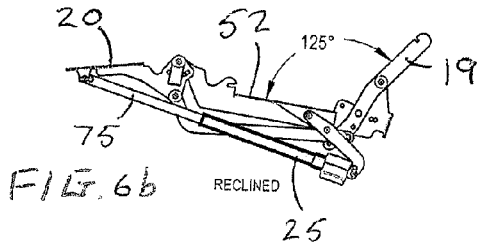
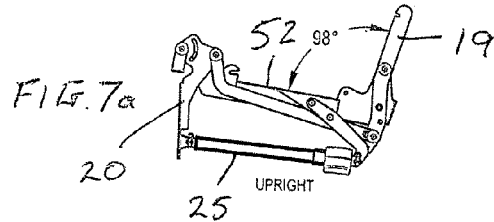
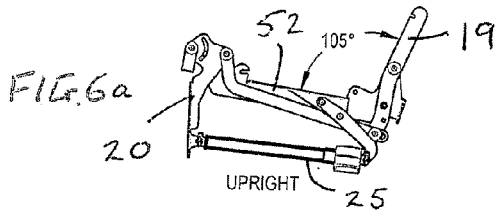
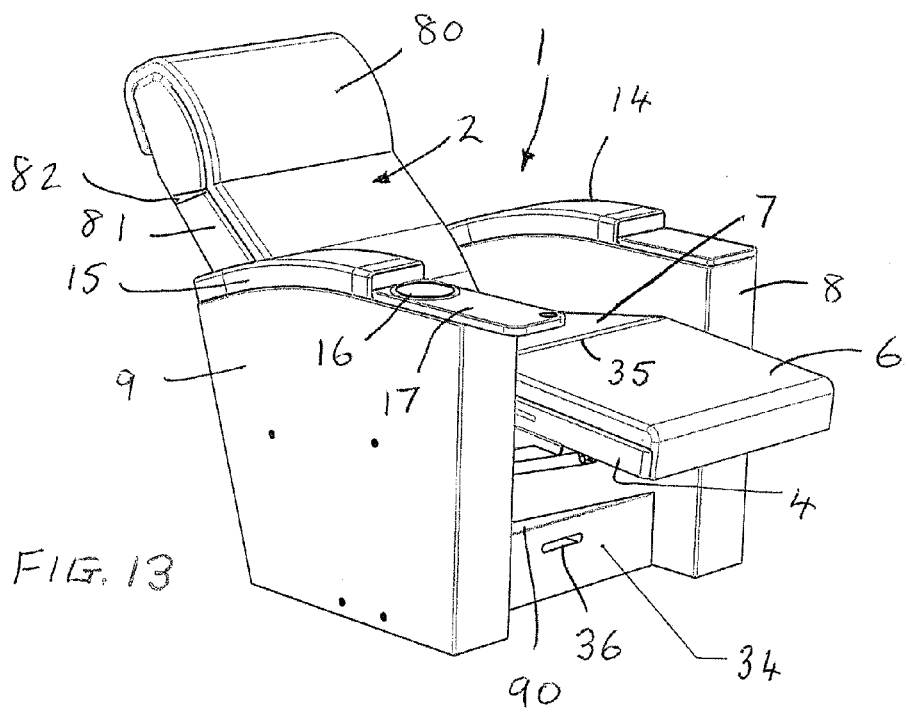
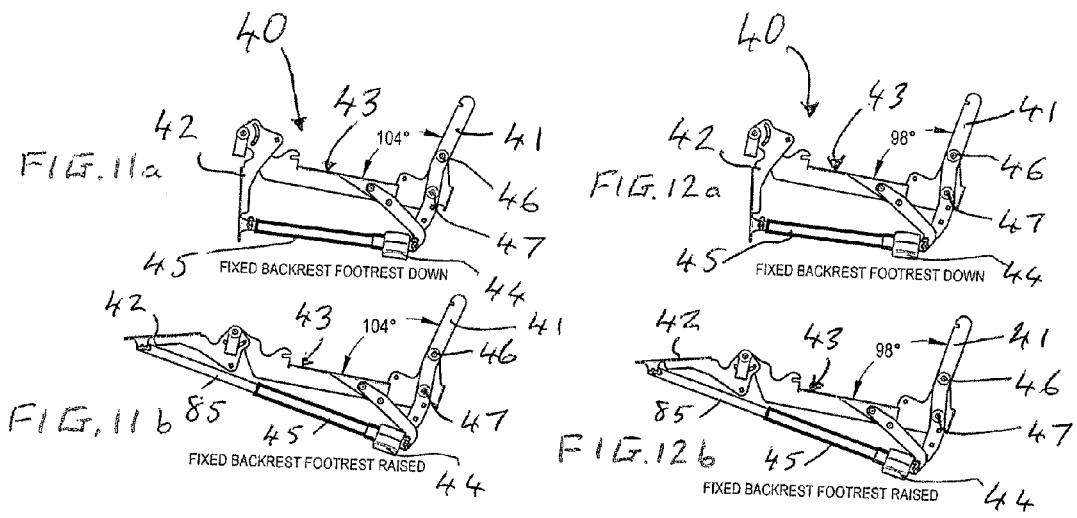


FIG. 5





RECLINABLE SEAT

FIELD

[0001] The invention relates to reclining seats, and particularly, but not exclusively relates to a reclining cinema or theatre seat.

BACKGROUND OF THE INVENTION

[0002] Reclining chairs are becoming more popular in public places, such as cinemas, theatres, stadiums, as well as in the home. Corporate hospitality further increases the need for comfortable reclining chairs.

[0003] Present reclining chairs used in public arenas have steelwork which fixes the chairs to the ground. The reclining mechanisms of such chairs are attached to the steelwork. This steelwork can be complicated and expensive to manufacture.

[0004] Existing reclining chairs may also have complicated reclining mechanisms. Such mechanisms can be difficult or time consuming to manufacture because of the large number of parts required. These mechanisms can also add to the weight of the chair.

[0005] Current reclining chairs have a reclined position and an upright position. These maximum reclined and upright positions are fixed and cannot be altered.

[0006] It would be desirable to provide a reclining seat which overcomes one or more of the problems associated with existing reclining chairs.

SUMMARY

[0007] An aspect of the present invention provides a reclinable seat, comprising: a seat rest; a backrest; a footrest; two side portions; and a reclining mechanism arranged to move at least one of the backrest and the footrest from a substantially upright position into a reclined position, wherein the reclining mechanism is mounted to at least one of the side portions.

[0008] The reclining mechanism may include a mounting body which is fixably connected to one of the side portions. The side portions may conveniently comprise side arm portions that include upper surfaces that act as armrests.

[0009] In one embodiment, the reclining mechanism includes a footrest support which is movable relative to the mounting body between a substantially upright position and a reclined position. The reclining mechanism may include an extendable member which acts on the footrest support and is movable between a retracted position and an extended position to move the footrest support between the substantially upright position and a reclined position. The extendable member may be a piston rod of a piston and cylinder assembly.

[0010] Alternatively, or additionally, the backrest may be reclinable. In this case, the reclining mechanism may include a backrest support which is movable relative to the mounting body between a substantially upright position and a reclined position. In one embodiment, the backrest and the footrest are both reclinable. The reclining motion of the backrest and footrest may occur simultaneously through the same reclining mechanism.

[0011] According to a second aspect of the invention, there is provided, a reclinable seat comprising: a seat rest; a backrest; a footrest; two side arm portions; and a reclining mechanism which is arranged to move the footrest from a

substantially upright position into a reclined position and to move the backrest simultaneously from a substantially upright position into a reclined position using a single driving mechanism

[0012] The reclining mechanism may include a driving mechanism comprising a motor, such as an electric motor. The motor may act to move the reclining mechanism into a reclined position or an upright position or any position between these two extreme positions. The seat may include a user operable control arranged to operate the reclining mechanism, such as by activating the motor. The user operable control may be conveniently provided on one of the side portions. The user operable control may include two buttons, one of which moves the footrest and/or backrest towards a reclined position and the other of which moves the seat towards an upright position. The reclining mechanism may include a piston and cylinder assembly which is actuated by the motor to cause the reclining motion. The piston and cylinder assembly may comprise a pneumatic, electrical or hydraulic cylinder having a piston and piston rod which are movable relative to the cylinder between a retracted position corresponding to the substantially upright position of the footrest and/or backrest, and an extended position corresponding to the reclined position of the footrest and/or backrest.

[0013] The side portions of the seat are may be made from a material which is lighter by volume than steel. Additionally, the side portions may be made from one of wood, fiberboard, engineered wood, particle board, medium density fiberboard (MDF) or hardboard.

[0014] The mounting body of the reclining mechanism, which is mounted to at least one of the side portions, may provide a seat rest support for the seat rest. A plurality of connections, at least some of which are pivotal connections, may be provided to connect the footrest support and the backrest support to the mounting body, to allow the required reclining movement between the footrest support and the mounting body, and optionally between the backrest support and the mounting body.

[0015] The footrest support and the backrest support may be interconnected, for example by a linkage bar, in such a manner that a reclining movement of the footrest support causes a simultaneous reclining of the backrest support. Alternatively, the linkage bar may be omitted so that only one of the footrest and backrest is reclinable by the reclining mechanism.

[0016] The term “substantially upright”, as used herein, indicates a direction that extends more vertically than parallel relative to a horizontal floor on which reclinable seat is mounted. For example, in the upright position, the backrest support and/or footrest support may extend at an angle from between about 98 degrees to about 105 degrees relative to a generally horizontally extending member of the mounting body which provides the seat support. If the generally horizontally extending member of the mounting body extends at an angle up to about 5 degrees relative to the horizontal, it will therefore be appreciated that the “substantially upright” position of the backrest and footrest and related supports may include angles varying from the vertical by up to about 20 degrees

[0017] In one embodiment, the reclining mechanism includes a mounting body which is fixably connected to one of the side arm portions, the mounting body including a seat rest support for the seat rest, a backrest support connected to

the mounting body by a first connection, a footrest support pivotally connected to the mounting body by a pivotal second connection, and an actuating mechanism having a first part fixably connected to the mounting body and an extendable member connected to the footrest support by a pivotal third connection, the extendable member being movable between a retracted position in which the footrest support is disposed in a substantially upright position and an extended position in which the footrest support is disposed in a reclined position.

[0018] Where only the footrest is required to be reclinable, the first connection connecting the backrest support to the mounting body may be a fixed connection. In this case, a substantially upright position of the backrest may be selected by fixably attaching the backrest support to one of a plurality of attachment points on the mounting body. In one embodiment, two attachment points are provided on the mounting body, allowing two possible substantially upright positions for the backrest support. For example, the substantially upright positions for the backrest support may range from an angle of 98 degrees relative to the seat rest support to an angle of 104 degrees relative to the seat rest support.

[0019] In another embodiment, the first connection is a pivotal connection, allowing the backrest support to move pivotally relative to the mounting body and the seat rest support, and the linkage bar has one end pivotally connected to a lower end of the backrest support by a fourth pivotal connection, and its opposite end connected to the footrest support by a fifth pivotal connection, whereby movement of the footrest support between the substantially upright position and the reclined position causes a simultaneous movement of the backrest support between a substantially upright position and a reclined position.

[0020] When the footrest support is connected to the backrest support by a linking bar, a substantially upright position of the backrest may be selected by providing a plurality of attachment positions for connecting the linking bar to the backrest support. This may allow for one of a plurality of fully reclined positions for the backrest support to be selected.

[0021] The backrest may include a backrest mounting cartridge which enables the backrest to be folded forwards for transport or storage. Folding the backrest forwards so that it lies upon the seat rest may enable the seat to take up less space and allow a larger number of seats to be shipped simultaneously or stored in the same place.

[0022] In one embodiment, the seat rest is tiltable to allow access to the area underneath the seat. The front end of the seat rest may be connected to a seat pivoting bracket which is pivotally connected to the mounting body to allow the seat rest to tilt forward relative to the mounting body. This arrangement may assist with cleaning of the seat and reaching the area beneath the seat rest for cleaning, dusting, or maintenance of the seat. The seat rest can be tilted forwards by a user by lifting the rear end of the seat rest adjacent to the backrest.

[0023] According to a further aspect of the invention, there is provided a reclinable seat, comprising: a seat rest; a backrest; a footrest, two side portions; and a reclining mechanism arranged to move at least one of the backrest and the footrest from a substantially upright position into a reclined position, wherein the seat rest is tiltable to allow access to a region underneath the seat rest

[0024] In a further embodiment, a container is positioned in the region beneath the seat rest. Access to the container may be permitted by tilting the seat rest or alternatively by reclining the chair to raise the footrest.

[0025] According to another aspect of the invention, there is provided a reclinable seat, comprising: a seat rest; a backrest; a footrest, two side portions; a reclining mechanism arranged to move at least the footrest from a substantially upright position into a reclined position, and a removable container in a region underneath the seat rest, wherein the container is removable when the footrest is moved from a substantially upright position into a reclined position.

[0026] The container may include an inclined upper surface allowing rubbish or unwanted items to slide into a rubbish trap at the rear of the container for easy cleaning. The rubbish trap may be part of the container or may be a separate item.

[0027] Additionally, the seat may include a barrier to prevent small items such as trash, foodstuffs, crumbs, or dirt from falling beneath the seat when the seat is being reclined or is in a reclined position. Particularly, the barrier may prevent small items from falling beneath the seat when the footrest is in a raised or reclined position.

[0028] The seat may include a means for selecting a substantially upright position of the backrest. This substantially upright position is the extreme position of the backrest reached when the backrest is placed into a fully unreclined position. The means for selecting the substantially upright position may be part of the backrest support and may allow the backrest support to be placed in a predetermined position with respect to one or more other parts of the reclining mechanism. The backrest support may include a number of distinct positions into which it may be placed to define the substantially upright position of the backrest. At least one of the backrest support and a part of the reclining mechanism to which the backrest support is mounted may include a number of mounting slots, each defining a specific upright position of the backrest. The backrest support and the part of the reclining mechanism to which the backrest support is mounted and the backrest support may connect to one of the mounting slots to select the substantially upright position. Optionally, one or both of the linking bar and backrest support may include a number of slots which define predetermined substantially upright positions of the backrest and the upright position may be selected by connecting the linking bar and the backrest through at least one slot. The backrest and the linking bar may be connected together by a screw, bolt, or other fastening device through a mounting slot in each of the backrest and linking bar.

[0029] In a further embodiment, the backrest may be provided with an articulating headrest that can be tilted forwardly as the backrest is reclined. This allows the viewing angle or the line of sight to be optimised for an occupant of the seat as the seat reclines.

[0030] In a further embodiment the reclining mechanism may comprise two parts. The parts may be a left side part and a right side part with the left side part connected to one of the side portions of the seat and the right side part connected to the other of the side portions of the seat. The two parts may be directly connected to one another or alternatively may not be directly connected to each other. One of the two parts of the reclining mechanism may be a driving mechanism which can be user actuated and the other

part of the reclining mechanism may be a driven mechanism which is indirectly driven when the driving mechanism is actuated by the user.

BRIEF DESCRIPTION OF ACCOMPANYING DRAWINGS

[0031] The invention may be better understood by reference to embodiments as shown in the accompanying drawings, in which:

[0032] FIG. 1 shows an isometric view of a reclinable chair according to an embodiment;

[0033] FIG. 2 shows an exploded view of the components of the reclinable chair of FIG. 1;

[0034] FIG. 3 shows an isometric view from one side of a reclining mechanism of the chair of FIGS. 1 and 2 in a retracted position corresponding to a substantially upright position of the chair;

[0035] FIG. 4 shows an isometric view of the reclining mechanism of FIG. 3 in an extended position corresponding to a reclined position of the chair;

[0036] FIG. 5 shows an isometric view of the reclining mechanism of FIG. 3 from the opposite side;

[0037] FIGS. 6a and 6b show side views of the reclining mechanism in a first arrangement;

[0038] FIGS. 7a and 7b show side views of the reclining mechanism in a second arrangement;

[0039] FIGS. 8a and 8b show side views of a reclining mechanism in a third arrangement;

[0040] FIGS. 9a and 9b show side views of a reclining mechanism in a fourth arrangement;

[0041] FIGS. 10a and 10b show side views of a reclining mechanism in a fifth arrangement;

[0042] FIGS. 11a and 11b show side views of a fixed backrest reclining mechanism;

[0043] FIGS. 12a and 12b show side views of a fixed backrest reclining mechanism in an alternative arrangement; and

[0044] FIG. 13 shows an isometric view of a reclinable chair according to a further embodiment.

DETAILED DESCRIPTION

[0045] FIGS. 1 and 2 show a reclinable cinema chair (1) according to a first embodiment. The chair (1) includes a cushioned backrest (2) a seat rest (3) and a footrest (4). In the displayed embodiment a seat and footrest overlay (5) is positioned over the seat rest (3) and footrest (4), the seat and footrest overlay (5) having a footrest overlay part (6) and a seat overlay part (7). The seat and footrest overlay (5) includes a hinged connecting part (35) between the footrest overlay part (6) and the seat overlay part (7) so that upon reclining the footrest overlay part (6) may move relative to the seat overlay part (7). In other embodiments the chair may include no overlay (5) and only a seat rest (3) and a footrest (4).

[0046] The chair includes a left side box arm (8) and a right side box arm (9), which act as side portions of the chair (1). Upper portions of the left side box arm (8) and the right side box arm (9) may include respective armrests (14, 15), and/or a cup holder (16) and/or a shelf (17, 18) on which items can be rested. Each of the left side and right side box arms (8, 9) may be made from any suitable material, such as of wood, fiberboard, engineered wood, particle board, medium density fiberboard (MDF) or hardboard. The left

side and the right side box arms (8, 9) may be made from materials that are lighter by volume than steel. The left side and right side box arms (8, 9) may be formed with a hollow middle portion, or may be solid in the middle. The box arms (8, 9) may be each formed from a single piece of material or from a number of pieces of material which are assembled together.

[0047] The chair (1) includes a reclining mechanism comprising a driving mechanism (10) and a driven mechanism (11). These two mechanisms of the reclining mechanism are not directly connected to one another. The driving mechanism (10) is fixedly connected to the right side box arm (9) and the driven mechanism (11) is fixedly connected to the left side box arm (8). The mechanisms (10, 11) may be connected to their respective side box arms by any convenient fixing means, such as by screws or bolts which extend through coinciding holes on each of the mechanisms (10, 11) and respective side box arms (8, 9).

[0048] In alternative embodiments the reclining mechanism may only include a driving mechanism (10) and no driven mechanism (11). In some embodiments a single reclining mechanism may attach to one of the sides or alternatively to both of the sides. Alternatively, the reclining mechanism may comprise a driving mechanism and a driven part that are directly connected to one another.

[0049] The seat rest (3) and associated seat overlay part (7) can be tilted to enable access to the area underneath the seat or to access the reclining mechanism. The seat rest (3) may attach to a part of the reclining mechanism which pivots to enable the seat rest (3) to be tilted.

[0050] A rear panel (12) is positioned at the back of the chair (1). The rear (12) panel encloses the lower back portion of the chair to prevent access to the mechanism through the back of the chair (1). The rear panel connects to the driving mechanism (10) and the driven mechanism (11). In other embodiments the rear panel (12) may connect to the sides (8, 9) or any other part of the chair in order to enclose the rear side of the chair.

[0051] The backrest (2) is connected to the reclining mechanism by a backrest mounting cartridge (13) on each side of the backrest (2). Each cartridge is connected to a part (19) of a respective one of the driving mechanism (10) and driven mechanism (11). The backrest mounting cartridges (13) are connected to the backrest by removable or adjustable fixing means, such as by screws or bolts, so as to allow the backrest (2) to be folded forwards relative to the cartridges and reclining mechanism. The folding may be permitted by loosening the screws or bolts that hold the backrest mounting cartridges (13) to the reclining mechanism parts (19). Alternatively, there may be different means used which permit the backrest (2) to be folded forwards. The backrest (2) is intended to be folded forwards so that it contacts the seat (3) or seat overlay part (7) to make the chair more compact for transport or storage. In everyday use the backrest (2) is fixed to the cartridges (13) and not permitted to fold forwards.

[0052] The driving mechanism (10) has a motor (24) attached to it. The motor (24) can be user activated by using buttons (33) which are located on one of the side box arms (8, 9). In an alternative embodiment the reclining mechanism does not have a motor and may be actuated manually.

[0053] FIGS. 3 and 5 show the driving mechanism (10) of the reclining mechanism in a retracted position which corresponds to a substantially upright position of the backrest

(2) and footrest (4) of the chair (1) as shown in FIG. 1. FIG. 4 shows the driving mechanism (10) in an extended position which corresponds to a fully reclined position of the backrest (2) and footrest (4) of the chair. The driving mechanism (10) has a mounting body (23), a backrest (19) which attaches to a respective cartridge (13) of the backrest (2) and a footrest support (20) which attaches to the footrest (4). The mounting body (23) comprises a generally horizontally extending elongate member (50) which has a generally vertical outer side surface (51), a generally horizontal upper surface (52) adapted to support the seat rest (3), a generally vertical inner side surface (53), and a perpendicularly extending rear portion (54) at the rear end of the elongate member (50). The outer side surface (51) of the elongate member (50) of the mounting body (23) is fixedly connected to the right side box arm (9) for instance by screws or bolts which extend through respective apertures in the box arm (9) and the outer side surface (51). The backrest support (19) is rotatably attached to a rear end portion (55) of the elongate member (50) of the mounting body (23) by a first pivotal connection (61), and the footrest support (20) is rotatably attached to a front end portion (56) of the elongate member (50) of the mounting body (23) by a second pivotal connection (62) in the form of a pin and slot arrangement. The backrest support (19) is connected to the footrest support (20) by an elongate linking bar (22). The linking bar (22) is a solid piece of material, such as metal. A rear end of the linking bar (22) is connected to a lower portion of the backrest support by a third pivotal connection (63), and a front end of the linking bar is connected to an upper end portion of the footrest support by a fourth pivotal connection (64) and the arrangement is such that movement of the footrest support (20) will directly effect a movement of the backrest support (19).

[0054] The driving mechanism (10) includes a pneumatic piston and cylinder assembly (25) which is connected rigidly at its rear end by a cylinder mounting plate (70) to the inner side surface (53) of the mounting body (23). The front end of a piston rod (75) of the pneumatic cylinder (25) is rotatably connected to a lower end of the footrest support (20) by a fifth pivotal connection (65). The motor (24) is attached to the pneumatic cylinder (25) and actuation of the motor (24) causes an extension of the piston rod (75) of the pneumatic cylinder (25) which pushes on the lower end of the footrest support (20) causing a rotation of the footrest support (20) with respect to the pneumatic cylinder (25). The footrest mount (20) also rotates about the second pivotal connection (62) with respect to the mounting body (23). This rotational motion of the footrest mount (20) causes a downward and forward movement of the front end of the linking bar (22) which causes a forward movement of the lower end of the backrest support (19) so that the backrest support (19) rotates relative to the mounting body (23) about the first pivotal connection (61) which in turn causes the upper end of the backrest support (19) and backrest (2) to move towards a reclined position. Actuation of the motor (24) will cause a movement of the parts of the driving mechanism (10) until the backrest support (19) and backrest (2) reach a fully reclined position and there can be no further movement in that direction, as shown in FIG. 4. With the driving mechanism in an extended position the backrest (2) will have been tilted backwards into a reclined position by the

backrest support (19) and the footrest (4) will have been lifted by the footrest support (20) into a substantially horizontal reclined position.

[0055] A seat pivoting bracket (21) is connected to an upper end portion of the footrest support (20) and to a front end of the elongate member (50) of the mounting body (23) by a sixth pivotal connection and the seat pivoting bracket (21) attaches to a lower front side of the seat rest (3). The seat pivoting bracket (21) can pivot with respect to the mounting body (23) and allows the seat rest (3) to be tilted forwardly such that a rear part of the seat rest (3) may be lifted.

[0056] FIG. 5 shows the opposite side of the driving mechanism with the piston rod (75) of the pneumatic cylinder (25) shown in the retracted position of FIG. 3. A substantially upright position of the backrest (3) which relates to the piston rod (75) being in a fully retracted position is adjustable through the relative mounting position of the backrest mount (19) with respect to the linking bar (22). The backrest support (19) includes a number of backrest mounting slots (27, 28, 29). The linking bar (22) includes a number of linking bar mounting slots (31, 32). The embodiment of FIG. 5 is shown with three backrest mounting slots (27, 28, 29) and two linking bar mounting slots (31, 32), though it will be appreciated that the number of position slots may be varied. As shown in FIG. 5 the backrest support (19) is connected to the linking bar (22) by the third pivotal connection (63) extending through the second backrest mounting slot (28) and the second linking bar mounting slot (32). Connecting the backrest mount (19) to the linking bar (22) using different combinations of the backrest mounting slots (27, 28, 29) and the linking bar mounting slots (31, 32) allows the substantially upright position of the backrest (2) to be varied as required. This position may be selected at the factory assembly stage or by an engineer depending on the substantially upright position of the backrest (2) that is required for the chair in its desired use. The number of linking bar mounting slots (31, 32) and backrest mounting slots (27, 28, 29) can be selected as required. A greater number of combinations of linking bar position slots and backrest position slots provides a greater number of potential substantially upright positions of the backrest (2).

[0057] In an alternative embodiment, the backrest mount (19) may attach to the mounting body (23) at a number of distinct positions in place of or as well as attaching to the linking bar (22) at a number of distinct positions. FIG. 5 shows a plurality of mounting holes (48,49) provided in the rear end portion (55) of the mounting body (23)

[0058] The relative connection between the backrest support (19) and the linking bar (22) will also affect the amount of recline of the backrest (2) when in a fully reclined position. For example, in some instances it may be desired that the backrest (2) is allowed to recline by a large degree so that a person using the chair is almost completely lying down when the backrest is fully reclined. Alternatively, there may be instances when it is desired that the chair only reclines by a relatively small amount when fully reclined, for example this may be desirable when the chair is placed in an area with less space.

[0059] It is also possible to alter the reclining movement in the footrest (4) by altering the positioning of the linking bar (22) relative to the footrest support (20) in a similar

manner. Such an arrangement may require a plurality of mounting slots in the footrest support similar to those in the backrest support.

[0060] FIGS. 6a, 7a, 8a, 9a and 10a show the backrest support (19) and footrest support (20) in substantially upright positions corresponding to the fully retracted position of the piston rod (75) of the pneumatic cylinder (25) for various combinations of the linking bar mounting slots (31, 32) and backrest mounting slots (27, 28, 29). Similarly, FIGS. 6b, 7b, 8b, 9b, and 10b show the backrest support (19) and footrest support (20) in reclined positions corresponding to the fully extended position of the piston rod (75) of the pneumatic cylinder (25) for the corresponding combinations of the linking bar mounting slots (30) and backrest mounting slots (26).

[0061] FIGS. 6a and 6b show the driving mechanism when the second backrest mounting slot (28) is connected to the second linking bar mounting slot (32). This arrangement of the slots gives a relative angle between the seat rest support surface (52) of the mounting body (23) and the backrest support (19) of 105° in a substantially upright position and 125° in a reclined position of the backrest support.

[0062] FIGS. 7a and 7b show the driving mechanism when the second backrest mounting slot (28) is connected to the first linking bar mounting slot (31). This arrangement of the slots gives a relative angle between the seat rest support surface (52) of the mounting body (23) and the backrest support (19) of 98° in a substantially upright position and 119° in a reclined position of the backrest support.

[0063] FIGS. 8a and 8b show the driving mechanism when the third backrest mounting slot (29) is connected to the second linking bar mounting slot (32). This arrangement of the slots gives a relative angle between the seat rest support surface (52) of the mounting body (23) and the backrest support (19) of 104° in a substantially upright position and 119° in a reclined position of the backrest support.

[0064] FIGS. 9a and 9b show the driving mechanism when the third backrest mounting slot (29) is connected to the first linking bar mounting slot (31). This arrangement of the slots gives a relative angle between the seat rest support surface (52) of the mounting body (23) and the backrest support (19) of 98° in a substantially upright position and 113° in a reclined position of the backrest support.

[0065] FIGS. 10a and 10b show the driving mechanism when the first backrest mounting slot (27) is connected to the first linking bar mounting slot (31). This arrangement of the slots gives a relative angle between the seat rest support surface (52) of the mounting body (23) and the backrest support (19) of 98° in the substantially upright position and 129° in the reclined position of the backrest support.

[0066] The relative angle between the seat rest support surface (52) of the mounting body (23) and the backrest support (19) may be the same as the angle between the seat rest (3) and the backrest (2). Alternatively, the angle between the mounting body (23) and the backrest support (19) may be different to the angle between the seat rest (3) and the backrest (2). In either of these cases, the difference between the angles in the substantially upright position compared to the angle in the reclined position may be in proportion between the seat rest support surface (52) of the mounting body (23) and backrest support (19) and the seat rest (3) and backrest (2).

[0067] FIGS. 11a, 11b, 12a, and 12b show embodiments in which only the footrest can be moved by the reclining mechanism, with the backrest remaining in a substantially upright position when the reclining mechanism is actuated. In these embodiments the driving mechanism (40) does not include a linking bar between the backrest support (41) and the footrest support (42). The backrest support (41) is rigidly attached to the mounting body (43) by first and second fixed connections (46, 47) on the backrest support (41). Otherwise, the reclining mechanism (40) of FIGS. 11a, 11b, 12a, and 12b is substantially the same as the reclining mechanism of FIGS. 2 to 5, with a plurality of connecting holes (48, 49) provided in the mounting body (43) as described in the previous embodiment of the mounting mechanism shown in FIG. 5.

[0068] The motor (44) remains connected to the pneumatic cylinder (45) and the rear end of the pneumatic cylinder (45) is fixedly attached to the mounting body (43) with the piston rod (85) of the pneumatic cylinder (45) rotatably connected to the footrest support (42). When the motor (44) is actuated to move the piston rod (85) of the pneumatic cylinder (45) from a retracted position to an extended position, the piston rod (85) extends such that it pushes the footrest support (42) to cause it to move and rotate with respect to the mounting body (43) from the upright position of FIG. 11a or 12a into the raised position of FIG. 11b or 12b. In this embodiment the movement of the footrest support (42) does not affect the backrest support (41) because the two are not connected by a linking bar.

[0069] FIGS. 11a and 11b show retracted and extended positions respectively of the piston rod (85) of the driving mechanism (40). The second fixed connection (47) of the backrest support (41) connects to the mounting body (43) at the first connecting hole (48) of the mounting body (43). This arrangement gives a relative angle between the seat rest support of the mounting body (43) and the backrest support (41) of 104° in both the retracted and extended positions of the piston rod (85).

[0070] FIGS. 12a and 12b show further retracted and extended positions respectively of the piston rod (85) of the driving mechanism (40). The second fixed connection (47) of the backrest support (41) connects to the mounting body (43) at the second connecting hole (49) of the mounting body (43). This arrangement gives a relative angle between the mounting body (43) and the backrest support (41) of 98° in both the retracted and extended positions of the piston rod (85).

[0071] FIG. 13 shows another embodiment of the cinema chair (1) in which a removable container (34), including a rubbish trap, is located at a base portion of the chair between the two side box arms (8, 9). The container (34) may have an inclined upper surface (90) at its front end to allow rubbish to slide to the rubbish trap at the back of the container for easier cleaning. The container (34) can be accessed by lifting the tilting seat rest (3) and associated seat overlay part (7) at the rear, adjacent to the backrest (3). Alternatively, the container (34) could be accessed by reclining the chair so that the footrest (4) is lifted away from the ground, and removing the container (34). The container (34) could alternatively be used to store items. The container (34) may have a handle (36) which allows the container (34) to be removed or handled more easily.

[0072] A further embodiment of the cinema chair is shown in FIG. 13 in which the backrest (2) includes a headrest (80)

which is connected to the main portion (81) of the backrest (2) by an articulating connection (82) in such a manner as to allow the headrest (80) to tilt forwardly relative to the main backrest portion (81) when the backrest (2) is reclined. This allows the viewing angle and/or the line of sight for an occupant of the seat to be optimised as the seat reclines.

[0073] Whilst the embodiments of the present invention are described above with reference to a cinema chair, it will be understood that a seat including a reclining mechanism according to the present invention may be any type of reclining seat, such as a chair, sofa, or bench.

[0074] It is also to be appreciated that the various embodiments and features of the present invention may be combined in different ways, and also that various modifications may be made to the embodiments described above without departing from the scope and spirit of the invention.

1. A reclinable seat, comprising:
 - a seat rest;
 - a backrest;
 - a footrest,
 - two side portions; and
 - a reclining mechanism arranged to move at least one of the backrest and the footrest from a substantially upright position into a reclined position, wherein the reclining mechanism is mounted to at least one of the side portions.
2. The reclinable seat according to claim 1, wherein the reclining mechanism includes a mounting body which is fixably connected to one of the side portions.
3. The reclinable seat according to claim 2, wherein the reclining mechanism includes a footrest support which is movable relative to the mounting body between a substantially upright position and a reclined position.
4. The reclinable seat of claim 3, wherein the reclining mechanism includes an extendable member which acts on the footrest support to move the footrest support between the substantially upright position and the reclined position.
5. The reclinable seat of claim 4, wherein the extendable member is a piston rod of a piston and cylinder assembly.
6. The reclinable seat according to claim 2, wherein the reclining mechanism includes a backrest support which is movable relative to the mounting body between a substantially upright position and a reclined position.
7. The reclinable seat according to claim 1, wherein the reclining mechanism includes a footrest support which is movable between a substantially upright position and a reclined position, and a backrest support which is movable between a substantially upright position and a reclined position.
8. The reclinable seat according to claim 1, further comprising a motor which drives the reclining mechanism.
9. The reclinable seat according to claim 1, further comprising a user operable control affixed to one of the side portions for operating the reclining mechanism.
10. The reclinable seat according to claim 6, wherein the footrest support and the backrest support are interconnected so that a reclining movement of the footrest support causes a simultaneous reclining of the backrest support.
11. A reclinable seat comprising:
 - a seat rest;
 - a backrest;
 - a footrest;

two side portions; and

a reclining mechanism which is arranged to move the footrest from a substantially upright position into a reclined position and to simultaneously move the backrest from a substantially upright position into a reclined position using a single driving mechanism.

12. The reclinable seat according to claim 10, wherein the footrest support and the backrest support are interconnected by a linking bar.

13. The reclinable seat according to claim 2, including a backrest support, wherein a substantially upright position of the backrest may be selected by fixably attaching the backrest support to one of a plurality of attachment points on the mounting body.

14. The reclinable seat according to claim 12, wherein a substantially upright position of the backrest may be selected by fixably attaching the backrest support to one of a plurality of attachment points on the linking bar.

15. The reclinable seat of claim 1 wherein the reclining mechanism includes a mounting body which is fixably connected to one of the side arm portions, the mounting body including a seat rest support for the seat rest, a backrest support connected to the mounting body by a first connection, a footrest support pivotally connected to the mounting body by a pivotal second connection, and an actuating mechanism having a first part fixably connected to the mounting body, and an extendable member connected to the footrest support by a pivotal third connection, the extendable member being movable between a retracted position in which the footrest support is disposed in a substantially upright position and an extended position in which the footrest support is disposed in a reclined position.

16. The reclinable seat of claim 15, wherein the first connection is a pivotal connection, allowing the backrest support to move pivotally relative to the mounting body and seat rest support, and the reclining mechanism includes a linkage bar having one end pivotally connected to a lower end of the backrest support by a fourth, pivotal connection and its opposite end connected to the footrest support by a pivotal fifth connection, whereby movement of the footrest support between the substantially upright position and the reclined position causes a simultaneous movement of the backrest support between a substantially upright position and a reclined position.

17. The reclinable seat according to claim 1, wherein the reclining mechanism includes a driving mechanism connected to one of the side portions, and a driven mechanism connected to the other of the side portions.

18. The reclinable seat according to claim 2 wherein the mounting body includes a seat rest support for the seat rest, and the seat rest is connected to a seat pivoting bracket which is pivotally connected to the mounting body to allow the seat rest to tilt relative to the mounting body.

19. The reclinable seat of claim 6, wherein the backrest is provided with an articulating headrest that can be tilted forwardly as the backrest is reclined.

20. A reclinable seat, comprising:

- a seat rest;
- a backrest;
- a footrest,
- two side portions; and
- a reclining mechanism arranged to move at least one of the backrest and the footrest from a substantially upright position into a reclined position,

wherein the seat rest is tiltable to allow access to a region underneath the seat rest.

21. The reclinable seat according to claim **1**, further comprising a removable container in a region underneath the seat rest.

22. A reclinable seat, comprising:

a seat rest;

a backrest;

a footrest;

two side portions; and

a reclining mechanism arranged to move at least the footrest from a substantially upright position into a reclined position, and

a removable container in a region underneath the seat rest, wherein the container is removable when the footrest is moved from a substantially upright position into a reclined position.

23. The reclinable seat of claim **22**, wherein the container includes an inclined upper surface.

* * * * *