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TITLE OF THE INVENTION

Child Safety Seat for Automobile

BACKGROUND OF THE INVENTION

Field of the Invention

5 The present invention relates to a child safety seat
for an automobile which is mounted on an original seat of
an automobile for safely seating a child in the
automobile, and more particularly, it relates to an
improvement in a reclining mechanism of such a child
10 safety seat for an automobile.

Description of the Background Art

 There is a child safety seat for an automobile which
comprises a reclining mechanism for keeping a child in a
comfortable position when it falls asleep on the seat, for
15 example. Such a seat typically has a reclinable backrest
portion. When this safety seat is mounted frontward on an
original seat of the automobile and the angle of the
backrest portion is adjusted, however, the backrest
portion interferes with that of the original seat of the
20 automobile. Therefore, the position for mounting the
child safety seat on the original seat of the automobile
must be changed every time the angle of the backrest
portion is adjusted. In order to avoid such a trouble in
adjustment of the angle of the backrest portion, there has
25 been proposed a child safety seat for an automobile

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comprising a reclining mechanism having the following structure:

5 This type of child safety seat comprises a base which is fixed to an original seat of an automobile, and a seat body which is movably held by the base. The base is provided with a guide rail arcuately extending in a vertical plane, while the seat body is provided with a guide member which is guided to move along the guide rail. Thus, it is possible to change the angle of inclination of the seat body without interfering with the original seat
10 of the automobile.

The aforementioned seat body is provided with backrest and seat portions in a fixed manner. When the seat body is inclined to adjust the angle of the backrest portion, therefore, a forward end of the seat portion is
15 also raised up.

In such a state, however, the knees of the child are drawn up to apply a relatively large load on its hips, although the child can recline the upper half of its body
20 on the backrest portion.

SUMMARY OF THE INVENTION

Accordingly, an object of the present invention is to prevent a front end of a seat portion from being raised upon adjustment of an angle of a backrest portion in a
25 child safety seat for an automobile having the latter



reclining structure described above.

A child safety seat for an automobile according to the present invention comprises a seat body forming a backrest portion, a seat portion which is rotatably
5 mounted on the seat body, and a base movably holding the seat body. The base and the seat body are coupled with each other by a relative movement guiding mechanism which is formed by combination of a guide rail arcuately extending in a vertical plane and a guide member guided to
10 move along the guide rail. The relative movement guiding mechanism further comprises means for selectively fixing the guide member on a plurality of positions of the guide rail. The mechanism further comprises coupling means for coupling the base and the seat portion with each other to
15 maintain the seat portion in a substantially constant inclination regardless of movement of the seat body.

According to the present invention, the seat body moves along an arcuate track with respect to the base. When the angle of the backrest portion is adjusted while
20 the base is fixed to an original seat of an automobile, therefore, the seat body will not interfere with a backrest portion of the original seat of the automobile.

According to the present invention, further, the seat portion is rotatably mounted on the seat body, while the
25 base and the seat portion are coupled with each other by

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the coupling means so that the seat portion is maintained in a substantially constant inclination. Thus, the seat portion is maintained in a substantially constant inclination regardless of the angle of the backrest portion as adjusted.

According to the present invention, as hereinabove described, the seat portion can be maintained in a substantially constant inclination regardless of the angle of the backrest portion, whereby the forward end of the seat portion is not raised up to force the child into an uncomfortable position upon adjustment of the angle of the backrest portion. Thus, the child can recline its body on the backrest portion, to take a nap in a comfortable position.

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 longitudinal sectional view schematically showing a child safety seat 1 for an automobile according to an embodiment of the present invention as viewed from a side portion;

Fig. 2 is a longitudinal sectional view corresponding



to Fig. 1, showing a seat body 3 in a position different from that shown in Fig. 1 with respect to a base 6;

Fig. 3 is an enlarged view showing a part of a guide rail 8;

5 Fig. 4 is a sectional view taken along the line IV - IV in Fig. 3;

Fig. 5 is an enlarged view showing a part of a guide member 9;

10 Fig. 6 is a sectional view taken along the line VI - VI in Fig. 5;

Fig. 7 is a sectional view taken along the line VII - VII in Fig. 5;

15 Fig. 8 is a sectional view showing the guide rail 8 and the guide member 9 which are in engagement with each other;

Fig. 9 is a sectional view showing a locking member 18 which is provided in relation to the guide member 9;

20 Fig. 10 is a sectional view showing a structure for controlling movement of the locking member 18 shown in Fig. 9; and

Fig. 11 is a sectional view schematically showing a structure for maintaining a seat portion 5 in a substantially constant inclination as viewed from a front portion of the child safety seat 1 for an automobile.

25 DESCRIPTION OF THE PREFERRED EMBODIMENTS



Figs. 1 and 2 are longitudinal sectional views schematically showing a child safety seat 1 for an automobile according to an embodiment of the present invention. A cushion member, a cover member etc. which
5 are generally provided in such a child safety seat 1 are not shown in these figures.

This safety seat 1 comprises a seat body 3 forming a backrest portion 2, a seat portion 5 which is mounted on the seat body 3 to be rotatable about a pivot portion 4,
10 and a base 6 movably holding the seat body 3. The base 6 is fixed to an original seat (not shown) of an automobile through a safety belt which is already provided on the original seat or the like.

As hereinabove described, the seat body 3 and the
15 base 6 movably holding the same are coupled with each other by a relative movement guiding mechanism 7. The relative movement guiding mechanism 7 is formed by combination of a guide rail 8 and a guide member 9. According to this embodiment, the guide rail 8 is provided
20 on the base 6, and the guide member 9 is provided on the seat body 3.

The guide rail 8 is formed by an arcuate portion 10 arcuately extending in a vertical plane, and a linear portion 11 linearly extending from one end of the arcuate
25 portion 10. Fig. 3 shows a part of the guide rail 8 in an

enlarged manner, and Fig. 4 shows a sectional view taken along the line IV - IV in Fig. 3. The guide rail 8 has a U-shaped section as a whole, with extensions 12 provided on both sides thereof.

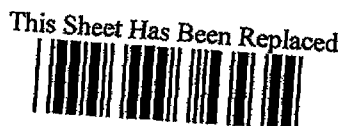
5 Fig. 5 shows a part of the guide member 9 in an enlarged manner, and Figs. 6 and 7 show sectional views taken along the lines VI - VI and VII - VII in Fig. 5 respectively.

10 The guide member 9 arcuately extends in correlation with the arcuate portion 10 of the aforementioned guide rail 8. As shown in Fig. 6, a principal part 13 of the guide member 9 has a lateral C-shaped section, to engage with the extensions 12 of the guide rail 8 as shown in Fig. 8. Thus, the guide member 9 can move along the guide
15 rail 8.

 An end 14 of the guide member 9 has a section shown in Fig. 7, not to engage with the guide rail 8. While such an end 14 is adapted to reinforce the seat body 3, it is not particularly necessary to form the same.

20 Such a relative movement guiding mechanism 7 comprises means for selectively fixing the guide member 9 on a plurality of positions of the guide rail 8. According to this embodiment, the selective fixing means is provided by the following structure:

25 Referring to Fig. 9, the guide rail 8 has a plurality



of engaging holes 15, 16, ... which are distributed along its longitudinal direction. On the other hand, the guide member 9 holds a locking member 18 provided with an engaging projection 17 which is inserted in any one of the engaging holes 15, 16, The locking member 18 is movably guided in a guide case 19 which is fixed to the guide member 9, and urged by a spring 20 to move in a direction for inserting the engaging projection 17 in any one of the engaging holes 15, 16, The locking member 18 is provided with an engaging pin 21. As shown in Fig. 10, the engaging pin 21 passes through a slot 22 which is provided in the guide case 19, to outwardly project from the guide case 19.

In order to allow the aforementioned movement of the locking member 18, the structure shown in Fig. 10 is employed. Referring to Fig. 10, a cam member 23 is arranged to be movable along the guide member 9. The cam member 23 is partially received in a hole 24 which is formed in the guide member 9, to be movable in a range of extension of the hole 24. The cam member 23 is provided with a cam surface 25, which is in an inclined state, for engaging with the aforementioned engaging pin 21.

An operation for making the aforementioned cam member 23 move along the guide member 9 is provided by an operating member 26. As shown in Figs. 1 and 2, the

operating member 26 is positioned on a forward end of the seat body 3 under the seat portion 5. This operating member 26 is horizontally movably held by a guide sleeve 27 which is fixed to the seat body 3. The operating member 26 is coupled with the aforementioned cam member 23 by a wire 28. The wire 28 is covered with an outer tube 29, which is fixed to the guide sleeve 27 and the guide member 9 respectively.

When an operator frontwardly pulls the operating member 26, this movement is transmitted to the cam member 23 through the wire 28. Thus, the cam member 23 frontwardly moves similarly to the operating member 26. Due to this movement of the cam member 23, the engaging pin 21 positioned on the cam face 25 is upwardly displaced as shown by a phantom line in Fig. 10. Consequently, the locking member 18 shown in Fig. 9 disengages the engaging projection 17 from the engaging hole 15, for example, against elasticity of the spring 20. Thus, the guide member 9 is movable with respect to the guide rail 8. During this movement, the force applied to the operating member 26 may be removed. When the engaging projection 17 is aligned with any one of the engaging holes 15, 16, ..., the locking member 18 is displaced to insert the same in the corresponding one of the engaging holes 15, 16, ... along elasticity of the spring 20. Due to such



displacement of the locking member 18, the engaging pin 21 engaging with the cam face 25 forces the cam member 23 into the state shown in Fig. 10, so that the operating member 26 is returned to its original state in response.

5 Coupling means for coupling the base 6 and the seat portion 5 is provided in order to maintain the seat portion 5 in a substantially constant inclination regardless of the aforementioned movement of the seat body 3. According to this embodiment, the coupling means is
10 formed by the aforementioned linear portion 11 of the guide rail 8 and a coupling member 30 which is fixed to the seat portion 5. Fig. 11 shows the relation between the guide rail 8 and the coupling member 30 as viewed from a front portion of the child safety seat 1. An engaging
15 portion 31 is provided on a lower end of the coupling member 30, to engage with the extensions 12 of the guide rail 8. The engaging portion 31 has a lateral C-shaped section, similarly to the principal part 13 of the guide member 9. This engaging portion 31 is movable along the
20 linear portion 11 of the guide rail 8, while the coupling member 30 maintains the seat portion 5 and the linear portion 11 of the guide rail 8 at a substantially constant distance. Thus, it is possible to maintain the seat
25 portion 5 in a substantially constant inclination regardless of the aforementioned movement of the seat body



3 along an arcuate track, as understood from Figs. 1 and 2
by contrast with each other.

While the present invention has been described with
reference to the embodiment shown in the drawings, some
5 modifications are available within the scope of the
present invention.

For example, the positional relation between the
guide rail 8 and the guide member 9 forming the relative
movement guiding mechanism 7 may be reversed so that the
10 guide rail 8 is provided on the seat body 3 and the guide
member 9 is provided on the base 6. Further, the guide
member 9 may be divided into a plurality of portions, to
move along the guide rail 8 respectively.

The linear portion 11 of the guide rail 8 forming a
15 part of the coupling means for maintaining the seat
portion 5 in a substantially constant inclination may be
provided by a member which is independent of the arcuate
portion 10 of the guide rail 8. While this coupling means
comprises the coupling member 30 which slides along the
20 linear portion 11 of the guide rail 8, the same may
alternatively be replaced by a mechanism formed by a
plurality of links which couples the seat portion 5 and
the base 6 with each other, for example.

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WHAT IS CLAIMED IS:

1. A child safety seat for an automobile,
comprising:

a seat body (3) forming a backrest portion (2);

5 a seat portion (5) being rotatably mounted on said
seat body (3);

a base (6) movably holding said seat body (3),

said base (6) and said seat body (3) being coupled
with each other by a relative movement guiding mechanism
(7) being formed by combination of a guide rail (8) having
10 a portion (10) arcuately extending in a vertical plane and
a guide member (9) being guided to move along said guide
rail (8),

said relative movement guiding mechanism (7)
comprising means (15, 16, 17, 18) for selectively fixing
15 said guide member (9) on a plurality of positions of said
guide rail (8); and

coupling means (30) for coupling said base (6) and
said seat portion (5) with each other for maintaining said
seat portion (5) in a substantially constant inclination
20 regardless of movement of said seat body (3).

2. A child safety seat for an automobile in
accordance with claim 1, wherein said guide rail (8) is





provided on said base (6), and said guide member (9) is provided on said seat body (3).

3. A child safety seat for an automobile in accordance with claim 2, wherein said guide rail (8) has a portion (11) linearly extending from an end of said arcuately extending portion (10), said coupling means
5 comprising a coupling member (30), being mounted on said seat portion (5), having an engaging portion (31) being movable while engaging with said linear portion (11).

4. A child safety seat for an automobile in accordance with claim 1, wherein said guide rail (8) has a U-shaped section as a whole with extensions (12) being provided on both sides thereof, said guide member (9)
5 having a lateral C-shaped section for engaging with said extensions (12).

5. A child safety seat for an automobile in accordance with claim 1, wherein said selectively fixing means comprises a plurality of engaging holes (15, 16) being provided to be distributed longitudinally along said
5 guide rail (8), and a locking member (18) having an engaging projection (17) being movably held by said guide member (9) to be selectively inserted in any one of said

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engaging holes (15, 16) by its movement.

6. A child safety seat for an automobile in accordance with claim 5, further comprising a spring (20) for urging said locking member (18) to move in a direction for inserting said engaging projection (17) in any one of
5 said engaging holes (15, 16).

7. A child safety seat for an automobile in accordance with claim 6, further comprising a cam member (23) being engageable with a part of said locking member (18) and movable in a direction perpendicular to that of
5 movement of said locking member (18) for driving said locking member (18) in a direction for disengaging said engaging projection (17) from said any one of said engaging holes (15, 16), and an operating member (26) for providing an operation for driving said cam member (23).

8. A child safety seat for an automobile in accordance with claim 7, wherein said operating member (26) is positioned under said seat portion (5).

9. A child safety seat for an automobile in accordance with claim 8, further comprising a wire (28) for coupling said operating member (26) and said cam member (23) with each other.

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10. A reclining seat comprising a body (3) defining
a backrest portion (2) of the seat mounted to a base
(6) for relative movement, thereto for adjusting the
angle of the backrest portion to the base, a seat
5 portion (5) mounted to said body for movement relative
thereto, and coupling means (30) coupling said seat
portion with said base for maintaining said seat
portion at a substantially constant inclination to
said base regardless of the angle to which the
10 backrest portion is adjusted.

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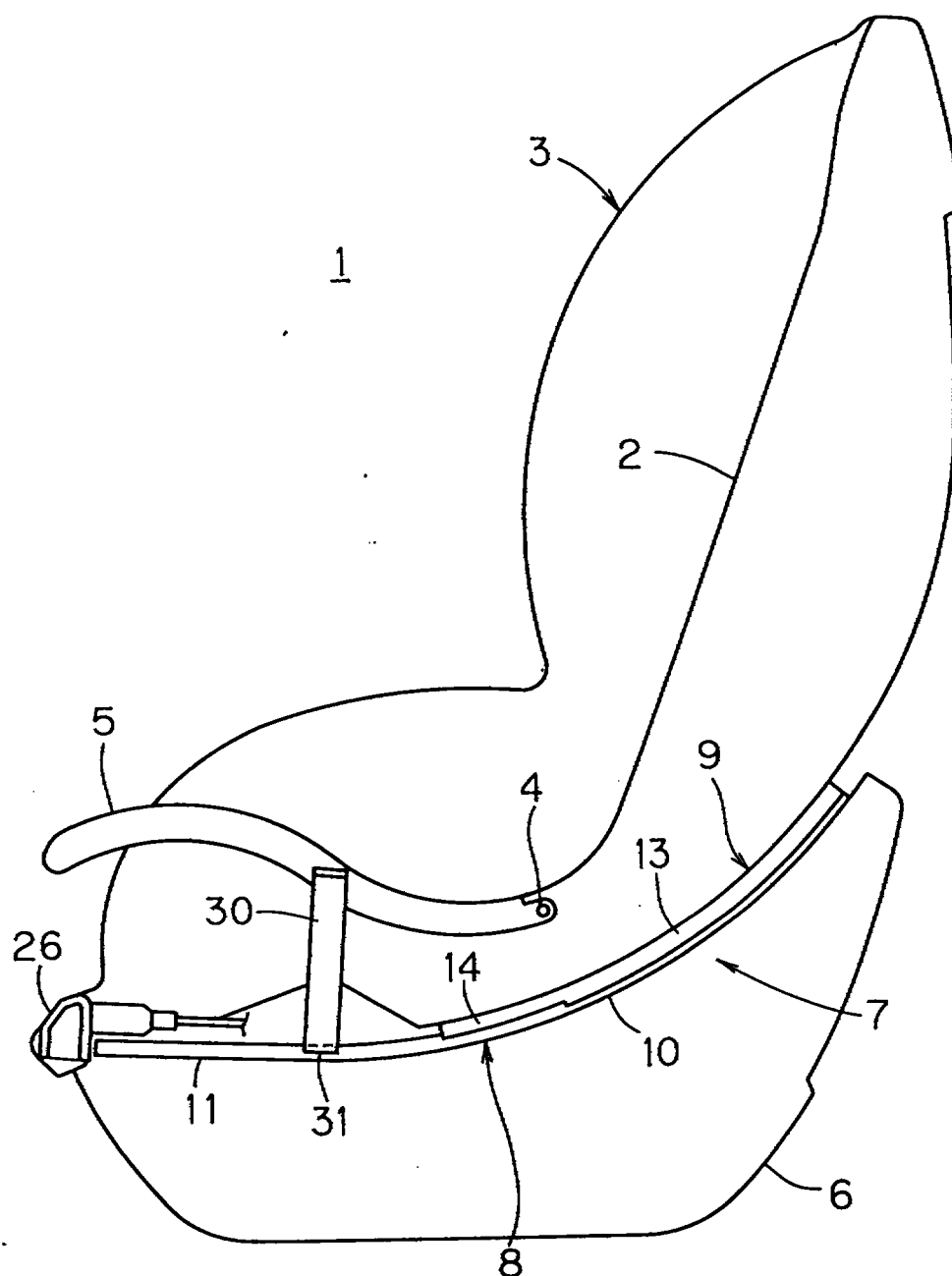
ABSTRACT OF THE DISCLOSURE

A seat body (3) forming a backrest portion (2) is made arcuately movable with respect to a base (6) by a relative movement guiding mechanism (7) which is formed by
5 combination of an arcuately extending guide rail (8) and a guide member (9) moving along the same. A seat portion (5) is rotatably mounted on the seat body (3) and a coupling member (30) is made to engage with a linear portion (11) of the guide rail (8), thereby maintaining
10 the seat portion (5) in a substantially constant inclination regardless of movement of the seat body (3). Thus, it is possible to maintain the seat portion (5) in a substantially horizontal state also when the angle of the backrest portion (2) is adjusted, while making the
15 backrest portion (2) reclinable without interfering with a backrest portion of an original seat provided in an automobile. Thus, a child is not forced into an uncomfortable position in an inclined state of the backrest portion (2).

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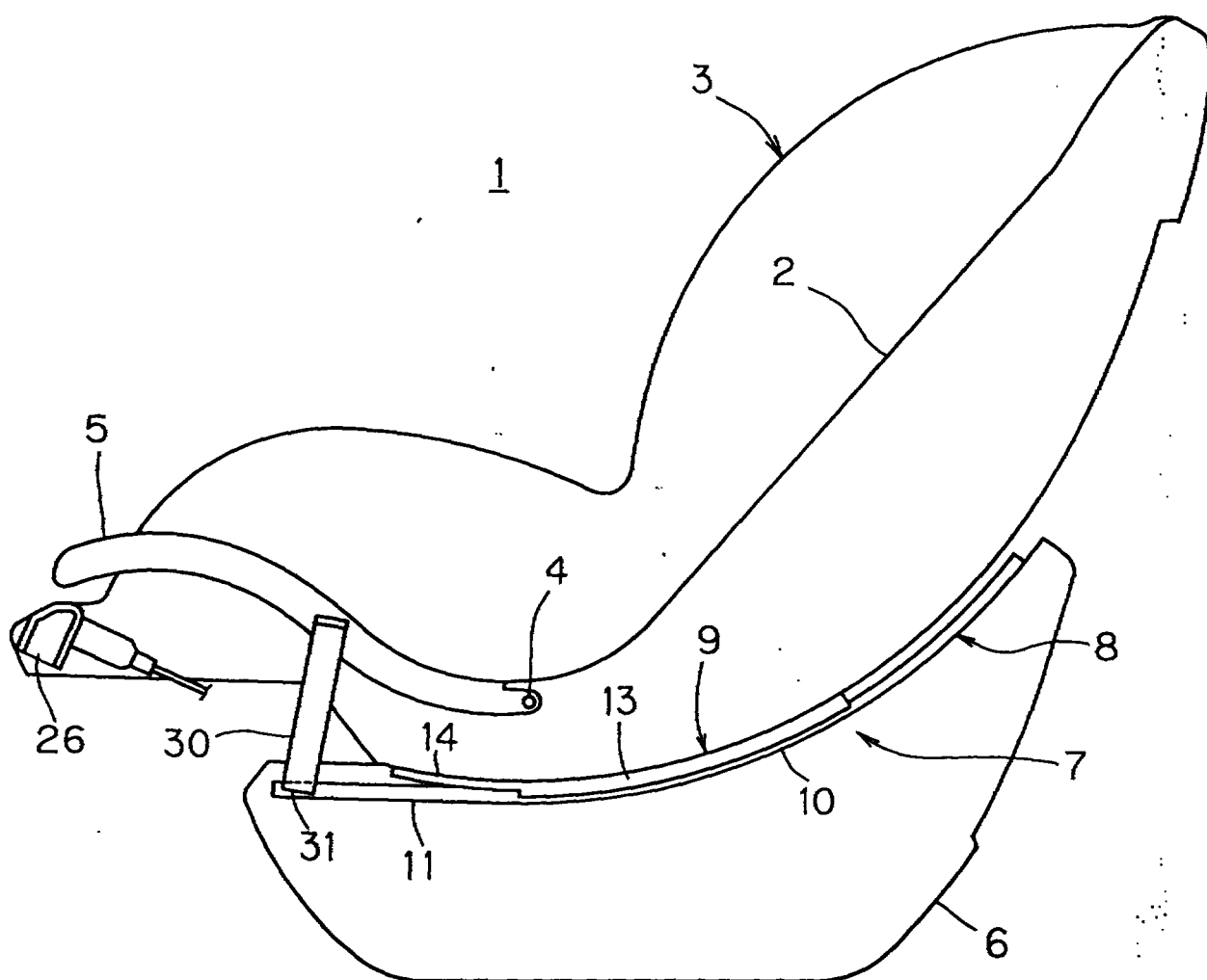
FIG. 1



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FIG. 2



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FIG. 3

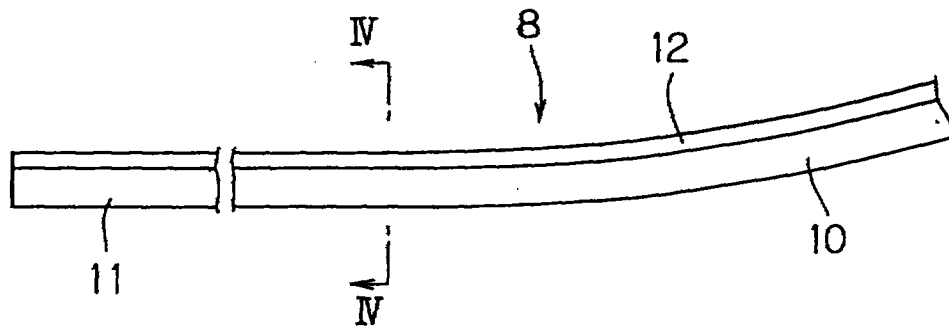


FIG. 4

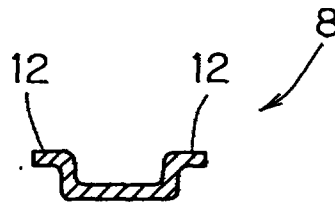


FIG. 5

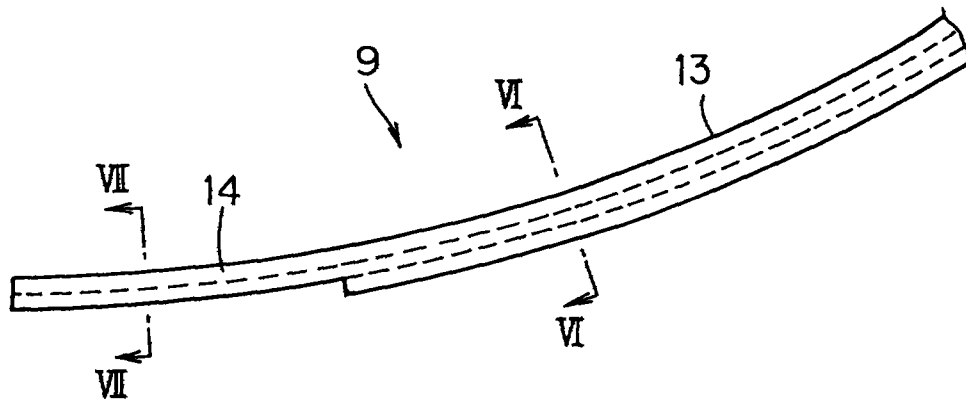
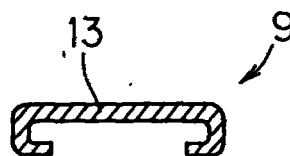


FIG. 6



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FIG. 7

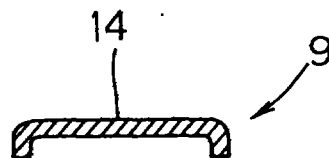


FIG. 8

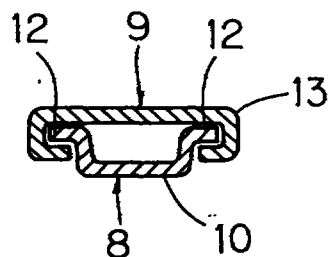
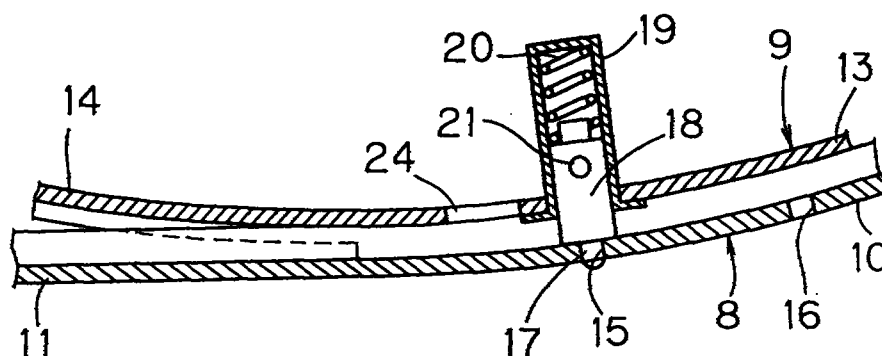


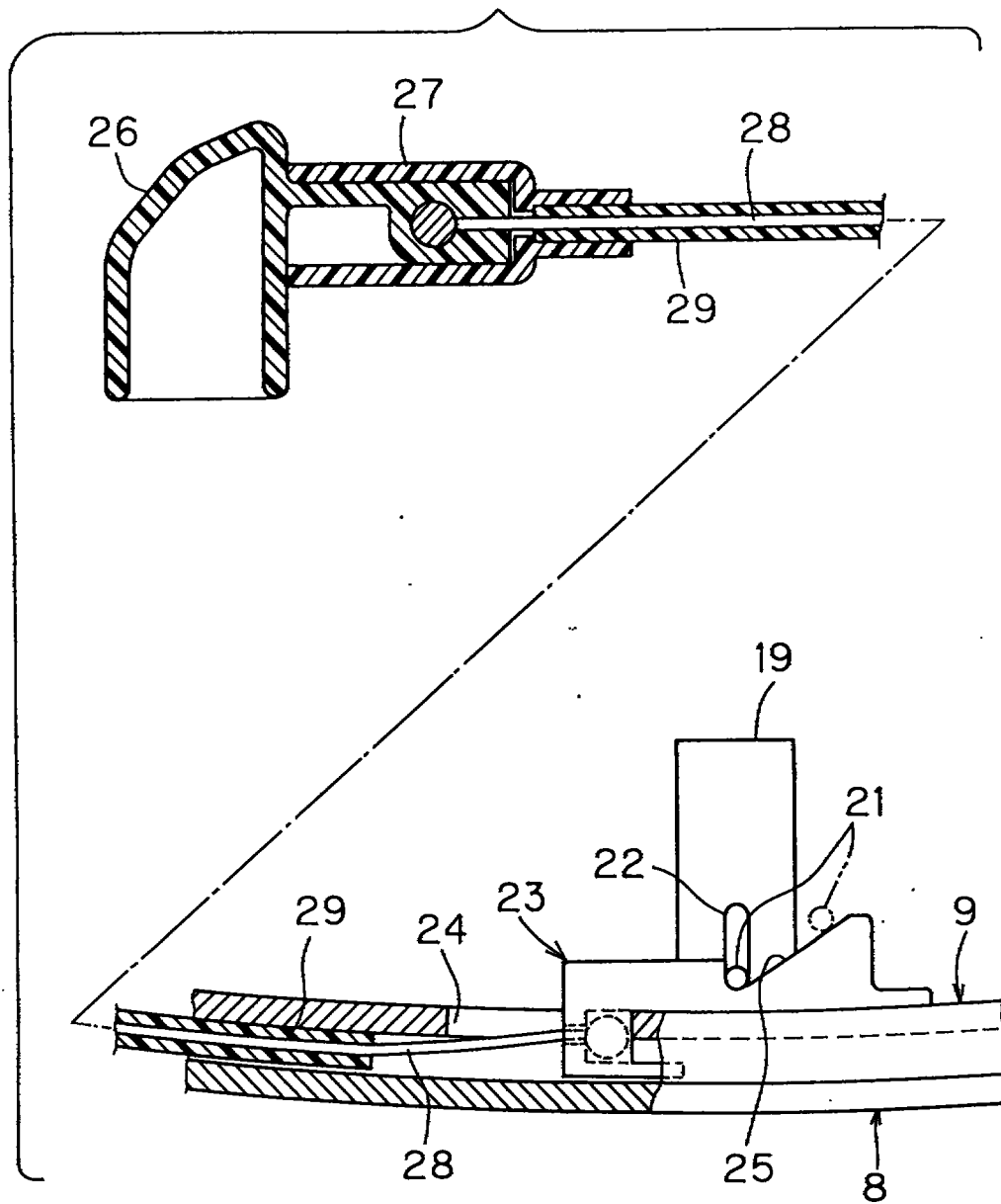
FIG. 9



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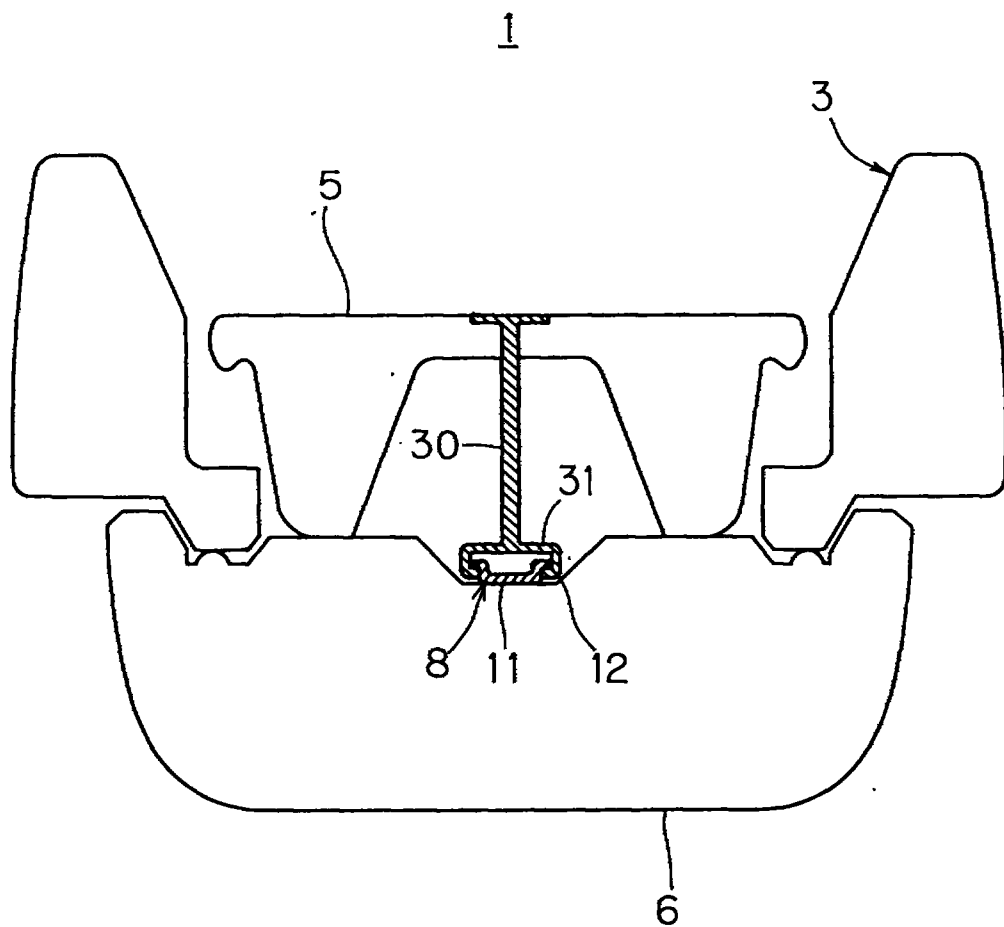
FIG. 10



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FIG. 11



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REPLACEMENT SHEETS		SG
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☒	Claim(s)	: paged <u>1</u> to paged <u>15</u>
☒	Drawing(s)	: paged <u>1/16</u> to paged <u>4/6</u>
☒	Abstract	: paged <u>16</u> to paged <u>.....</u>
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REPLACED SHEETS		SG
☒	Description	: paged <u>1</u> to paged <u>11</u>
☒	Claim(s)	: paged <u>12</u> to paged <u>15</u>
☐	Drawing(s)	: paged <u>.....</u> to paged <u>.....</u>
☒	Abstract	: paged <u>16</u> to paged <u>.....</u>
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TITLE OF THE INVENTION

Child Safety Seat for Automobile

BACKGROUND OF THE INVENTION

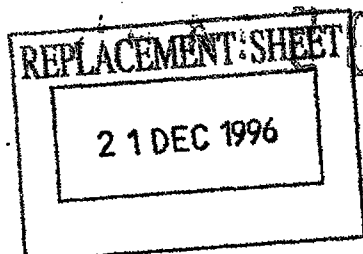
Field of the Invention

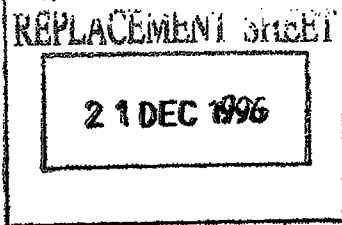
The present invention relates to a child safety seat for an automobile which is mounted on an original seat of an automobile for safely seating a child in the automobile, and more particularly, it relates to an improvement in a reclining mechanism of such a child safety seat for an automobile.

Description of the Background Art

There is a child safety seat for an automobile which comprises a reclining mechanism for keeping a child in a comfortable position when it falls asleep on the seat, for example. Such a seat typically has a reclinable backrest portion. When this safety seat is mounted frontward on an original seat of the automobile and the angle of the backrest portion is adjusted, however, the backrest portion interferes with that of the original seat of the automobile. Therefore, the position for mounting the child safety seat on the original seat of the automobile must be changed every time the angle of the backrest portion is adjusted. In order to avoid such a trouble in adjustment of the angle of the backrest portion, there has been proposed a child safety seat for an automobile

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comprising a reclining mechanism having the following structure:

This type of child safety seat comprises a base which is fixed to an original seat of an automobile, and a seat body which is movably held by the base. The base is provided with a guide rail arcuately extending in a vertical plane, while the seat body is provided with a guide member which is guided to move along the guide rail. Thus, it is possible to change the angle of inclination of the seat body without interfering with the original seat of the automobile.

The aforementioned seat body is provided with backrest and seat portions in a fixed manner. When the seat body is inclined to adjust the angle of the backrest portion, therefore, a forward end of the seat portion is also raised up.

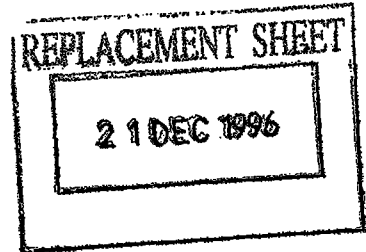
In such a state, however, the knees of the child are drawn up to apply a relatively large load on its hips, although the child can recline the upper half of its body on the backrest portion.

SUMMARY OF THE INVENTION

Accordingly, an object of the present invention is to prevent a front end of a seat portion from being raised upon adjustment of an angle of a backrest portion in a child safety seat for an automobile having the latter

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reclining structure described above.

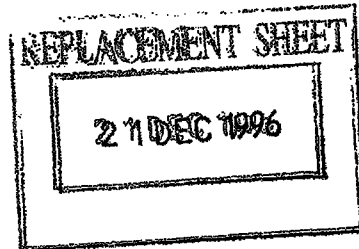
A child safety seat for an automobile according to the present invention comprises a seat body forming a backrest portion, a seat portion which is rotatably mounted on the seat body, and a base movably holding the seat body. The base and the seat body are coupled with each other by a relative movement guiding mechanism which is formed by combination of a guide rail arcuately extending in a vertical plane and a guide member guided to move along the guide rail. The relative movement guiding mechanism further comprises means for selectively fixing the guide member on a plurality of positions of the guide rail. The mechanism further comprises coupling means for coupling the base and the seat portion with each other to maintain the seat portion in a substantially constant inclination regardless of movement of the seat body.

According to the present invention, the seat body moves along an arcuate track with respect to the base. When the angle of the backrest portion is adjusted while the base is fixed to an original seat of an automobile, therefore, the seat body will not interfere with a backrest portion of the original seat of the automobile.

According to the present invention, further, the seat portion is rotatably mounted on the seat body, while the base and the seat portion are coupled with each other by

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the coupling means so that the seat portion is maintained in a substantially constant inclination. Thus, the seat portion is maintained in a substantially constant inclination regardless of the angle of the backrest portion as adjusted.

According to the present invention, as hereinabove described, the seat portion can be maintained in a substantially constant inclination regardless of the angle of the backrest portion, whereby the forward end of the seat portion is not raised up to force the child into an uncomfortable position upon adjustment of the angle of the backrest portion. Thus, the child can recline its body on the backrest portion, to take a nap in a comfortable position.

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.

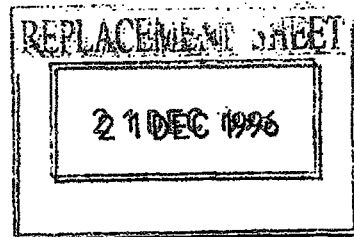
BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a longitudinal sectional view schematically showing a child safety seat 1 for an automobile according to an embodiment of the present invention as viewed from a side portion;

Fig. 2 is a longitudinal sectional view corresponding

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to Fig. 1, showing a seat body 3 in a position different from that shown in Fig. 1 with respect to a base 6;

Fig. 3 is an enlarged view showing a part of a guide rail 8;

Fig. 4 is a sectional view taken along the line IV - IV in Fig. 3;

Fig. 5 is an enlarged view showing a part of a guide member 9;

Fig. 6 is a sectional view taken along the line VI - VI in Fig. 5;

Fig. 7 is a sectional view taken along the line VII - VII in Fig. 5;

Fig. 8 is a sectional view showing the guide rail 8 and the guide member 9 which are in engagement with each other;

Fig. 9 is a sectional view showing a locking member 18 which is provided in relation to the guide member 9;

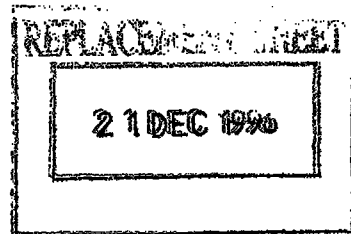
Fig. 10 is a sectional view showing a structure for controlling movement of the locking member 18 shown in Fig. 9; and

Fig. 11 is a sectional view schematically showing a structure for maintaining a seat portion 5 in a substantially constant inclination as viewed from a front portion of the child safety seat 1 for an automobile.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

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Figs. 1 and 2 are longitudinal sectional views schematically showing a child safety seat 1 for an automobile according to an embodiment of the present invention. A cushion member, a cover member etc. which are generally provided in such a child safety seat 1 are not shown in these figures.

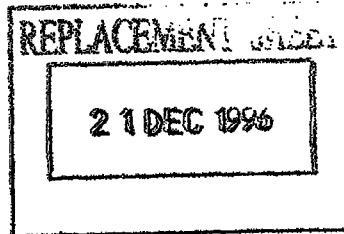
This safety seat 1 comprises a seat body 3 forming a backrest portion 2, a seat portion 5 which is mounted on the seat body 3 to be rotatable about a pivot portion 4, and a base 6 movably holding the seat body 3. The base 6 is fixed to an original seat (not shown) of an automobile through a safety belt which is already provided on the original seat or the like.

As hereinabove described, the seat body 3 and the base 6 movably holding the same are coupled with each other by a relative movement guiding mechanism 7. The relative movement guiding mechanism 7 is formed by combination of a guide rail 8 and a guide member 9. According to this embodiment, the guide rail 8 is provided on the base 6, and the guide member 9 is provided on the seat body 3.

The guide rail 8 is formed by an arcuate portion 10 arcuately extending in a vertical plane, and a linear portion 11 linearly extending from one end of the arcuate portion 10. Fig. 3 shows a part of the guide rail 8 in an

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enlarged manner, and Fig. 4 shows a sectional view taken along the line IV - IV in Fig. 3. The guide rail 8 has a U-shaped section as a whole, with extensions 12 provided on both sides thereof.

Fig. 5 shows a part of the guide member 9 in an enlarged manner, and Figs. 6 and 7 show sectional views taken along the lines VI - VI and VII - VII in Fig. 5 respectively.

The guide member 9 arcuately extends in correlation with the arcuate portion 10 of the aforementioned guide rail 8. As shown in Fig. 6, a principal part 13 of the guide member 9 has a lateral C-shaped section, to engage with the extensions 12 of the guide rail 8 as shown in Fig. 8. Thus, the guide member 9 can move along the guide rail 8.

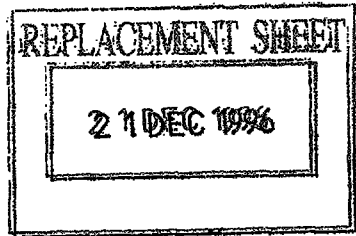
An end 14 of the guide member 9 has a section shown in Fig. 7, not to engage with the guide rail 8. While such an end 14 is adapted to reinforce the seat body 3, it is not particularly necessary to form the same.

Such a relative movement guiding mechanism 7 comprises means for selectively fixing the guide member 9 on a plurality of positions of the guide rail 8. According to this embodiment, the selective fixing means is provided by the following structure:

Referring to Fig. 9, the guide rail 8 has a plurality

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of engaging holes 15, 16, ... which are distributed along its longitudinal direction. On the other hand, the guide member 9 holds a locking member 18 provided with an engaging projection 17 which is inserted in any one of the engaging holes 15, 16, The locking member 18 is movably guided in a guide case 19 which is fixed to the guide member 9, and urged by a spring 20 to move in a direction for inserting the engaging projection 17 in any one of the engaging holes 15, 16, The locking member 18 is provided with an engaging pin 21. As shown in Fig. 10, the engaging pin 21 passes through a slot 22 which is provided in the guide case 19, to outwardly project from the guide case 19.

In order to allow the aforementioned movement of the locking member 18, the structure shown in Fig. 10 is employed. Referring to Fig. 10, a cam member 23 is arranged to be movable along the guide member 9. The cam member 23 is partially received in a hole 24 which is formed in the guide member 9, to be movable in a range of extension of the hole 24. The cam member 23 is provided with a cam surface 25, which is in an inclined state, for engaging with the aforementioned engaging pin 21.

An operation for making the aforementioned cam member 23 move along the guide member 9 is provided by an operating member 26. As shown in Figs. 1 and 2, the

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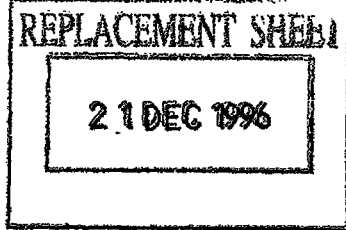
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operating member 26 is positioned on a forward end of the seat body 3 under the seat portion 5. This operating member 26 is horizontally movably held by a guide sleeve 27 which is fixed to the seat body 3. The operating member 26 is coupled with the aforementioned cam member 23 by a wire 28. The wire 28 is covered with an outer tube 29, which is fixed to the guide sleeve 27 and the guide member 9 respectively.

When an operator frontwardly pulls the operating member 26, this movement is transmitted to the cam member 23 through the wire 28. Thus, the cam member 23 frontwardly moves similarly to the operating member 26. Due to this movement of the cam member 23, the engaging pin 21 positioned on the cam face 25 is upwardly displaced as shown by a phantom line in Fig. 10. Consequently, the locking member 18 shown in Fig. 9 disengages the engaging projection 17 from the engaging hole 15, for example, against elasticity of the spring 20. Thus, the guide member 9 is movable with respect to the guide rail 8. During this movement, the force applied to the operating member 26 may be removed. When the engaging projection 17 is aligned with any one of the engaging holes 15, 16, ..., the locking member 18 is displaced to insert the same in the corresponding one of the engaging holes 15, 16, ... along elasticity of the spring 20. Due to such

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displacement of the locking member 18, the engaging pin 21 engaging with the cam face 25 forces the cam member 23 into the state shown in Fig. 10, so that the operating member 26 is returned to its original state in response.

Coupling means for coupling the base 6 and the seat portion 5 is provided in order to maintain the seat portion 5 in a substantially constant inclination regardless of the aforementioned movement of the seat body 3. According to this embodiment, the coupling means is formed by the aforementioned linear portion 11 of the guide rail 8 and a coupling member 30 which is fixed to the seat portion 5. Fig. 11 shows the relation between the guide rail 8 and the coupling member 30 as viewed from a front portion of the child safety seat 1. An engaging portion 31 is provided on a lower end of the coupling member 30, to engage with the extensions 12 of the guide rail 8. The engaging portion 31 has a lateral C-shaped section, similarly to the principal part 13 of the guide member 9. This engaging portion 31 is movable along the linear portion 11 of the guide rail 8, while the coupling member 30 maintains the seat portion 5 and the linear portion 11 of the guide rail 8 at a substantially constant distance. Thus, it is possible to maintain the seat portion 5 in a substantially constant inclination regardless of the aforementioned movement of the seat body

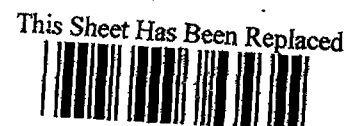
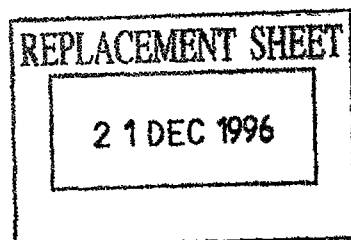


3 along an arcuate track, as understood from Figs. 1 and 2 by contrast with each other.

While the present invention has been described with reference to the embodiment shown in the drawings, some modifications are available within the scope of the present invention.

For example, the positional relation between the guide rail 8 and the guide member 9 forming the relative movement guiding mechanism 7 may be reversed so that the guide rail 8 is provided on the seat body 3 and the guide member 9 is provided on the base 6. Further, the guide member 9 may be divided into a plurality of portions, to move along the guide rail 8 respectively.

The linear portion 11 of the guide rail 8 forming a part of the coupling means for maintaining the seat portion 5 in a substantially constant inclination may be provided by a member which is independent of the arcuate portion 10 of the guide rail 8. While this coupling means comprises the coupling member 30 which slides along the linear portion 11 of the guide rail 8, the same may alternatively be replaced by a mechanism formed by a plurality of links which couples the seat portion 5 and the base 6 with each other, for example.

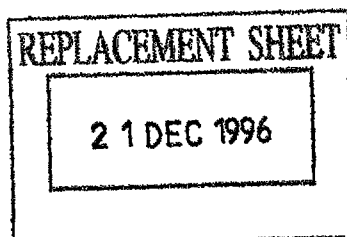




WHAT IS CLAIMED IS:

1. A child safety seat for an automobile,
comprising:
a seat body (3) forming a backrest portion (2);
a seat portion (5) being rotatably mounted on said
seat body (3);
a base (6) movably holding said seat body (3),
said base (6) and said seat body (3) being coupled
with each other by a relative movement guiding mechanism
(7) being formed by combination of a guide rail (8) having
a portion (10) arcuately extending in a vertical plane and
a guide member (9) being guided to move along said guide
rail (8),
said relative movement guiding mechanism (7)
comprising means (15, 16, 17, 18) for selectively fixing
said guide member (9) on a plurality of positions of said
guide rail (8); and
coupling means (30) for coupling said base (6) and
said seat portion (5) with each other for maintaining said
seat portion (5) in a substantially constant inclination
regardless of movement of said seat body (3).

2. A child safety seat for an automobile in
accordance with claim 1, wherein said guide rail (8) is



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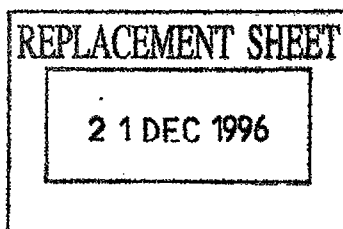
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provided on said base (6), and said guide member (9) is provided on said seat body (3).

3. A child safety seat for an automobile in accordance with claim 2, wherein said guide rail (8) has a portion (11) linearly extending from an end of said arcuately extending portion (10), said coupling means comprising a coupling member (30), being mounted on said seat portion (5), having an engaging portion (31) being movable while engaging with said linear portion (11).

4. A child safety seat for an automobile in accordance with claim 1, wherein said guide rail (8) has a U-shaped section as a whole with extensions (12) being provided on both sides thereof, said guide member (9) having a lateral C-shaped section for engaging with said extensions (12).

5. A child safety seat for an automobile in accordance with claim 1, wherein said selectively fixing means comprises a plurality of engaging holes (15, 16) being provided to be distributed longitudinally along said guide rail (8), and a locking member (18) having an engaging projection (17) being movably held by said guide member (9) to be selectively inserted in any one of said





engaging holes (15, 16) by its movement.

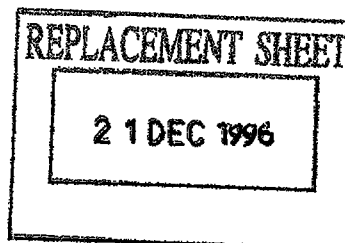
6. A child safety seat for an automobile in accordance with claim 5, further comprising a spring (20) for urging said locking member (18) to move in a direction for inserting said engaging projection (17) in any one of said engaging holes (15, 16).

7. A child safety seat for an automobile in accordance with claim 6, further comprising a cam member (23) being engageable with a part of said locking member (18) and movable in a direction perpendicular to that of movement of said locking member (18) for driving said locking member (18) in a direction for disengaging said engaging projection (17) from said any one of said engaging holes (15, 16), and an operating member (26) for providing an operation for driving said cam member (23).

8. A child safety seat for an automobile in accordance with claim 7, wherein said operating member (26) is positioned under said seat portion (5).

9. A child safety seat for an automobile in accordance with claim 8, further comprising a wire (28) for coupling said operating member (26) and said cam member (23) with each other.

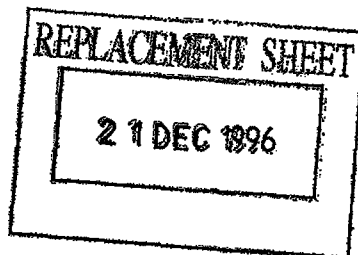
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10. A reclining seat comprising a body (3) defining a backrest portion (2) of the seat mounted to a base (6) for relative movement thereto for adjusting the angle of the backrest portion to the base, a seat portion (5) mounted to said body for movement relative thereto, and coupling means (30) coupling said seat portion with said base for maintaining said seat portion at a substantially constant inclination to said base regardless of the angle to which the backrest portion is adjusted.



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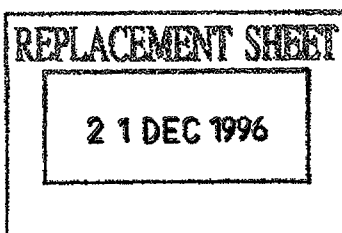


CHILD SAFETY SEAT FOR AUTOMOBILE

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ABSTRACT OF THE DISCLOSURE

A seat body (3) forming a backrest portion (2) is made arcuately movable with respect to a base (6) by a relative movement guiding mechanism (7) which is formed by combination of an arcuately extending guide rail (8) and a guide member (9) moving along the same. A seat portion (5) is rotatably mounted on the seat body (3) and a coupling member (30) is made to engage with a linear portion (11) of the guide rail (8), thereby maintaining the seat portion (5) in a substantially constant inclination regardless of movement of the seat body (3). Thus, it is possible to maintain the seat portion (5) in a substantially horizontal state also when the angle of the backrest portion (2) is adjusted, while making the backrest portion (2) reclinable without interfering with a backrest portion of an original seat provided in an automobile. Thus, a child is not forced into an uncomfortable position in an inclined state of the backrest portion (2).



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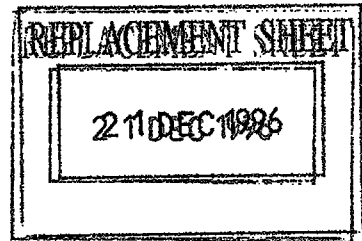
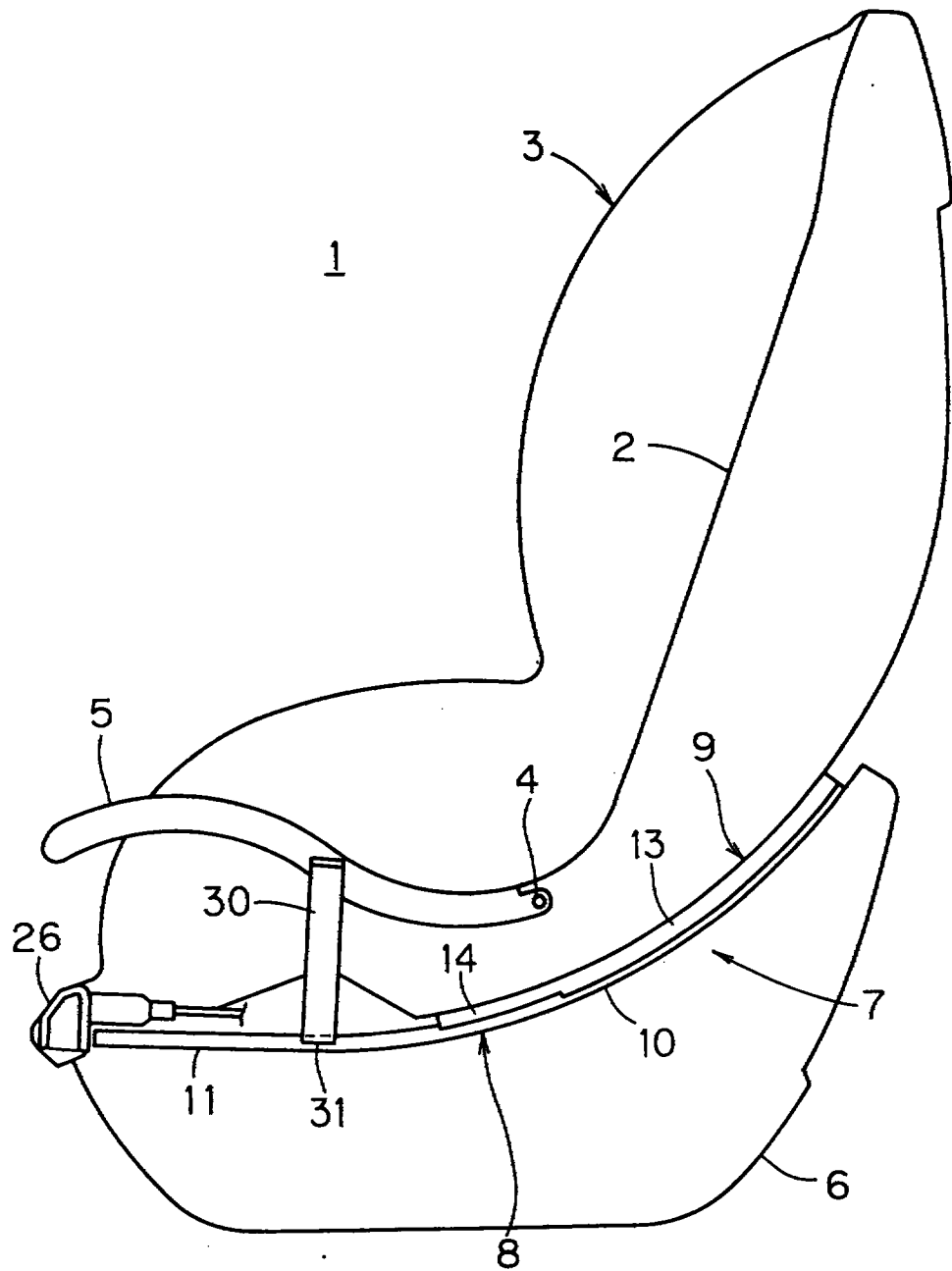


FIG. 1



6 7 10 11 13 14 26 30 31

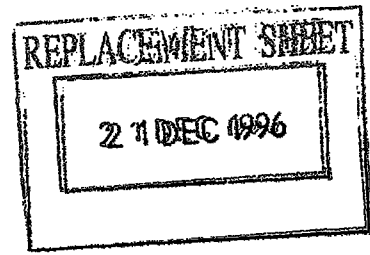
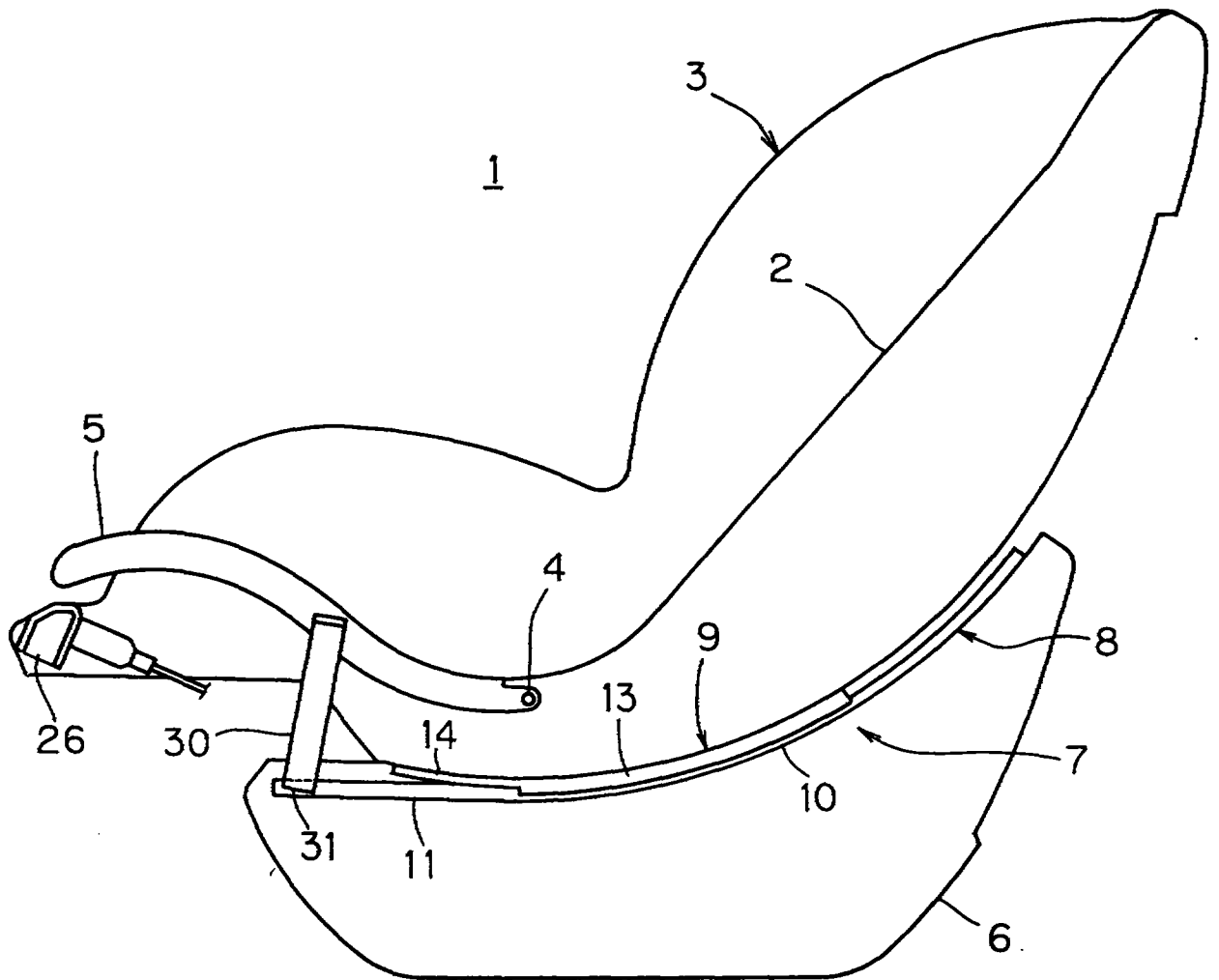


FIG. 2



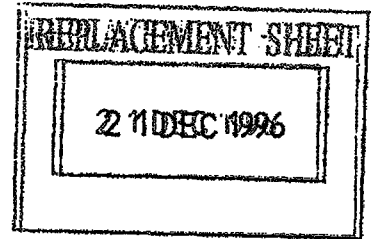


FIG. 3

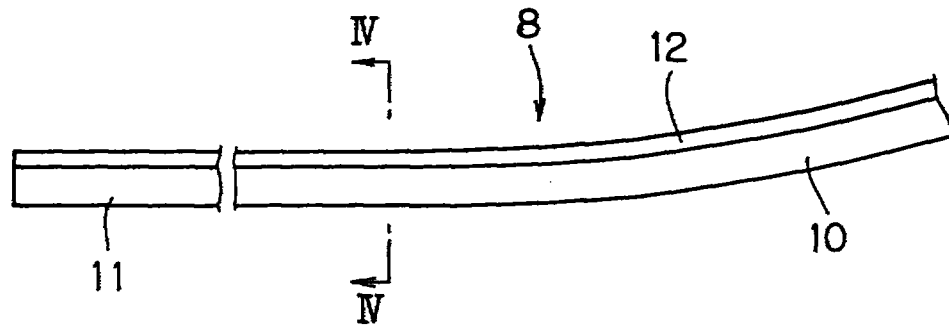


FIG. 4

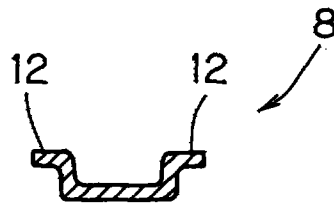


FIG. 5

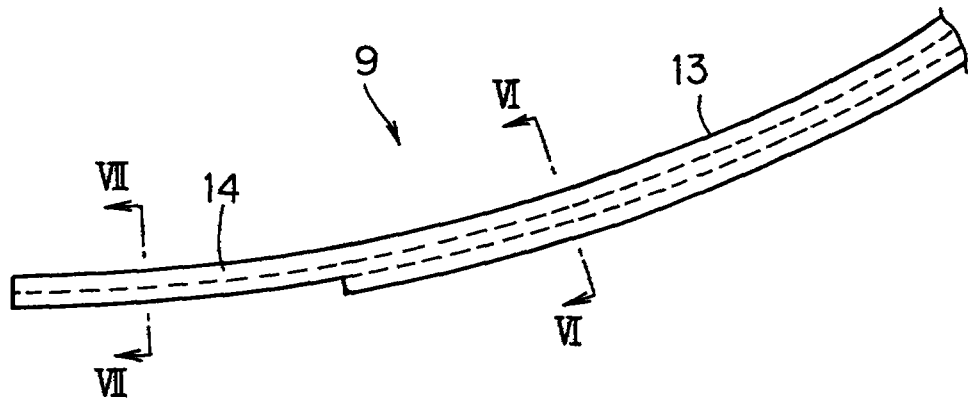
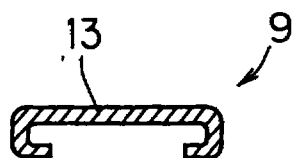


FIG. 6



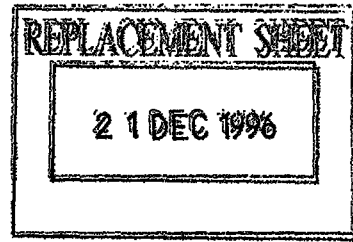


FIG. 7

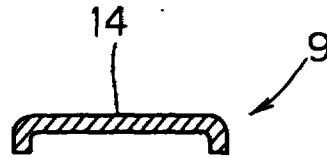


FIG. 8

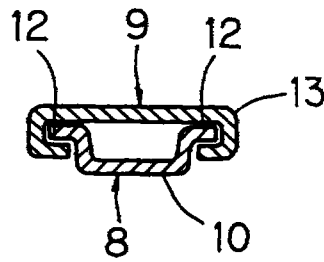
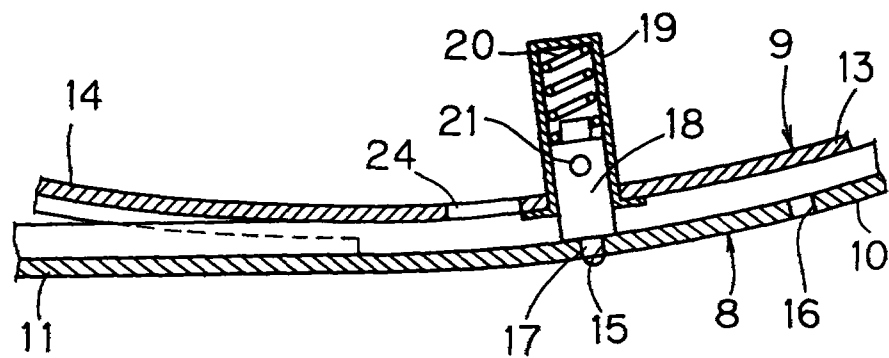


FIG. 9



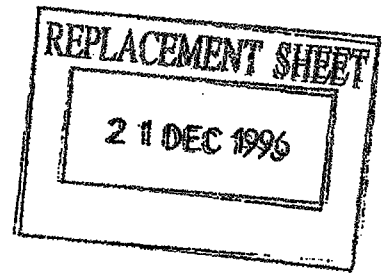
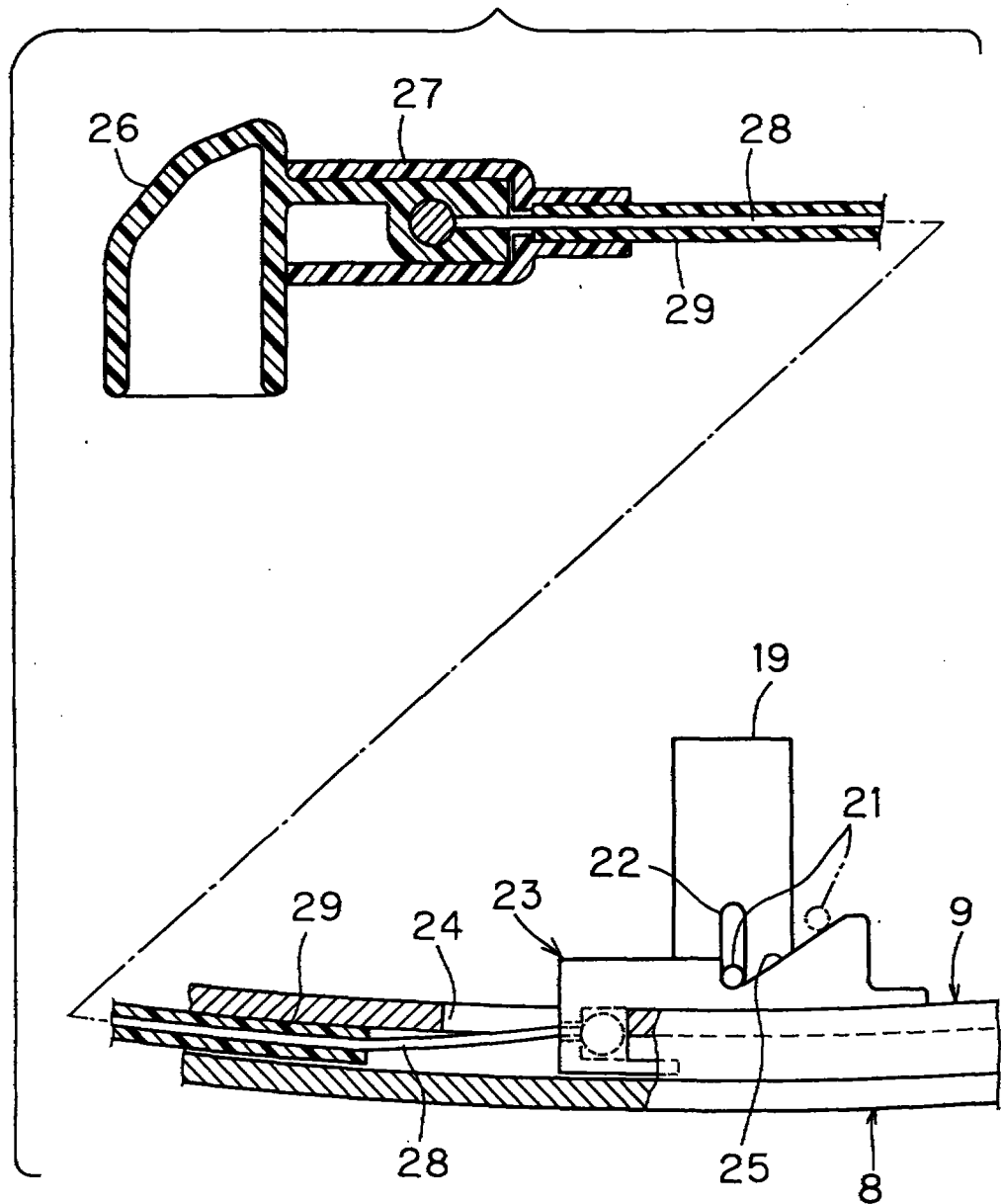


FIG. 10



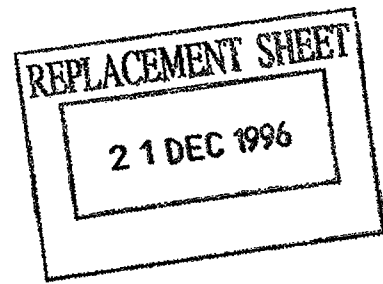
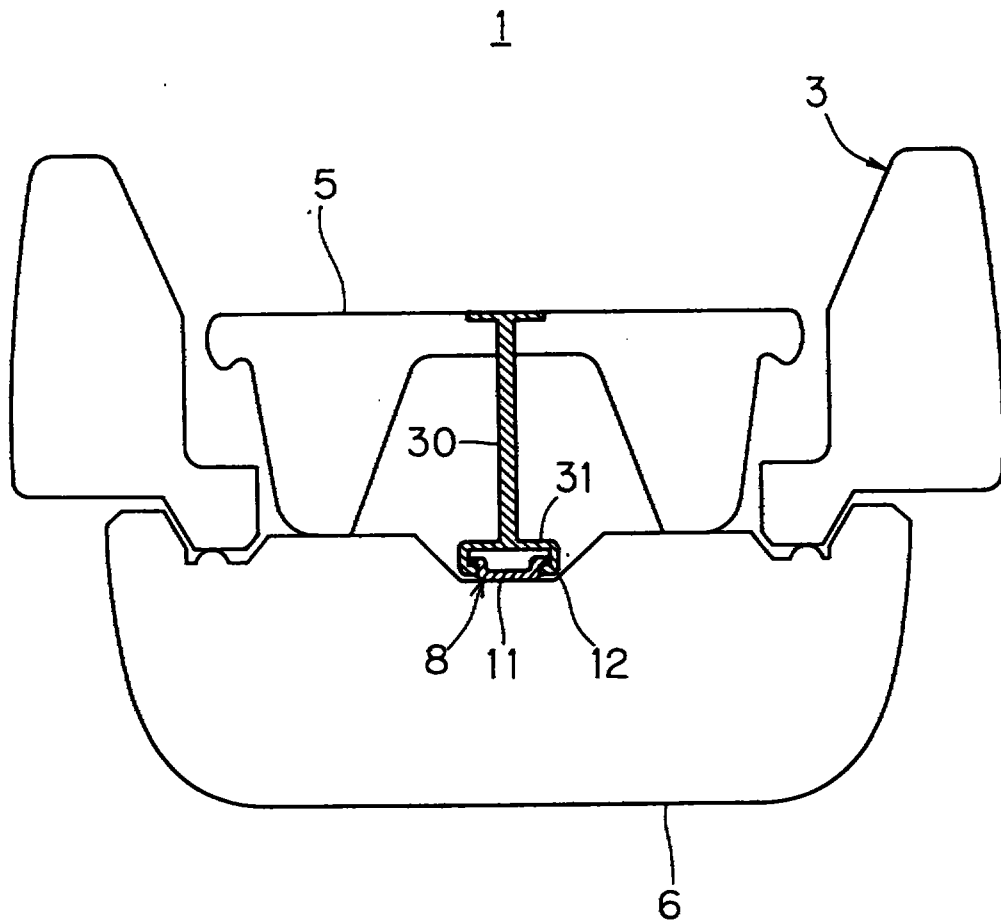


FIG. 11



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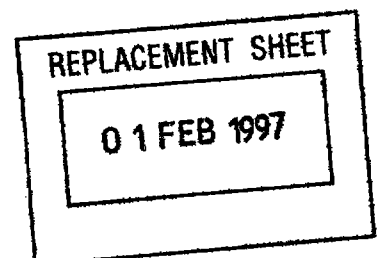
CHILD SAFETY SEAT FOR AUTOMOBILE

ABSTRACT OF THE DISCLOSURE

A seat body (3) forming a backrest portion (2) is made arcuately movable with respect to a base (6) by a relative movement guiding mechanism (7) which is formed by combination of an arcuately extending guide rail (8) and a guide member (9) moving along the same. A seat portion (5) is rotatably mounted on the seat body (3) and a coupling member (30) is made to engage with a linear portion (11) of the guide rail (8), thereby maintaining the seat portion (5) in a substantially constant inclination regardless of movement of the seat body (3). Thus, it is possible to maintain the seat portion (5) in a substantially horizontal state also when the angle of the backrest portion (2) is adjusted, while making the backrest portion (2) reclinable without interfering with a backrest portion of an original seat provided in an automobile. Thus, a child is not forced into an uncomfortable position in an inclined state of the backrest portion (2).

FIGURE 1

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REPLACEMENT SHEETS		SG
☒	Description	: paged 1 to paged 10
☒	Claim(s)	: paged 11 to paged 13
☐	Drawing(s)	: paged 14 to paged 15
☒	Abstract	: paged 16 to paged 17
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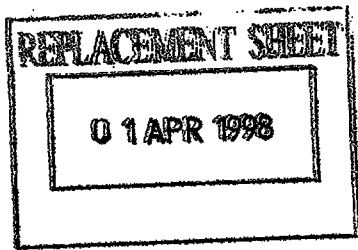
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CHILD SAFETY SEAT FOR AUTOMOBILE

The present invention relates to a child safety seat for an automobile which is mountable on an original seat of an automobile for safely seating a child in the automobile and is provided with a reclining mechanism. The present invention also relates, more generally, to a reclining seat as set forth in independent claim 10.

There is a child safety seat for an automobile which comprises a reclining mechanism for keeping a child in a comfortable position when it falls asleep on the seat, for example. Such a seat typically has a reclinable backrest portion. When this safety seat is mounted frontward on an original seat of the automobile and the angle of the backrest portion is adjusted, however, the backrest portion interferes with that of the original seat of the automobile. Therefore, the position for mounting the child safety seat on the original seat of the automobile must be changed every time the angle of the backrest portion is adjusted. In order to avoid such a trouble in adjustment of the angle of the backrest portion, there has been proposed a child safety seat for an automobile comprising a reclining mechanism having the following structure:

This type of child safety seat comprises a base which is fixed to an original seat of an automobile, and a seat body which is movably held by the base. The base is provided with a guide rail arcuately extending in a vertical plane, while the seat body is provided with a guide member



which is guided to move along the guide rail. Thus, it is possible to change the angle of inclination of the seat body without interfering with the original seat of the automobile.

The aforementioned seat body is provided with backrest and seat portions in a fixed manner. When the seat body is inclined to adjust the angle of the backrest portion, therefore, a forward end of the seat portion is also raised up.

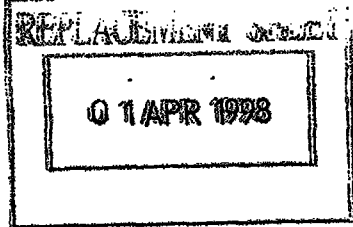
In such a state, however, the knees of the child are drawn up to apply a relatively large load on its hips, although the child can recline the upper half of its body on the backrest portion.

DE-U-9201796 cited during the examination of this application discloses a child safety seat for an automobile, comprising:

- a backrest portion and a seat portion;
- a seat body forming said backrest portion; and
- a base movably holding said seat body,

said base and said seat body being coupled with each other by a relative movement guiding mechanism being formed by combination of a guide rail having a portion arcuately extending in a vertical plane and a guide member being guided to move along said guide rail,

said relative movement guiding mechanism comprising means for selectively fixing said guide member on a plurality of positions of said guide rail.

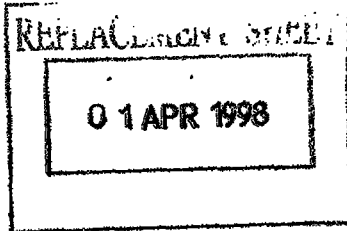


As with the proposed structure discussed above, in the seat disclosed in DE-U-9201796 the seat body forms not only the backrest portion of the seat but also the seat portion which is fixed relative to the backrest portion. Thus movement of the backrest portion to incline the same is accompanied by a corresponding movement of the seat portion as discussed above and the front end of the seat portion is raised.

An object of the invention is to enable the seat portion to be maintained at a substantially constant inclination to the base regardless of the angle to which the backrest is adjusted.

To this end the invention provides a child safety seat as defined in the last but two preceding paragraph characterised in that said seat portion is rotatably mounted to said seat body and in that coupling means are provided for coupling said base and said seat portion with each other for maintaining said seat portion in a substantially constant inclination regardless of movement of said seat body.

The invention also includes a reclining seat comprising a seat body defining a backrest portion of the seat mounted to a base for relative movement thereto along an arcuate path for adjusting the angle of the backrest portion to the base, characterised by a seat portion rotatably mounted to said seat body for movement relative thereto, and coupling means coupling said seat portion with said base for



maintaining said seat portion at a substantially constant inclination to said base regardless of the angle to which the backrest portion is adjusted.

In order that the invention may be well understood, an embodiment thereof which is given by way of example only, will now be described with reference to the accompanying drawings, in which:

Fig. 1 is a longitudinal sectional view schematically showing a child safety seat 1 for an automobile according to an embodiment of the present invention as viewed from a side portion;

Fig. 2 is a longitudinal sectional view corresponding to Fig. 1, showing a seat body 3 in a position different from that shown in Fig. 1 with respect to a base 6;

Fig. 3 is an enlarged view showing a part of a guide rail 8;

Fig. 4 is a sectional view taken along the line IV - IV in Fig. 3;

Fig. 5 is an enlarged view showing a part of a guide member 9;

Fig. 6 is a sectional view taken along the line VI - VI in Fig. 5;

Fig. 7 is a sectional view taken along the line VII - VII in Fig. 5;

Fig. 8 is a sectional view showing the guide rail 8 and the guide member 9 which are in engagement with each other;

Fig. 9 is a sectional view showing a locking member 18 which is provided in relation to the guide member 9;

Fig. 10 is a sectional view showing a structure for controlling movement of the locking member 18 shown in Fig. 9; and

Fig. 11 is a sectional view schematically showing a structure for maintaining a seat portion 5 in a substantially constant inclination as viewed from a front portion of the child safety seat 1.

Figs. 1 and 2 are longitudinal sectional views schematically showing a child safety seat 1 for an automobile according to an embodiment of the present invention. A cushion member, a cover member etc. which are generally provided in such a child safety seat 1 are not shown in these figures.

This safety seat 1 comprises a seat body 3 forming a backrest portion 2, a seat portion 5 which is mounted to the seat body 3 to be rotatable about a pivot portion 4, and a base 6 movably holding the seat body 3. The base 6 is fixed to an originally seat (not shown) of an automobile through a safety belt which is already provided on the original seat or the like.

The seat body 3 and the base 6 movably holding the same are coupled with each other by a relative movement guiding mechanism 7. The relative movement guiding mechanism 7 is formed by combination of a guide rail 8 and a guide member 9. According to this embodiment, the guide rail 8 is provided on the base 6, and the guide member 9 is provided on the seat body 3.

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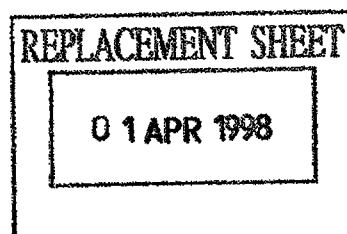
The guide rail 8 is formed by an arcuate portion 10 arcuately extending in a vertical plane, and a linear portion 11 linearly extending from one end of the arcuate portion 10. Fig. 3 shows a part of the guide rail 8 in an enlarged manner, and Fig. 4 shows a sectional view taken along the line IV - IV in Fig. 3. The guide rail 8 has a U-shaped section as a whole, with extensions 12 provided on both sides thereof..

Fig. 5 shows a part of the guide member 9 in an enlarged manner, and Figs. 6 and 7 show sectional views taken along the lines VI - VI and VII - VII in Fig. 5 respectively.

The guide member 9 arcuately extends in correlation with the arcuate portion 10 of the aforementioned guide rail 8. As shown in Fig. 6, a principal part 13 of the guide member 9 has a lateral C-shaped section, to engage with the extensions 12 of the guide rail 8 as shown in Fig. 8. Thus, the guide member 9 can move along the guide rail 8.

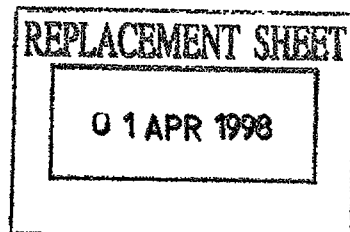
An end 14 of the guide member 9 has a section shown in Fig. 7, not to engage with the guide rail 8. While such an end 14 is adapted to reinforce the seat body 3, it is not particularly necessary to form the same.

The relative movement guiding mechanism 7 also comprises means for selectively fixing the guide member 9 on a plurality of positions of the guide rail 8. According to this embodiment, the selective fixing means is provided by the following structure:



Referring to Fig. 9, the guide rail 8 has a plurality of engaging holes 15, 16, ... which are distributed along its longitudinal direction. On the other hand, the guide member 9 carries a locking member 18 provided with an engaging projection 17 which is movable for selective insertion in any one of the engaging holes 15, 16, The locking member 18 is movably guided in a guide case 19 which is fixed to the guide member 9, and urged by a spring 20 to move in a direction for inserting the engaging projection 17 in any one of the engaging holes 15, 16, The locking member 18 is provided with a part engageable with a cam member 23 which is movable in a direction perpendicular to that of the movement of the locking member 18 for driving the locking member in a direction for disengaging said engaging portion 17 from an engaging hole 15, 16 This part comprises an engaging pin 21 which, as shown in Fig. 10, passes through a slot 22 which is provided in the guide case 19, to outwardly project from the guide case 19 and engage the cam member 23.

In order to allow the aforementioned movement of the locking member 18, the structure shown in Fig. 10 is employed. Referring to Fig. 10, the cam member 23 is arranged to be movable along the guide member 9. The cam member 23 is partially received in a hole 24 which is formed in the guide member 9, to be movable in a range of extension of the hole 24. The cam member 23 is provided with a cam surface 25, which is in an inclined state, for engaging with the aforementioned engaging pin 21.



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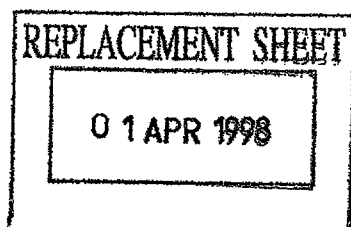
An operation for making the aforementioned cam member 23 move along the guide member 9 is provided by an operating member 26. As shown in Figs. 1 and 2, the operating member 26 is positioned on a forward end of the seat body 3 under the seat portion 5. This operating member 26 is horizontally movably held by a guide sleeve 27 which is fixed to the seat body 3. The operating member 26 is coupled with the aforementioned cam member 23 by a wire 28. The wire 28 is covered with an outer tube 29, which is fixed to the guide sleeve 27 and the guide member 9 respectively.

When an operator frontwardly pulls the operating member 26, this movement is transmitted to the cam member 23 through the wire 28. Thus, the cam member 23 frontwardly moves similarly to the operating member 26. Due to this movement of the cam member 23, the engaging pin 21 positioned on the cam face 25 is upwardly displaced as shown by a phantom line in Fig. 10. Consequently, the locking member 18 shown in Fig. 9 disengages the engaging projection 17 from the engaging hole 15, for example, against elasticity of the spring 20. Thus, the guide member 9 is movable with respect to the guide rail 8. During this movement, the force applied to the operating member 26 may be removed. When the engaging projection 17 is aligned with any one of the engaging holes 15, 16, ..., the locking member 18 is displaced to insert the same in the corresponding one of the engaging holes 15, 16, ... along elasticity of the spring 20. Due to such displacement of the locking member 18, the engaging pin 21 engaging with the

cam face 25 forces the cam member 23 into the state shown in Fig. 10, so that the operating member 26 is returned to its original state in response.

Coupling means for coupling the base 6 and the seat portion 5 is provided in order to maintain the seat portion 5 in a substantially constant inclination regardless of the aforementioned movement of the seat body 3. According to this embodiment, the coupling means is formed by the aforementioned linear portion 11 of the guide rail 8 and a coupling member 30 which is fixed to the seat portion 5. Fig. 11 shows the relation between the guide rail 8 and the coupling member 30 as viewed from a front portion of the child safety seat 1. An engaging portion 31 is provided on a lower end of the coupling member 30, to engage with the extensions 12 of the guide rail 8. The engaging portion 31 has a lateral C-shaped section, similarly to the principal part 13 of the guide member 9. This engaging portion 31 is movable along the linear portion 11 of the guide rail 8, while the coupling member 30 maintains the seat portion 5 and the linear portion 11 of the guide rail 8 at a substantially constant distance. Thus, it is possible to maintain the seat portion 5 in a substantially constant inclination regardless of the aforementioned movement of the seat body 3 along an arcuate track, as understood from Figs. 1 and 2 by contrast with each other.

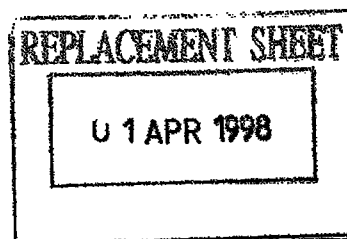
While the present invention has been described with reference to the embodiment shown in the drawings, some modifications are available within the scope of the present invention.



For example, the positional relation between the guide rail 8 and the guide member 9 forming the relative movement

guiding mechanism 7 may be reversed so that the guide rail 8 is provided on the seat body 3 and the guide member 9 is provided on the base 6. Further, the guide member 9 may be divided into a plurality of portions, to move along the guide rail 8 respectively.

The linear portion 11 of the guide rail 8 forming a part of the coupling means for maintaining the seat portion 5 in a substantially constant inclination may be provided by a member which is independent of the arcuate portion 10 of the guide rail 8. While this coupling means comprises the coupling member 30 which slides along the linear portion 11 of the guide rail 8, the same may alternatively be replaced by a mechanism formed by a plurality of links which couples the seat portion 5 and the base 6 with each other, for example.

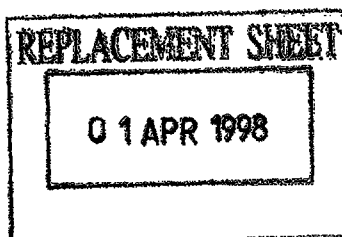


**CLAIMS:**

1. A child safety seat for an automobile, comprising:
a backrest portion (2) and a seat portion (5);
a seat body (3) forming said backrest portion (2);
a base (6) movably holding said seat body (3),
said base (6) and said seat body (3) being coupled with
each other by a relative movement guiding mechanism (7)
being formed by combination of a guide rail (8) having a
portion (10) arcuately extending in a vertical plane and a
guide member (9) being guided to move along said guide
rail (8);

said relative movement guiding mechanism (7) comprising
means (15, 16, 17, 18) for selectively fixing said guide
member (9) on a plurality of positions of said guide rail
(8); characterised in that said seat position (5) is
rotatably mounted to said seat body (3) and in that coupling
means (30) are provided for coupling said base (6) and said
seat portion (5) with each other for maintaining said seat
portion (5) in a substantially constant inclination
regardless of movement of said seat body (3).

2. A child safety seat for an automobile in accordance
with claim 1, wherein said guide rail (8) is provided on
said base (6), and said guide member (9) is provided on said
seat body (3).



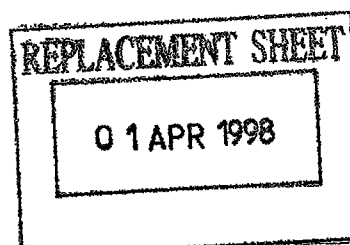


3. A child safety seat for an automobile in accordance with claim 2, wherein said guide rail (8) has a portion (11) linearly extending from an end of said arcuately extending portion (10), said coupling means comprising a coupling member (30), being mounted on said seat portion (5), having an engaging portion (31) being movable while engaging with said linear portion (11).

4. A child safety seat for an automobile in accordance with claim 1, 2 or 3 wherein said guide rail (8) has a U-shaped section as a whole with extensions (12) being provided on both sides thereof, said guide member (9) having a lateral C-shaped section for engaging with said extensions (12).

5. A child safety seat for an automobile in accordance with anyone of claims 1 to 4, wherein said selectively fixing means comprises a plurality of engaging holes (15, 16) being provided to be distributed longitudinally along said guide rail (8), and a locking member (18) carried by said guide member (9) and having an engaging projection (17) which is movable for selective insertion in any one of said engaging holes (15, 16).

6. A child safety seat for an automobile in accordance with claim 5, further comprising a spring (20) for urging said locking member (18) to move in a direction for inserting said engaging projection (17) in any one of said engaging holes (15, 16).

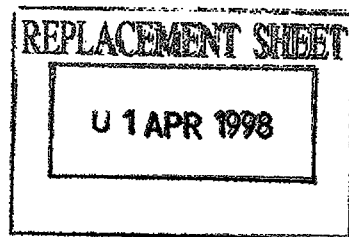




7. A child safety seat for an automobile in accordance with claim 6, further comprising a cam member (23) engageable with a part (21) of said locking member (18) and movable in a direction perpendicular to that of movement of said locking member (18) for driving said locking member (18) in a direction for disengaging said engaging projection (17) from said any one of said engaging holes (15, 16), and an operating member (26) for providing an operation for driving said cam member (23).

8. A child safety seat for an automobile in accordance with claim 7, wherein said operating member (26) is positioned under said seat portion (5).

9. A child safety seat for an automobile in accordance with claim 8, further comprising a wire (28) for coupling said operating member (26) and said cam member (23) with each other.



CHILD SAFETY SEAT FOR AUTOMOBILE

ABSTRACT OF THE DISCLOSURE

A seat body (3) forming a backrest portion (2) is made arcuately movable with respect to a base (6) by a relative movement guiding mechanism (7) which is formed by combination of an arcuately extending guide rail (8) and a guide member (9) moving along the same. A seat portion (5) is rotatably mounted on the seat body (3) and a coupling member (30) is made to engage with a linear portion (11) of the guide rail (8), thereby maintaining the seat portion (5) in a substantially constant inclination regardless of movement of the seat body (3). Thus, it is possible to maintain the seat portion (5) in a substantially horizontal state also when the angle of the backrest portion (2) is adjusted, while making the backrest portion (2) reclinable without interfering with a backrest portion of an original seat provided in an automobile. Thus, a child is not forced into an uncomfortable position in an inclined state of the backrest portion (2).

FIGURE 1

