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TITLE OF THE INVENTION

Child Seat Apparatus

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to a child seat apparatus, and more particularly, it relates to a child seat apparatus which comprises head guards forming walls on both sides of the head portion of a child seated on the seat apparatus for protecting the head portion.

Description of the Background Art

An exemplary child seat apparatus is a child safety seat for an automobile, which is mounted on an original seat of an automobile for providing a seat for safely seating a child in the automobile.

Such a child safety seat for an automobile comprises a seat portion, and a backrest portion upwardly extending from a rear end of the seat portion. The child safety seat may further comprise head guards, in order to protect the head portion of the child on both sides. Such head guards are generally provided to frontwardly extend from both side edges of the backrest portion.

Since the head guards are provided in consideration of safety for the child, the space between the pair of head guards is preferably reduced to be capable of locating the head portion of the child. Particularly when

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the child is asleep, the space between the head guards is preferably reduced in consideration of safety.

If the space between the head guards is too small, however, the child disadvantageously feels cramped. When the child is awake, for example, it generally enjoys the scene from the car window. In this case, the head guards unpreferably narrow the view of the child if the same are in proximity to the head portion of the child.

In consideration of such a background, the space between the head guards is generally designed to satisfy the aforementioned inconsistent requirements. However, it is difficult to sufficiently satisfy both of these requirements.

Apparatuses providing child seats include not only the aforementioned child safety seat for an automobile, but a baby carriage, a child chair and the like. Such child seat apparatuses meet the aforementioned problem in common.

SUMMARY OF THE INVENTION

Accordingly, an object of the present invention is to provide a child seat apparatus which can satisfy both of the aforementioned inconsistent requirements.

The present invention is directed to a child seat apparatus which comprises a seat portion, a backrest portion upwardly extending from a rear end of the seat

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portion, and a pair of head guards frontwardly extending from both side edges of the backrest portion. In order to solve the aforementioned technical problem, the present invention is characterized in that a space between the pair of head guards is changeable.

For example, the respective head guards are mounted on the backrest portion to be rotatable about axes extending substantially in parallel with the direction of upward extension of the backrest portion, so that the space between the pair of head guards is changeable.

Further, the respective head guards may be mounted on the backrest portion to be translatable along its width.

According to the present invention, therefore, it is possible to selectively provide a narrower space for improving safety for a child and a wider space for preventing the child from feeling cramped by changing the space between the head guards. Thus, it is possible to change the space between the head guards depending on whether the child is asleep or awake, for example. Further, it is possible to reduce the space between the head guards when the child is relatively infant for improving safety and to increase the space when it gets older.

When the respective head guards are rotatably mounted on the backrest portion as described above, the child seat

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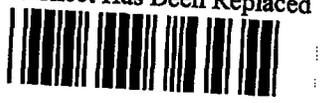

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apparatus preferably further comprises engaging means for maintaining a plurality of positions obtained by rotation of the respective head guards. According to the enagaging means, the positions of the head guards can be stably maintained.

When the respective head guards are rotatably mounted on the backrest portion, further, the child seat apparatus may further comprise a rotation operating member which is rotatably provided on a rear surface of the backrest portion, an angle fixing mechanism which is engaged with the rotation operating member for fixing a plurality of rotation angles of the rotation operating member, and a pair of rigid rods having first ends which are coupled to two positions of the rotation operating member between which the rotation center thereof is located and second ends which are coupled to the pair of head guards respectively. In this case, it is possible to symmetrically rotate the pair of head guards at the same time by rotating the rotation operating member, while it is possible to fix adjusted angles of the head guards by fixing the rotation angle of the rotation operating member by the angle fixing mechanism.

When the respective head guards are mounted on the backrest portion to be translatable along its width, on the other hand, the child seat apparatus may further

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comprise a rectilinear operating member which is rectilinearly movable along the direction of upward extension of the backrest portion, a position fixing mechanism for fixing a plurality of positions of movement of the rectilinear operating member, and a transmission mechanism for transmitting rectilinear movement of the rectilinear operating member to the pair of head guards respectively for simultaneously approaching/separating the pair of head guards to/from each other. According to this structure, the pair of head guards can be symmetrically moved at the same time upon movement of the rectilinear operating member. Further, the respective positions of the pair of head guards thus moved are fixed by the position fixing mechanism fixing the rectilinear operating member.

The foregoing and other objects, features, aspects and advantages of the present invention will become more apparent from the following detailed description of the present invention when taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view showing the overall appearance of a child safety seat 1 for an automobile according to an embodiment of the present invention;

Fig. 2 is a perspective view showing a mounting

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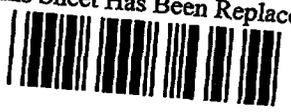

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portion of a head guard 4 shown in Fig. 1 in an enlarged manner;

Fig. 3 is a perspective view corresponding to Fig. 2, showing the head guard 4 which is rotated to reduce a space between the same and another head guard 5 as compared with the state shown in Fig. 2;

Fig. 4 is a rear elevational view showing a part of a seat which is included in a child seat apparatus 21 according to another embodiment of the present invention;

Fig. 5 is a sectional view taken along the line V - V in Fig. 4;

Fig. 6 is a sectional view taken along the line VI - VI in Fig. 4;

Figs. 7A and 7B are perspective views showing a part of a seat which is included in a child seat apparatus 51 according to still another embodiment of the present invention as viewed from a front side, and in particular, Fig. 7A shows a pair of head guards 53 and 54 which are most separated from each other, and Fig. 7B shows the pair of head guards 53 and 54 which are most approached to each other;

Figs. 8A and 8B are front elevational views of the seat shown in Figs. 7A and 7B, and in particular, Fig. 8A shows the pair of head guards 53 and 54 which are most separated from each other, and Fig. 8B shows the pair of

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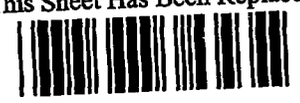

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head guards 53 and 54 which are most approached to each other;

Figs. 9A and 9B are rear elevational views of the seat shown in Figs. 7A and 7B, and in particular, Fig. 9A shows the pair of head guards 53 and 54 which are most separated from each other, and Fig. 9B shows the pair of head guards 53 and 54 which are most approached to each other;

Figs. 10A and 10B are sectional views taken along the lines XA - XA and XB - XB in Figs. 9A and 9B respectively; and

Fig. 11 is a sectional view taken along the line XI - XI in Fig. 9B.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Fig. 1 is a perspective view showing the overall appearance of a child safety seat 1 for an automobile according to an embodiment of the present invention.

The child safety seat 1 comprises a seat portion 2, a backrest portion 3 upwardly extending from a rear end of the seat portion 2, and a pair of head guards 4 and 5 frontwardly extending from both side edges of the backrest portion 3. The seat portion 2 is provided with an upwardly extending crotch pad 6, which is to be located between thighs of a seated child. The crotch pad 6 holds a buckle 7. On the other hand, shoulder belts 8 and 9 are

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drawn out from the backrest portion 3 to pass through shoulder positions of the child respectively, so that respective ends of the shoulder belts 8 and 9 are fixed to a relatively rear part of the seat portion 2. The shoulder belts 8 and 9 are inserted in tongue plates 10 and 11 respectively. The aforementioned buckle 7 detachably couples these tongue plates 10 and 11 with each other. The tongue plates 10 and 11 are mounted on the buckle 7 after the child is seated on this child safety seat 1.

In such a child safety seat 1, the respective ones of the head guards 4 and 5 are rendered rotatable about axes extending substantially in parallel with the direction of upward direction of the backrest portion 3. In other words, the head guards 4 and 5 are rotatable along arrows 12 and 13 in Fig. 1 respectively. The space between the pair of head guards 4 and 5 is changed by such rotation. The rotatable structure of the head guards 4 and 5 is now described in detail with reference to Figs. 2 and 3.

Figs. 2 and 3 are perspective views showing a mounting portion of the head guard 4 in enlarged manners. The space between the pair of head guards 4 and 5 is increased and decreased in Figs. 2 and 3 respectively. These figures show members serving as bases for the head guard 4 and the backrest portion 3 respectively, while

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omitting a cushion member and a cover member. A structure related to the other head guard 5, which is not shown in Figs. 2 and 3, is substantially similar to and symmetrical with the structure related to the head guard 4.

Referring to Figs. 2 and 3, the member serving as the base for the head guard 4 is provided by a resin product. A mounting portion 15 is integrally coupled to the head guard 4 through a hinge portion 14 having a small thickness. This mounting portion 15 is fixed to a corresponding part of the backrest portion 3 by rivets 16, so that the head guard 4 is held by the backrest portion 3. At this time, the hinge portion 14 provides an axis for rotating the head guard 4, so that the head guard 4 is rotatable with respect to the backrest portion 3 about the hinge portion 14. The axis provided by the hinge portion 14 extends substantially in parallel with the direction of upward extension of the backrest portion 3.

The backrest portion 3 is provided with an engaging projection 17 which projects toward the head guard 4. According to this embodiment, the member serving as the base for the backrest portion 3 is provided by a resin product, and the engaging projection 17 is integrally formed with this resin product. On the other hand, the head guard 4 is provided with an engaging portion 18 which is engaged with the engaging projection 17. When the head

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guard 4 is rotated from the position shown in Fig. 2 to that shown in Fig. 3 and vice versa, the engaging portion 18 must pass over the engaging projection 17 with slight elastic deformation. After the engaging portion 18 thus passes over the engaging projection 17, therefore, the positions of the head guard 4 are stably maintained as shown in Figs. 2 and 3 respectively.

It is possible to attain rotation of the head guards 4 and 5 based on the aforementioned structure by applying slightly strong force to the head guards 4 and 5. According to this embodiment, the head guards 4 and 5 are rotated in angular ranges of about 15° respectively. Such angular ranges can be arbitrarily set at desire.

While the hinge portion 14 which is provided by a resin part having a small thickness is employed for rotatably holding each of the head guards 4 and 5 in the aforementioned embodiment, the same may be replaced by a pivotal support structure employing a shaft.

While the combination of the engaging projection 17 and the engaging portion 18 is employed in the aforementioned embodiment for fixing each of the head guards 4 and 5 at a desired angle, the same may be replaced by another means. For example, locking means may be employed for strictly fixing the head guards 4 and 5 after rotation by prescribed operations.

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While the angle of each of the head guards 4 and 5 is adjustable in two stages in the aforementioned embodiment, the angle may alternatively be changed in three or more stages.

Figs. 4 to 6 show a child seat apparatus 21 according to another embodiment of the present invention. The child seat apparatus 21 shown in these figures is intended to provide a baby carriage or a child chair, for example. Figs. 4 to 6 show only a part of a backrest portion 22 of the child seat apparatus 21 and only one head guard 23. Fig. 4 shows a rear surface of the backrest portion 2, while Figs. 5 and 6 show sections taken along the lines V - V and VI - VI in Fig. 4 respectively.

The head guard 23 is mounted on the backrest portion 23 to be rotatable through a shaft 24. The head guard 23 has a part which extends on the rear side of the backrest portion 22 over the part positioning the shaft 24, so that a second shaft 25 is mounted on an end of this part.

A rotation operating member 26 is rotatably mounted on the rear surface of the backrest portion 22. In more concrete terms, the rotation operating member 26 has an axial part 27, which is inserted in a bearing part 28 provided on the backrest portion 22. A collar 29 is engaged in an end of the axial part 27, thereby preventing disengagement of the axial part 27 from the bearing part

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28. A plurality of, e.g., three key ways 30, 31 and 32 are provided in a peripheral surface of the rotation operating member 26. The rotation operating member 26 is further provided with an operating rib 33, for facilitating rotation thereof. In addition, the rotation operating member 26 is provided with pivot holes 34 and 35 in two positions, respectively, between which the rotation center is located. According to this embodiment, the pivot holes 34 and 35 are located on a single diameter.

An end of a rigid rod 36 is operably coupled to the aforementioned second shaft 25. According to this embodiment, a ring-shaped portion 37 is formed on the end of the rigid rod 36, to receive the shaft 25 therein. Another end of the rigid rod 36 is perpendicularly bent to be received in one pivot hole 34 provided in the rotation operating member 26. Another head guard (not shown) has a structure which is horizontally symmetrical with that of the head guard 23, so that one end of another rigid rod 38 is coupled to this head guard and another end of the rigid rod 38 is received in the other pivot hole 35 of the rotation operating member 26.

In such a structure, the rotation operating member 26 is rotated so that its rotation is transmitted to the head guard 23 through the rigid rod 36 to rotate the head guard 23, and further transmitted to the other head guard (not

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23, and further transmitted to the other head guard (not shown) through the rigid rod 38 to rotate the same. Fig. 6 shows rotated states of the head guard 23 in solid and phantom lines respectively. The head guard 23 and the other head guard (not shown) are symmetrically rotated at the same time.

In order to fix respective positions of the head guard 23 and the other head guard which are rotated in the aforementioned manner, an angle fixing mechanism 39 is provided to be engaged with the rotation operating member 26 for fixing a plurality of rotation angles thereof respectively. The angle fixing mechanism 39 comprises a key member 40 which is engaged in any one of the key ways 30 to 32. The key member 40 is held by a guide 41 to be approachable/separatable to/from the rotation operating member 26. Further, the key member 40 is urged by a spring 42 toward the rotation operating member 26. The key member 40 is provided with an externally projecting operating tongue 43 for operating the key member 40 to be separated from the rotation operating member 26 against elasticity of the spring 42.

Figs. 4 and 5 show the key member 40 which is engaged in the key way 30. This state is stably maintained by the spring 42. When the key member 40 is thus engaged in the key way 30, each of the head guard 23 and the other head

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guard is maintained in the position shown by the solid lines in Fig. 6. In order to change the position of each of the head guard 23 and the other head guard as shown by the phantom lines in Fig. 6, downward force is first applied to the operating tongue 43, thereby downwardly displacing the key member 40 against elasticity of the spring 42. Thus, the key member 40 is disengaged from the key way 30, thereby allowing rotation of the rotation operating member 26. When the rotation operating member 26 is rotated anticlockwise in Fig. 4 by 90° so that the key member 40 is engaged in the key way 32, the head guard 23 is maintained in the position shown by the phantom lines in Fig. 6. When the key member 40 is engaged in the key way 31, on the other hand, the head guard 23 is maintained in an intermediate position between those shown by the solid and phantom lines in Fig. 6.

As clearly understood from Fig. 6, the backrest portion 22 and the head guard 23 are provided with cushion members 44 and 45 respectively, which are covered with cover members 46 and 47 respectively. These cushion member 44 and the cover member 46 are not shown in Fig. 5.

While the pair of head guards are rendered rotatable with respect to the backrest portion so that the space therebetween is changeable in each of the aforementioned embodiments, respective ones of such head guards may be

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mounted on the backrest portion to be translatable along its width, as described below.

Figs. 7A to 11 show a child seat apparatus 51 according to still another embodiment of the present invention. This child seat apparatus 51 is intended to provide a baby carriage or a child chair, for example. Figs. 7A to 11 show only a part of a backrest portion 52 of a seat and a pair of head guards 53 and 54 provided in the child seat apparatus 51. In these figures, Figs. 7A and 7B are perspective views showing a front surface of the seat and Figs. 8A and 8B show a front surface of the backrest portion 52, while Figs. 9A and 9B show a rear surface of the backrest portion 52. Figs. 10A and 10B are sectional views taken along the lines XA - XA and XB - XB in Figs. 9A and 9B respectively, while Fig. 11 is a sectional view taken along the line XI - XI in Fig. 9B. Figs. 7A, 8A, 9A and 10A show the pair of head guards 53 and 54 which are most separated from each other, while Figs. 7B, 8B, 9B and 10B show the pair of head guards 53 and 54 which are most approached to each other.

As shown in Figs. 7A and 7B, a cushion member 55 is arranged on the backrest portion 52 and the head guards 53 and 54. The cushion member 55 is not particularly fixed to the head guards 53 and 54, but is deformed along the head guards 53 and 54 following movement thereof, on the

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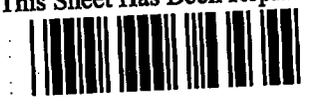

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basis of its flexibility. A pair of notches 56 and 57 are formed in the cushion member 55, in order to facilitate such deformation. Additional cushion members 58 and 59 are provided on the head guards 53 and 54 respectively, independently of the cushion member 55. The cushion members 55, 58 and 59 are shown by phantom lines in Figs. 8A to 10B. These cushion members 55, 58 and 59 are not shown in Fig. 11.

The backrest portion 52 is provided with a pair of side walls 60 and 61 which are aligned with the head guards 53 and 54 when the head guards 53 and 54 are most separated from each other. These side walls 60 and 61 protect a seated child mainly in a portion below its shoulders.

Each of the head guards 53 and 54 has an L-shaped section, and a part thereof is positioned on the rear surface of the backrest portion 52. Guide rails 62 to 65 are provided on the rear surface of the backrest portion 52. The head guard 53 is held by the guide rails 62 and 63, and guided to be movable along the width of the backrest portion 52. On the other hand, the head guard 54 is held by the guide rails 64 and 65, and guided to be movable along the width of the backrest portion 52.

Further, a rectilinear operating member 66 is provided on the rear surface of the backrest portion 52.

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This rectilinear operating member 66 is movable along a guide rib 67 which is provided on the rear surface of the backrest portion 52 to extend along the direction of upward extension of the backrest portion 52. Wing members 68 and 69 are mounted on the rectilinear operating member 66 to extend along the width of the backrest portion 52.

As a position fixing mechanism for fixing a plurality of positions of movement of the rectilinear operating member 66, the guide rib 67 is provided with a plurality of, e.g., five engaging holes 70 to 74 which are distributed along the direction of extension of the guide rib 67. On the other hand, the rectilinear operating member 66 displaceably holds an engaging member 75. Due to such displacement, the engaging member 75 can implement a state being engaged in any one of the engaging holes 70 to 74 and a state being disengaged from the corresponding one of the engaging holes 70 to 74. The engaging member 75 is urged by a spring 76 to be engaged in any one of the engaging holes 70 to 74. The engaging member 75 is provided with a projection 77 projecting toward the exterior of the rectilinear operating member 66. When the engaging member 75 is engaged in any one of the engaging holes 70 to 74, the rectilinear operating member 66 is fixed in the current position. In order to move the rectilinear operating member 66, the engaging member 75

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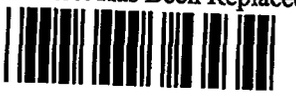

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may be disengaged from the corresponding one of the engaging holes 70 to 74 against elasticity of the spring 76. The engaging member 75 can be readily driven through the projection 77.

The aforementioned wing members 68 and 69 are adapted to implement a transmission mechanism for transmitting the aforementioned rectilinear operation of the rectilinear operating member 66 to the pair of head guards 53 and 54 respectively for simultaneously approaching/separating the pair of head guards 53 and 54 to/from each other. The wing members 68 and 69 are positioned between the backrest portion 52 and the head guards 53 and 54 respectively. Slots 78 and 79 are provided in portions of the head guards 53 and 54 positioned on the rear side of the backrest portion 52 to extend in directions inclined with respect to the direction of rectilinear movement of the rectilinear operating member 66. The slots 78 and 79 are inclined in directions opposite to each other. On the other hand, guide pins 80 and 81 are mounted on respective ends of the wing members 68 and 69, to be received in the slots 78 and 79 respectively.

Figs. 7A, 8A, 9A and 10A shows the pair of head guards 53 and 54 which are most separated from each other. In this state, the rectilinear operating member 66 is located on the lowermost position, so that the engaging

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member 75 is engaged in the engaging hole 70. Further, the guide pins 80 and 81 are positioned on the lowermost ends of the slots 78 and 79 respectively.

In order to most approach the pair of head guards 53 and 54 to each other as shown in Figs. 7B, 8B, 9B and 10B from the aforementioned state, the engaging member 75 is displaced through the projection 77 against elasticity of the spring 76, to be disengaged from the engaging hole 70. Then, the rectilinear operating member 66 is upwardly moved while maintaining this state. Thus, the guide pins 80 and 81 are moved in the slots 78 and 79 respectively, thereby approaching the pair of head guards 53 and 54 to each other. When the operation for the projection 77 is relieved upon final alignment of the engaging member 75 with the engaging hole 74, the engaging member 75 is engaged in the engaging hole 74 due to the action of the spring 76. In this state, the guide pins 80 and 81 are positioned on uppermost ends of the slots 78 and 79 respectively, to implement the most approached state of the pair of head guards 53 and 54.

An intermediate state between the aforementioned two typical states can also be implemented by engaging the engaging member 75 in any one of the engaging holes 71 to 73.

According to this embodiment, as hereinabove

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described, it is possible to transmit the rectilinear operation of the rectilinear operating member 66 to the pair of head guards 53 and 54 respectively, for simultaneously approaching/separating the pair of head guards 53 and 54 to/from each other.

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WHAT IS CLAIMED IS:

1. A child seat apparatus comprising:

a seat portion (2);

a backrest portion (3, 22, 52) upwardly extending from a rear end of said seat portion (2); and

a pair of head guards (4, 5, 23, 53, 54) frontwardly extending from both side edges of said backrest portion (3, 22, 52),

a space between said pair of head guards (4, 5, 23, 53, 54) being rendered changeable.

2. A child seat apparatus in accordance with claim 1, wherein respective said head guards (4, 5, 23) are mounted on said backrest portion (3, 22) to be rotatable about axes (14, 24) extending substantially in parallel with the direction of upward extension of said backrest portion (3, 22).

3. A child seat apparatus in accordance with claim 2, further comprising engaging means (17, 18) for maintaining a plurality of positions being obtained by rotation of respective said head guards (4, 5).

4. A child seat apparatus in accordance with claim

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2, further comprising a rotation operating member (26) being rotatably provided on a rear surface of said backrest portion (22), an angle fixing mechanism (39) being engaged with said rotation operating member (26) for fixing a plurality of rotation angles of said rotation operating member (26) respectively, and a pair of rigid rods (3, 38) having first ends being coupled to two positions (34, 35) of said rotation operating member (26) respectively between which a rotation center (27) is located and second ends being coupled to said pair of head guards (23) respectively.

5. A child seat apparatus in accordance with claim 4, wherein said rotation operating member (26) has a plurality of key ways (30, 31, 32) being provided to be distributed along its peripheral direction, said angle fixing mechanism (39) comprising a key member (40) being selectively engaged in any one of said plurality of key ways (30, 31, 32), and a guide (41) for guiding said key member (40) in a direction to be engaged in any one of said key ways (30, 31, 32) and a direction opposite thereto.

6. A child seat apparatus in accordance with claim 5, wherein said angle fixing mechanism (39) further

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comprises a spring (42) for urging said key member (40) in said direction to be engaged in any one of said key ways (30, 31, 32).

7. A child seat apparatus in accordance with claim 1, wherein respective said head guards (53, 54) are mounted on said backrest portion (52) to be translatable along its width.

8. A child seat apparatus in accordance with claim 7, further comprising a rectilinear operating member (66) being rectilinearly movable in the direction of upward extension of said backrest portion (52), a position fixing mechanism (70 to 74, 75) for fixing a plurality of positions of movement of said rectilinear member (66), and a transmission mechanism (68, 69, 78, 79, 80, 81) for transmitting a rectilinear operation of said rectilinear operating member (66) to said pair of head guards (53, 54) respectively for simultaneously approaching/separating said pair of head guards (53, 54) to/from each other.

9. A child seat apparatus in accordance with claim 8, wherein said backrest portion (52) is provided with a plurality of engaging holes (70 to 74) along a path of movement of said rectilinear member (66), said position

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fixing mechanism comprising an engaging member (75) being held by said rectilinear operating member (66) to be selectively engaged in any one of said plurality of engaging holes (70 to 74).

10. A child seat apparatus in accordance with claim 9, wherein said position fixing mechanism further comprises a spring (76) for urging said engaging member (75) in a direction to be engaged in any one of said engaging holes (70 to 74).

11. A child seat apparatus in accordance with claim 8, wherein said transmission mechanism comprises a pair of guide pins (80, 81) being provided to integrally operate with said rectilinear operating member (66), and a pair of guide paths (78, 79) being provided on said pair of head guards (53, 54) respectively for movably guiding said guide pins (80, 81) respectively, said pair of guide paths (78, 79) extending to be inclined in opposite directions.

12. A child seat apparatus in accordance with claim 11, wherein said pair of guide paths are provided by a pair of slots (78, 79) being provided in said pair of head guards (53, 54) respectively.

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13. A seat having a backrest portion extending upwardly from a seat portion and having a pair of spaced-apart head guards mounted to the backrest for protecting from both sides the head of a person seated on the seat, wherein the relative positions of the head guards are selectively adjustable for adjusting the space defined therebetween.

