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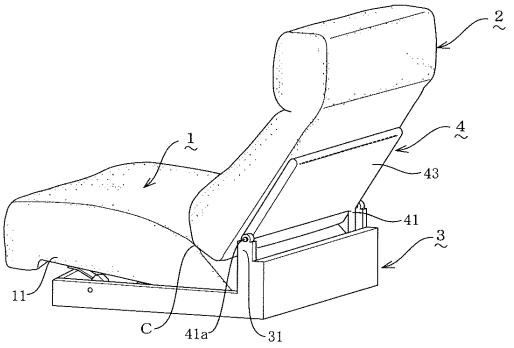
(54) RECLINING CHAIR STRUCTURE

(57) A reclining seat structure is provided, which is comfortable to sit on without the dislocation of a user's back with regard to the reclining portion in use and is easy to recline and convenient to install and use as well as being highly endurable.

(MEANS TO SOLVE THE ISSUES)

The reclining seat structure comprises a seat cushion portion; a backrest cushion portion foldabley connected to the seat cushion portion; a base on which those portions are movably supported; and a bell crank connected slidably in a vertical direction to the back frame of the backrest cushion portion, an intermediate link portion formed on a lower part of which crank is swingably supported around a raised support portion of the base, wherein the rear end portion of the seating frame and the lower end portion of the bell crank are pivotally connected and the seat cushion portion moves to and fro on the base.

Fig. 1



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Description

TECHNICAL FIELD

[0001] The present invention relates to an improvement on a reclining seat structure, in more details, pertaining to such structure as being easy to recline without displacing a reclining portion (or backrest cushion portion) of the seat with regard to the back of a user thereon and with his/her body snugly fitted therein when such reclining portion tilts back and being highly endurable so that it can provide a very comfortable and favorable seat in use. Hereinafter, in definition, the reclining and seating portions of the seat correspond to a backrest cushion portion hereof and a seat cushion portion hereof, respectively.

BACKGROUND ART

[0002] Such reclining mechanism is generally known in the field of seating instruments such as sofas and so forth as allowing the users to take a posture of making them feel comfortable by adjusting an inclining angle of the reclining portion as they like.

[0003] A seating instrument adopting such conventionally known reclining mechanism is shown in Figure 14 (a), which is arranged such that a rear lower surface of the seating portion is pivotally connected to a lower back surface of a reclining portion. However, with such mechanism as mentioned above, when the reclining portion is listed as shown in Figure 14 (b), there arises a large gap I between a lower side surface of the reclining portion and a rear surface of the seating portion, which gap I causes the back of a user thereon to be displaced with regard to the reclining portion, with the result that the backside of a jacket is pulled up so that it wrinkles to the disadvantage of the users.

[0004] In addition, the dislocation of the reclining portion also causes a lumbar support and a headrest disposed thereon to shift upwards accordingly so that the users cannot help shifting themselves to a position where they feel comfortable, to their inconveniences.

[0005] On the other hand, conventionally, such reclining mechanism of a seating instrument is publicly known as disclosed in the patent literature 1 mentioned below, wherein a reclining portion thereof lists by an arbitrary angle by pivotally connecting a seating portion thereof, which is movable to and fro, and a reclining portion thereof, the upper backside portion of which is connected to a rail post, and connecting the backsides of those portions by an extensile and contractile cylinder, and vertically moving the interconnecting portion of the reclining portion and rail post according to the to-and-fro movement of the seating portion.

[0006] Though, with such reclining mechanism as mentioned above, the load generated by a weight of a sitting person in a reclining position concentrates on the interconnecting portion of the reclining portion and rail post, which brings the likelihood of such mechanism being malfunctioned during the continued use thereof.

[0007] Then, regarding the aforesaid reclining mechanism referred to as the patent literature 1, it requires that a rail post be disposed behind a seating instrument so that not only an extra space for it is must, but also the placement of such instrument is limited to such spaces as accommodating such rail posts to the users' inconveniences.

[0008] Likewise, as for the aforesaid reclining mechanism, the pivotal fulcrum of the reclining portion with regard to the basic frame is arranged on an upper part of such portion so that the listing back of such portion causes the seating portion to push out forwards from the frame, in which an ottoman or footstool disposed in front of the seating portion shall be pulled back towards the users when the seating portion is pulled back by raising the reclining portion, to their extreme inconveniences.

(FIRST PATENT LITERATURE)

[0009] Gazetted in the Japanese Patent Application Laid-open No.2000-175774 (refer to paragraph 34 and Figure 7).

DISCLOSURE OF THE INVENTION

(Issues to be Solved)

[0010] In view of the above inconveniences encountered with the prior art, the present invention is to provide a reclining seat structure that prevents the back of a user from being displaced from a reclining portion thereof even though such user lists back the reclining portion and is easy to take a reclining position of making such user feel very comfortable, and is effective for saving a space for disposition and convenient to use as well as being highly endurable.

(Means to Solve the Issues)

[0011] The means to solve the above issues are described below with reference to the accompanying drawings.

[0012] Namely, the present invention is characterized in comprising a seat cushion portion 1 whose bottom portion is supported by a seating frame 11; a backrest cushion portion 2 whose backside surface is supported by a back frame 21; a base 3, on a rear side of which a raised support portion 31 is provided and on which the cushion portions 1 and 2 are movably supported; and a bell crank 4 that is connected slidably in a vertical direction on the back frame 21 and an intermediate link portion 41 of which crank is swingably supported around the raised support portion 31, wherein an upper backside surface of the seat cushion portion 1 and a bottom side frontal surface of the backrest cushion portion 2 are foldabley connected so as to form a connection portion C, around

which portion the backrest cushion portion 2 as a whole reclines on the base 3, and a rear end portion 11a of the seating frame 11 and a lower end portion 42 of the bell crank 4 are pivotally connected and the seat cushion portion 1 is to and fro movable integrally with the seating frame 11 on the base 3, wherein upon the seat cushion portion 1 sliding forwards, the seating frame 11 moves forwards along with the lower end portion 42, in synchronization with which an upper portion 43 of the bell crank 4 tilts backwards around the raised support portion 31 so as to make the backrest cushion portion 2 list back around the connection portion C whereas upon the seat cushion portion 1 sliding backwards when the backrest cushion portion 2 is in a reclining position, the seating frame 11 thrusts the lower end portion 42 so as to move the portion 42 backwards, in synchronization with which the upper portion 43 lists upwards around the raised support portion 31 so as to tilt the backrest cushion portion 2 to an upward direcion.

[0013] Further, the present invention is characterized in providing a supporting plate 43, which abuts on the backside surface of the backrest cushion portion 2, above the link portion 41.

[0014] Further, the present invention is characterized in slidably connecting the back frame 21 with the bell crank 4 by disposing bosses R on the back frame 21 and inserting those bosses in respective guide channels 44 arranged on the upper part of the bell crank 4.

[0015] Moreover, the present invention is characterized in fixing the backrest cushion potion 2 with a tilting angle as required by providing a stopper 5 in which a positioning rod 51 is engaged on a beam 11b disposed at the frontal end of the seating frame 11 and the rod is gripped or released with a chuck 52 disposed in the base 3 so as to make the rod fixed at a position as required.

[0016] Furthermore, the present invention is characterized in comprising a seat cushion portion 1, a bottom part of which is supported by a seating frame 11; a backrest cushion portion 2; a base 3, on a rear side of which a raised support portion 31 is provided and on which the cushion portions 1 and 2 are movably supported; and a bell crank 4 that supports the backrest cushion portion 2 and on which a backside surface of the backrest cushion portion 2 slidably abuts in a vertical direction and an intermediate link portion 41 of which crank is swingably supported around the raised support portion 31, wherein a backside upper surface of the seat cushion portion 1 and a bottom side frontal surface of the backrest cushion portion 2 are foldably connected so as to form a connection portion C, around which portion C the backrest cushion portion 2 as a whole reclines on the base 3, and a rear end portion 11a of the seating frame 11 and a lower end portion 42 of the bell crank 4 are pivotally connected and the seat cushion portion 1 is to and fro movable integrally with the seating frame 11 on the base 3, wherein upon the seat cushion portion 1 sliding forwards, the seating frame 11 moves forwards along with the lower end portion 42, in synchronization with which an upper portion 43 of the bell crank 4 tilts backwards around the raised support portion 31 so as to make the backrest cushion portion 2 list back around the connection portion C whereas upon the seat cushion portion 1 sliding backwards when the backrest cushion portion 2 is in a reclining position, the seating frame 11 thrusts the lower end portion 42 so as to move the portion 42 backwards, in synchronization with which the upper portion 43 lists upwards around the raised support portion 31 so as to tilt the backrest cushion portion 2 to an upward direction.

EFFECT

[0017] The present invention is arranged such that the seating portion and the reclining portion are foldably connected on the seating side surface and the bell crank slidably abuts in a vertical direction to the backside surface of the reclining portion, the lower end portion of which crank is connected to the rear end portion of the seating portion while the intermediate link portion of the bell crank is swingably supported around the raised support portion of the base, thereby, sliding the seating portion mounted on the base either forwards or backwards together with the lower end portion of the bell crank causing the upper portion of the crank to tilt either backwards or forwards, which permits the reclining portion to list by an angle as required with the rear surface of the reclining portion slid to either the lower side or the upper side of the crank.

[0018] As well, the connection of the rear upper surface of the seat cushion portion with the bottom side frontal surface of the backrest cushion portion on the seating side surface prevents a gap from being generated on the seating surface when the backrest cushion portion reclines backwards so that a user feels very comfortable in a reclining position, and prevents the displacement of the back of the user with regard to the backrest cushion portion, which causes wrinkles on the clothing, and the dislocation of a lumbar support and a headrest, so that the user does not have to correct a seating posture after reclining operation.

[0019] The disposition of the intermediate link portion of the bell crank on the lower portion thereof, which link is movably supported on the base, allows the upper portion of the crank to abut the backrest cushion portion to stably support the same so that the load applied to the backrest cushion portion is dispersed so as to prevent malfunction caused by the local concentration thereof.

[0020] In addition, the disposition of the intermediate link portion of the crank on the lower portion thereof restrains the forward and backward shifting of the seat cushion portion, which is caused by the tilting of the backrest cushion portion, to the minimum, so that there is no need to change the position of an ottoman disposed in front of the seat cushion portion before or after the backrest cushion portion being reclined and such fixing member as the rail post for installation is dispensed with, which overcomes restrictions on an installation space.

[0021] Accordingly, the present invention provides a reclining seat structure excellent in reclining function and convenient to use and easy for installation, the practicability on the market of which is very high.

BEST MODE FOR CARRYING OUT THE INVENTION

(FIRST EMBODIMENT)

[0022] The present embodiment is described below with reference to the accompanying Figures 1 through 7. In the drawings, numerals 1 and 2 indicate a seat cushion portion and a backrest cushion portion, respectively. Numerals 3, 4 and 5 in them indicate a base, a bell crank and a stopper.

[0023] Then, the arrangement of this embodiment is explained as follows. To begin with, herein, a seat cushion portion 1 is provided by disposing a seating frame 11 on the bottom of a cushion member while a backrest cushion portion 2 is provided by disposing a back frame 21 on the rear side of the cushion member, as shown in Figures 1 and 2.

[0024] A rear side upper fringe portion of the seat cushion portion 1 and a bottom side frontal surface of the backrest cushion portion 2 are connected with a connection member C, around which member the backrest cushion portion 2 is foldable with regard to the seat cushion portion 1.

[0025] To note, in this embodiment, a highly elastic urethane foam made from diphenylmethane diisocyanate (MDI) is adopted for the cushion member of the seat cushion portion 1 and the backrest cushion portion 2 respectively while a highly rigid metallic pipe is adopted for the seating frame 11 and the back frame 21 respectively.

[0026] The cushion member of the seat cushion portion 1 integrally with the seating frame 11 is sheathed with a cover material A while the cushion member of the backrest cushion portion 2 integrally with the back frame 21 embedded therein is sheathed with a cover material A, as shown in Figures 3 and 4.

[0027] In this embodiment, an elastic sash cloth is adopted for the connection member C between the seat cushion portion 1 and the backrest cushion portion 2, which cloth is inserted into a cut opened through the cover A to sheathe the respective cushion portions 1 and 2 with and sewn through the respective cuts so as to form a connection C between those portions, as shown in Figure 5.

[0028] Subsequently, the seating frame 11 is mounted on the base 3 in such a manner that it is movable to and fro within a fixed area of the base 3, on a rear end portion 11a of which frame, a lower end portion 42 of the bell crank 4 connected slidably in a vertical direction to the back frame 21 to support the cushion portion 2 is pivotally supported.

[0029] Then, a projection 41a of an intermediate link portion 41 is pivotally attached on a raised support potion 31 of the base 3 in such a manner that the bell crank 4 is swingably supported on the base 3.

[0030] In this embodiment, bosses R are provided on the back frame 21, which bosses are inserted into the respective guide channels 44 attached on a support plate 43 of the bell crank 4 so that the backrest cushion portion 2 is slidably connected to the bell crank 4.

[0031] With such arrangement as mentioned above, the forward sliding of the seat cushion portion 1 from a back position allows the seating frame 11 to pull forwards the lower end portion of the bell crank 4 so as to make the upper portion of the crank 4 tilt backwards, with the result that the backrest cushion portion 2 slides through the bell crank 4 to a reclining position.

[0032] On the other hand, the backward sliding of the seat cushion portion 1 from a front position allows the seating frame 11 to thrust back the lower end portion 42 so as to make the upper portion of the crank 4 tilt upwards, with the result that the backrest cushion portion 2 rises up.

[0033] To note, in this embodiment, the seat cushion portion 1 moves to and fro with an upward inclination effected on the frontal side thereof by slanting a guide portion 32 of the base 3 to make the cushion portion 1 slide to and fro. Thus, when a user's center of gravity lies on the seat cushion portion 1, the cushion portion 1 automatically slides backwards so as to make the backrest cushion portion 2 raise.

[0034] Then, when a user' s center of gravity shifts to the backrest cushion portion 2, the cushion portion 2 tilts back simultaneously with the cushion portion 1 slid forwards. Thus, a user does not have to get up, but only have to change his/her center of gravity, in order to bring the backrest cushion portion 2 to a reclining position.

[0035] In relation with the foregoing, there is provided a frictional resistance in relative rotation between the projection 41a of the intermediate link portion 41 and the raised support portion 31 of the base 3, so that there is no case where the backrest cushion portion 2 suddenly gets up or tilts back to make a user feel inconvenient to use.

[0036] Further, the connection of the seat cushion portion 1 with the backrest cushion portion 2 on the seating side surface prevents a gap from being generated on the seating surface when the cushion portion 2 tilts back, so that a user feels comfortable thereon even during the cushion portion 2 being in a reclining position.

[0037] In this embodiment, the formation of the intermediate link portion 41 of the bell crank 4 on the lower side portion thereof allows the upper portion of the crank 4 to abut the backrest cushion portion 2 so as to stably support the portion 2, which acts to disperse the load applied to the portion 2.

[0038] Especially, herein, the formation of the support plate 43 arranged on the bell crank 4 permits the cushion portion 2 to be supported on the plate surface, so that the load applied to the cushion potion 2 is effectively dispersed.

[0039] Also, the provision of the projection 41a pivot-

ally attached on the raised support portion 31 on the lower side of the bell crank 4 restrains the to and fro movement of the seat cushion portion 1 according to the tilting back or get-up of the cushion portion 2 to the minimum, so that there is no need to change the position of an ottoman to be disposed in front of the seating portion before or after the cushion portion 2 being reclined.

[0040] As well, a stopper 5 is provided herein, in which a positioning rod 51 is connected to a beam 11b disposed on the frontal end portion of the seating frame 11, which rod is gripped or released with a chuck 52 disposed in the base 3 so as to make the rod 51 fixed at a position as required.

[0041] Thereby, after the rod 51 is released so as to tilt back the backrest cushion portion 2 by an angle as required, the rod is gripped with the chuck 52 so as to make the cushion portion 2 positioned at such angle as required, as shown in Figure 7.

[0042] Herein, a wire operating chuck 52 is adopted for the stopper 5, where the rod 51 is released with the chuck 52 upon a lever 53 disposed on the side of the seat cushion portion 1 being pulled up whereas the lever 53 returns to the original position for gripping the rod 51 with the chuck 52 upon the lever 53 being released.

[0043] To note, the stopper 5 does not necessarily comprise the positioning rod 51 and the chuck 52 as mentioned above, but such other mechanism is adopted as allowing the backrest cushion portion 2 to be positioned by a reclining angle as desired, e.g., a ratchet mechanism.

(SECOND EMBODIMENT)

[0044] Then, the second embodiment of the invention is described below in details with reference to Figures 8 through 11. Herein, it is arranged such that the rear side surface of the backrest cushion portion 2 abuts slidably in a vertical direction on the upper part of the bell crank 4, as shown in Figures 8 and 9.

[0045] Especially, herein, ceramic coat is applied on the abutment surface of a support plate 43 that is disposed on the upper part of the crank 4 to make such surface less friction-resistant and which surface is opposed to the rear surface of the backrest cushion portion 2, which allows the cushion portion 2 to smoothly slide on the support plate 43.

[0046] As well, herein, the extended formation of the upper part of the bell crank 4 reaching the topmost portion of the cushion portion 2 permits an abutment area between the cushion portion 2 and the support plate to enlarge, so that the backrest cushion portion 2 can be more stably supported.

[0047] Herein, a seating frame 11 of the seat cushion portion 1 is made of a plate member, and adhesive members 11c are attached on such member to fix a cushion member to make the plate and cushion members integrated, as shown in Figure 10.

[0048] Likewise, herein, the adoption of a zipper type connection member C between the cushion portions 1 and 2 , as shown in Figure 11 (a),facilitates the connection and separation of those portions, as shown in Figure 11 (b) and improves on handling during transportation and storage.

[0049] To note, a well-known velvet-type adhesive fastener is adopted instead for the connection member C as a freely attachable and detachable member between the cushion portions 1 and 2.

[0050] The preset invention is generally described up to here, which is not limited to the embodiments as shown in the accompanying drawings, but may be modified in various manners within the scope of the accompanying patent claims. For example, the arrangement of the seat cushion portion 1, just provided that the seating frame 11 and the cushion member are integrally combined, such mounting structure as shown in Figure 12 is also adopted.

[0051] As for the engagement between the backrest cushion portion 2 and the bell crank 4, just provided that they are slidably connected to each other, it may be arranged such that an L-shaped plug-in plate member P is attached on the back frame 21 and such member P is inserted into a receiving slot 45 provided on the support plate 43 of the crank 4, and the back frame 21 of the backrest cushion portion 2 is locally disposed in the cushion member, as shown in Figure 13.

[0052] As well, the sliding arrangement of the seat cushion portion 1 with respect to the base 3 may be modified, just provided that it moves to and fro within a predetermined range therein, which modification and the like also belong to the technical scope of the invention.

INDUSTRIAL APPLICABILITY

[0053] In recent years, reclining seat instruments are widely used in such places as a barber's shop, a haircut salon, a hospital, facilities for the elderly and the handicapped and such vehicles as train and so forth. Nowadays, reclining sofas to make users feel comfortable with a laid-back posture are very popular among the people who wish to relax themselves at home.

[0054] In view of the above, the reclining seat structure according to the invention remarkably improves on a user's comfortableness in use and excels in safety and convenience to use, so that its industrial marketability and applicability is very high.

BRIEF DESCRIPTION OF THE DRAWINGS

[0055]

Figure 1 is a whole perspective view of a reclining seat structure according to the first embodiment of the invention.

Figure 2 is a sectional view of the reclining seat structure according to the first embodiment of the invention.

Figure 3 is a whole perspective view of a seat cushion portion according to the first embodiment of the invention.
Figure 4 is a partly perspective view of an engagement structure between the bell crank and the backrest cushion portion according to the first embodiment of the invention.
Figure 5 is a partly perspective view of an engagement structure between the seat and backrest cushion portions according to the first embodiment of the invention.
Figure 6 is a sectional view of the reclining seat structure in use according to the first embodiment of the invention.
Figure 7 is a broken perspective view of a stopper adopted in the reclining seat structure according to the first embodiment of the invention.
Figure 8 is a whole perspective view of a reclining seat structure according to the second embodiment of the invention.
Figure 9 is a sectional view of the reclining seat structure in use according to the second embodiment of the invention.
Figure 10 is a partly perspective view of a seat cushion portion structure according to the second embodiment of the invention.
Figure 11 is a partly perspective view of an engagement structure between the seat and backrest cushion portions according to the second embodiment of the invention.
Figure 12 is a sectional view of a modified engagement structure between the backrest cushion portion and the bell crank according to the invention.
Figure 13 is a whole perspective view of a modified seat cushion portion structure according to the invention.
Figure 14 is a sectional view of the prior reclining seat structure.

NOMENCLATURE

[0056]

1: seat cushion portion

- 11: seating frame
- 11a: rear end portion
- 11b: beam
- 11c: adhesive member

2: backrest cushion portion

- 21: back frame

3: base

- 31: raised support portion
- 32: guide portion

4: bell crank

- 41: intermediate link portion
  - 41a: projection
- 42: lower end portion
- 43: support plate
- 44: guide channel
- 45: receiving slot

5: stopper

- 51: positioning rod
- 52: chuck
- 53: lever

C: connection portion
A: cover material
R: boss
P: plug-in member

Claims

1. Reclining seat structure comprising a seat cushion portion 1 whose bottom portion is supported by a seating frame 11; a backrest cushion portion 2 whose backside surface is supported by a back frame 21; a base 3, on a rear side of which a raised support portion 31 is provided and on which said cushion portions 1 and 2 are movably supported; and a bell crank 4 that is connected slidably in a vertical direction on said back frame 21 and an intermediate link portion 41 of which crank is swingably supported around said raised support portion 31, wherein a upper backside surface of said seat cushion portion 1 and a bottom side frontal surface of said backrest cushion portion 2 are foldabley connected so as to form a connection portion C, around which portion said backrest cushion portion 2 as a whole reclines on said base 3, and a rear end portion 11a of said seating frame 11 and a lower end portion 42 of said bell crank 4 are pivotally connected and said seat cushion portion 1 is to and fro movable integrally with said seating frame 11 on said base 3, wherein upon said seat cushion portion 1 sliding forwards, said seating frame 11 moves forwards along with said lower end portion 42, in synchronization with which a upper portion 43 of said bell crank 4 tilts backwards around said raised support portion 31 so as to make said backrest cushion portion 2 list back around said connection portion C whereas upon said seat cushion portion 1 sliding backwards when said backrest cushion portion 2 is in a reclining position, the seating frame 11 thrusts said lower end portion 42 so as to move said portion 42 backwards, in synchronization with which said upper portion 43 lists

upwards around said raised support portion 31 so as to tilt said backrest cushion portion 2 to an upward direction.

2. Reclining seat structure according to claim 1, wherein a support plate 43 is provided, which abuts on said backside surface of said backrest cushion portion 2, above said bell crank 4.

3. Reclining seat structure according to claim 1 or 2, wherein said back frame 21 and said bell crank 4 are slidably connected by disposing bosses R on said back frame 21 and inserting said bosses in respective guide channels 44 arranged on an upper part of said bell crank 4.

4. Reclining seat structure in any one of the preceding claims, wherein said backrest cushion portion 2 is fixed with a tilting angle as required by providing a stopper 5 in which a positioning rod 51 is engaged on a beam 11b disposed at a frontal end of said seating frame 11 and said rod is gripped or released with a chuck 52 disposed in said base 3 so as to make said rod fixed at a position as required.

5. Reclining seat structure comprising a seat cushion portion 1, a bottom part of which is supported by a seating frame 11; a backrest cushion portion 2; a base 3, on a rear side of which a raised support portion 31 is provided and on which said cushion portions 1 and 2 are movably supported; and a bell crank 4 that supports said backrest cushion portion 2 and on which a backside surface of said backrest cushion portion 2 slidably abuts in a vertical direction and an intermediate link portion 41 of which crank is swingably supported around said raised support portion 31, wherein a upper backside surface of said seat cushion portion 1 and a bottom side frontal surface of said backrest cushion portion 2 are foldabley connected so as to form a connection portion C, around which portion said backrest cushion portion 2 as a whole reclines on said base 3, and a rear end portion 11a of said seating frame 11 and a lower end portion 42 of said bell crank 4 are pivotally connected and said seat cushion portion 1 is to and fro movable integrally with said seating frame 11 on said base 3, wherein upon said seat cushion portion 1 sliding forwards, said seating frame 11 moves forwards along with said lower end portion 42, in synchronization with which a upper portion 43 of said bell crank 4 tilts backwards around said raised support portion 31 so as to make said backrest cushion portion 2 list back around said connection portion C whereas upon said seat cushion portion 1 sliding backwards when said backrest cushion portion 2 is in a reclining position, said seating frame 11 thrusts said lower end portion 42 so as to move said portion 42 backwards, in synchronization with which said upper portion 43 lists

upwards around said raised support portion 31 so as to tilt said backrest cushion portion 2 to an upward direction.

Fig. 1

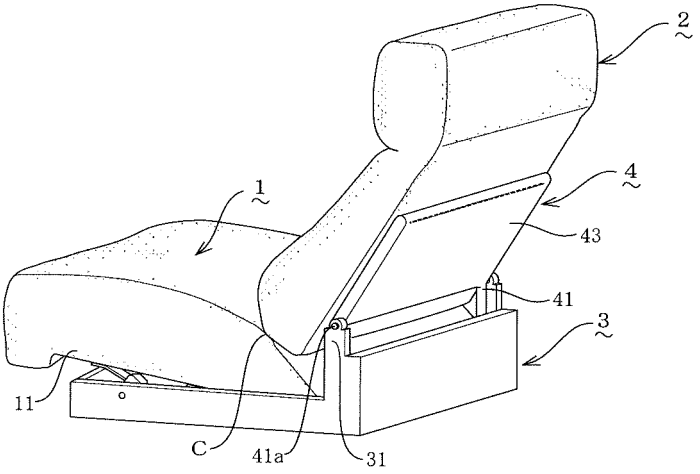
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Fig. 2

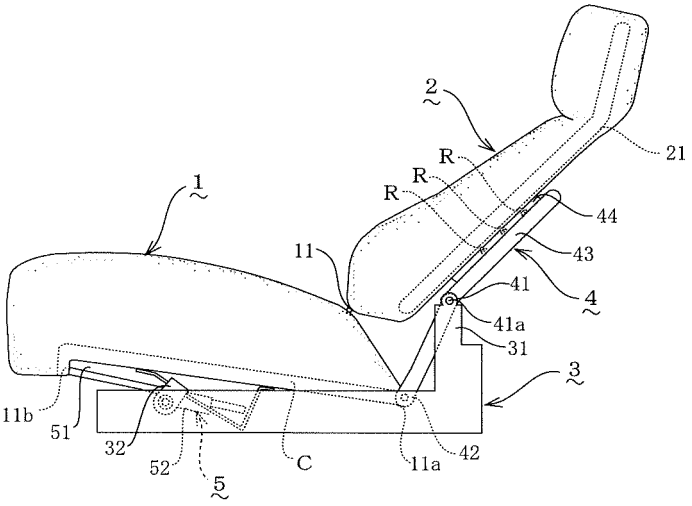
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Fig. 3

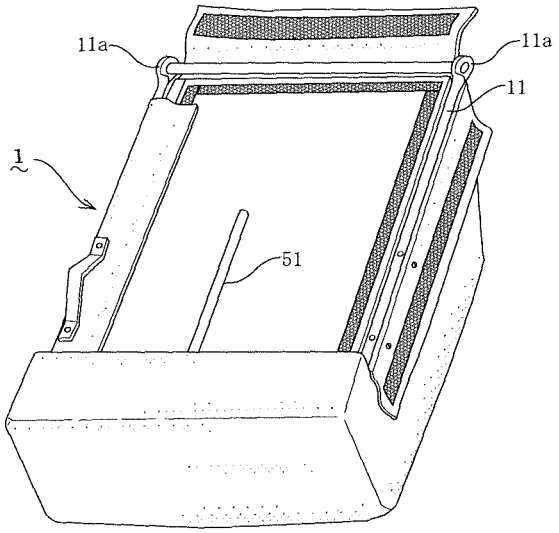


Fig. 4

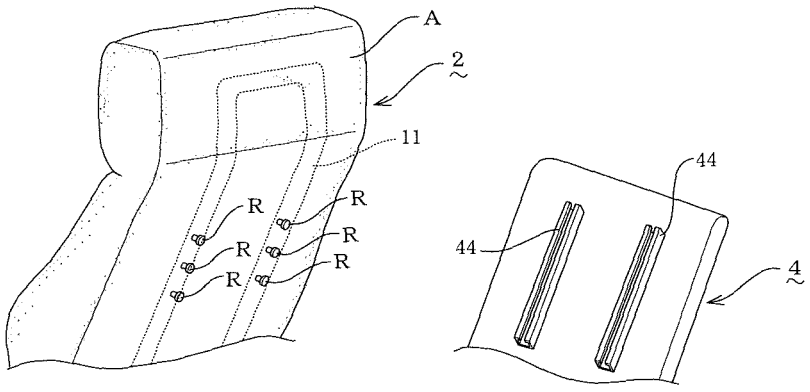


Fig. 5

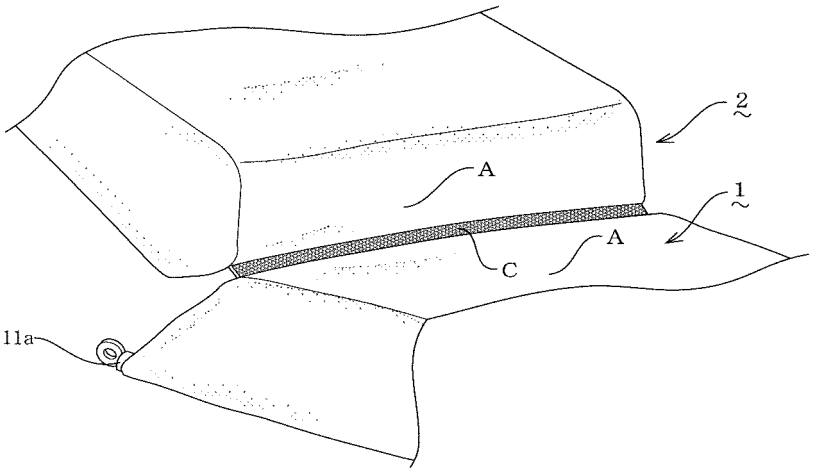


Fig. 6

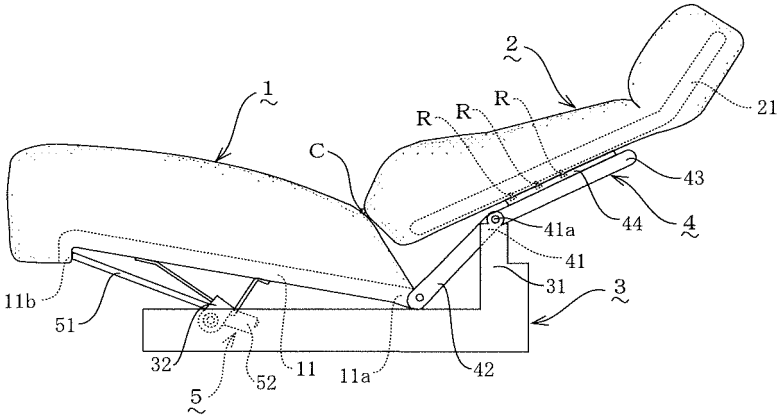
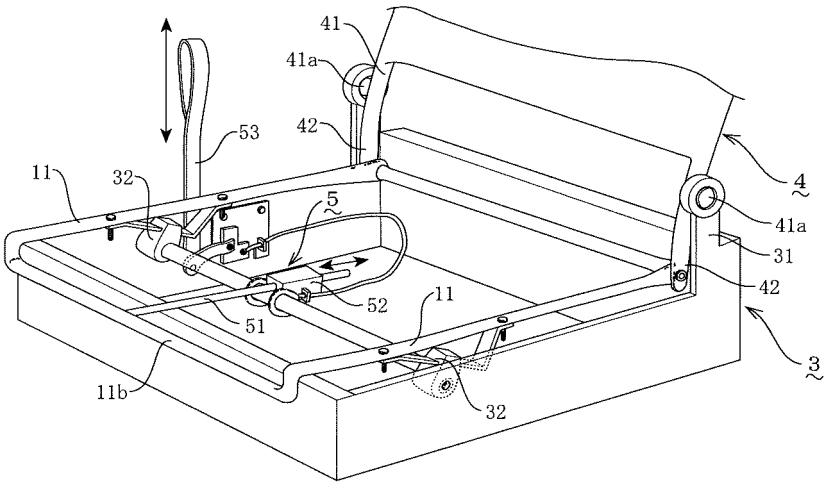


Fig. 7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11
11b
32
4
41a
31
42
3

Fig. 8

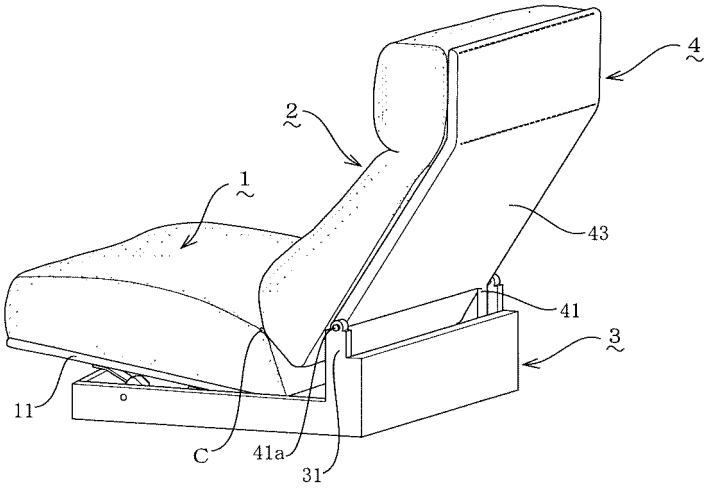

4
2
1
43
41
3
11
C
41a
31

Fig. 9

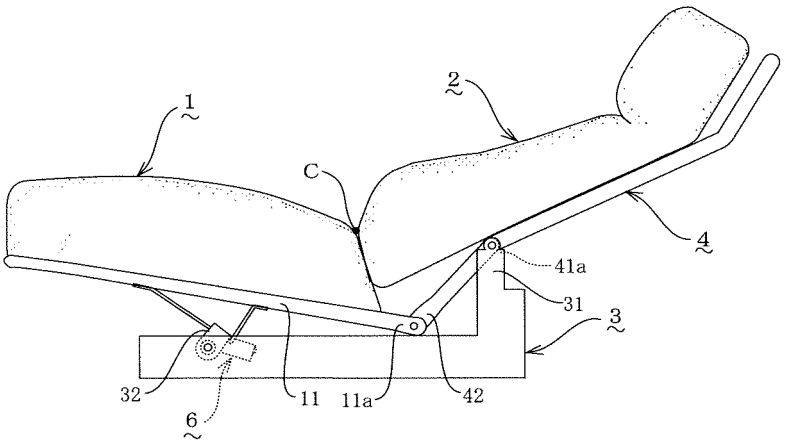


Fig. 10

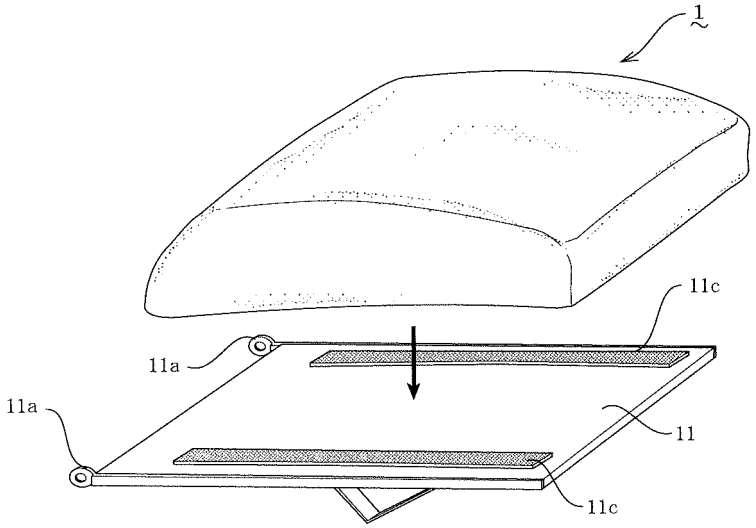
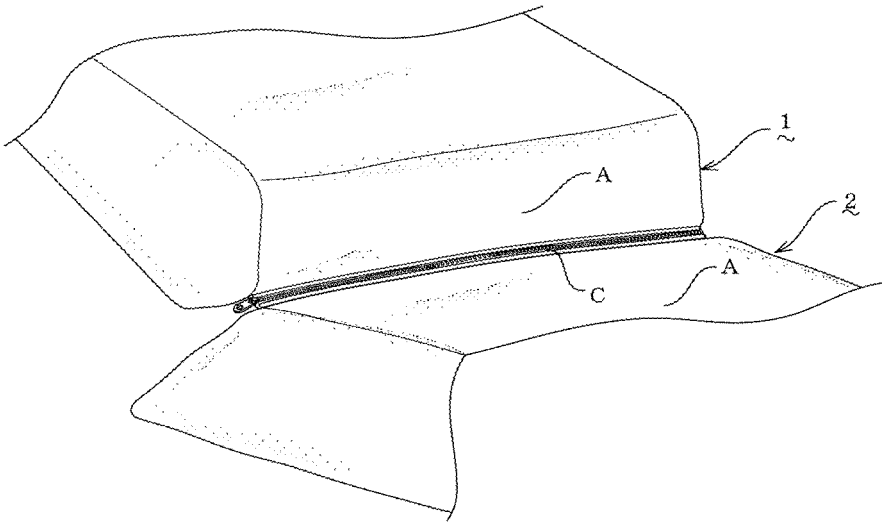


Fig. 11

(a)



(b)

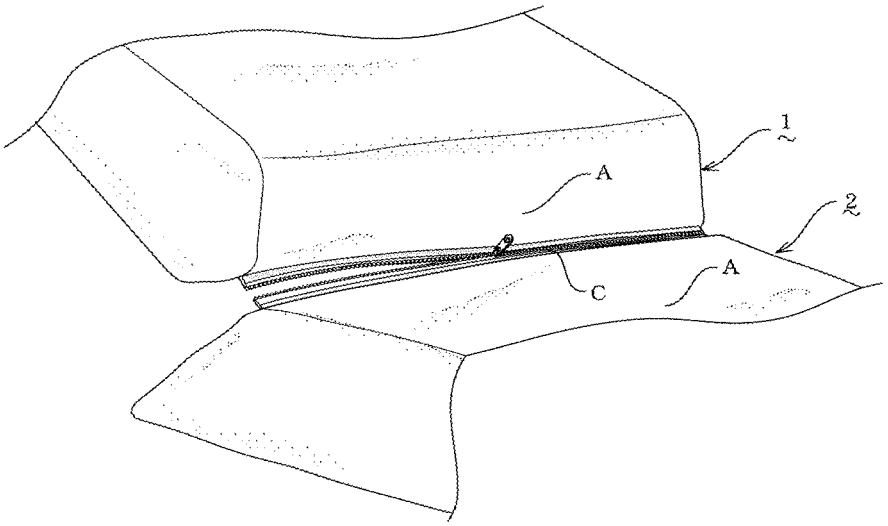


Fig. 12

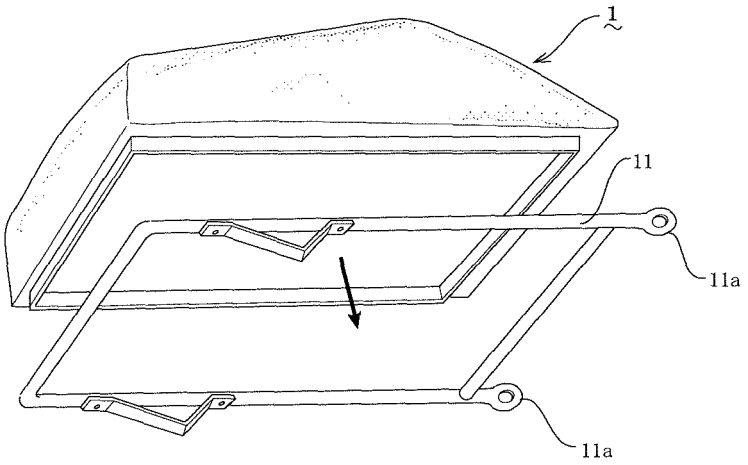


Fig. 13

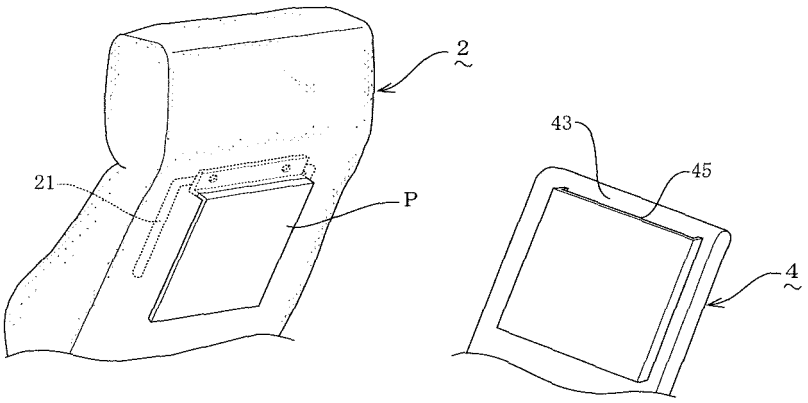
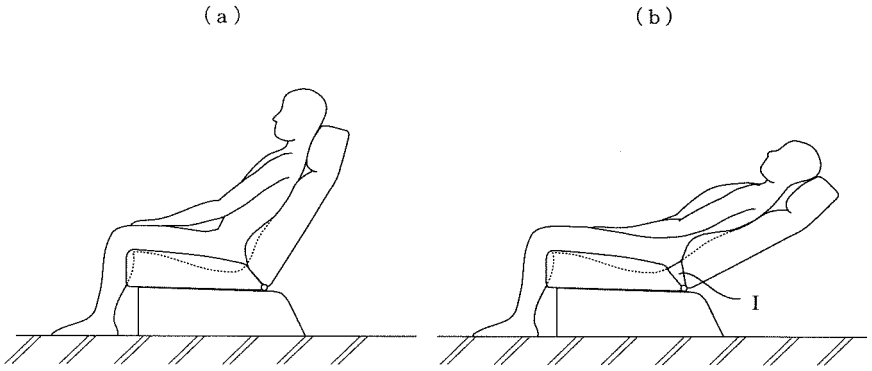


Fig. 14



INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2007/063375

A. CLASSIFICATION OF SUBJECT MATTER
A47C1/032(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A47C1/032, A47C3/02

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2007
Kokai Jitsuyo Shinan Koho 1971-2007 Toroku Jitsuyo Shinan Koho 1994-2007

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	JP 2000-37253 A (France Bed Co., Ltd.), 08 February, 2000 (08.02.00), Figs. 1, 2 (Family: none)	1,4,5 2,3
X Y	JP 3091157 U (Don He Wu), 23 October, 2002 (23.10.02), Figs. 3 to 9 (Family: none)	1,4,5 2,3

☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

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"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
30 July, 2007 (30.07.07)	14 August, 2007 (14.08.07)
Name and mailing address of the ISA/ Japanese Patent Office Facsimile No.	Authorized officer Telephone No.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2007/063375

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 11438/1985(Laid-open No. 129547/1986) (Ikeda Bussan Co., Ltd.), 13 August, 1986 (13.08.86), Figs. 1 to 3 (Family: none)	1,4,5 2,3
X Y	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 115357/1980(Laid-open No. 37345/1982) (Chitose Kabushiki Kaisha), 27 February, 1982 (27.02.82), Figs. 1 to 4 (Family: none)	1,4,5 2,3
Y	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 42063/1986(Laid-open No. 153934/1987) (Kariya Mokuzai Kogyo Kabushiki Kaisha), 30 September, 1987 (30.09.87), Full text; all drawings (Family: none)	2,3
Y	JP 58-41511 A (Giroflex Entwicklungs AG.), 10 March, 1983 (10.03.83), Full text; Fig. 5 & US 4502729 A & EP 85670 A	2,3

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 2000175774 A **[0009]**