A cushion system for use with a child safety seat has a plurality of bladders assembled to form a seat cushion that cooperates with the seat’s safety harness. One or more sensors coupled to the safety harness sense tension therein and generate a signal indicative of the tension. Each of the bladders is individually pressurized by a pressurization system to define a support configuration of the seat cushion. The pressurization system is disabled when tension in the safety harness has attained a threshold level.

21 Claims, 2 Drawing Sheets
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CUSHION SYSTEM FOR MULTI-USE CHILD SAFETY SEAT

ORIGIN OF THE INVENTION

The invention was made by employees of the United States Government and may be manufactured and used by or for the Government for governmental purposes without the payment of any royalties.

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to child safety seats. More specifically, the invention is adjustable cushion system for use with a child safety seat designed for a variety of uses.

2. Description of the Related Art

Over the years, the child safety seat has evolved from designs used exclusively in a vehicle to designs that provide for multiple uses. More specifically, today's child safety seats include a variety of mechanisms and/or attachments that allow the seat to be adapted for a variety of uses to include, for example, a car seat, a stroller, a high chair, a rocker, a bed, etc. In general, each adaptation changes the orientation of the seat to position the child sitting therein in one of a recumbent orientation, an upright orientation, or something in between. However, while seat orientations change, there is no mechanism to adjust the support provided by the seat as the conventional child safety seat comprises a foam-backed seat cushion fitted over a rigid frame.

SUMMARY OF THE INVENTION

Accordingly, it is an object of the present invention to provide a cushion system for a multi-use child safety seat.

Another object of the present invention is to provide a child safety seat cushion system that can be configured to provide a variety of support configurations in accordance with various orientations of the child safety seat.

Still another object of the present invention is to provide a child safety seat cushion system that can be configured to provide a variety of support configurations to thereby keep a child comfortable.

Other objects and advantages of the present invention will become more obvious hereinafter in the specification and drawings.

In accordance with the present invention, a cushion system for use with a child safety seat has a plurality of bladders assembled to form a seat cushion. The seat cushion is adapted to be positioned in a child safety seat equipped with a safety harness and cooperate with the safety harness so that a child sitting on the seat cushion can be secured by the safety harness. One or more sensors are coupled to the safety harness to sense tension therein and generate a signal indicative of the tension. Each of the bladders is individually pressurized by a pressurization system to define a support configuration of the seat cushion. The pressurization system is coupled to the sensors and is responsive to their signals. Specifically, the pressurization system is disabled when the signal indicates that the tension in the safety harness has attained a threshold level.

BRIEF DESCRIPTION OF THE DRAWING(S)

Other objects, features and advantages of the present invention will become apparent upon reference to the following description of the preferred embodiments and to the drawings, wherein corresponding reference characters indicate corresponding parts throughout the several views of the drawings and wherein:

FIG. 1 is a perspective view of a conventional child safety seat;
FIG. 2 is a schematic view of the cushion system for a child safety seat in accordance with an embodiment of the present invention; and
FIG. 3A is a side view of two bladders joined by a hook-and-loop fastener system;
FIG. 3B is a side view of two bladders joined by a zipper; and
FIG. 3C is a side view of two bladders joined by snaps.

DESCRIPTION OF THE PREFERRED EMBODIMENT(S)

Referring now to the drawings, and more particularly to FIG. 1, a conventional child safety seat is shown and referenced generally by numeral 10. Child safety seat 10 is representative of any child safety seat design defined by a rigid seat body 12 and a harness 14 having straps 14A pulled over a child's shoulders and upper body and locked to seat body 12 via a lockable coupling 14B. A conventional foam/fabric seat cushion 16 can be provided on seat body 12. It is to be understood that the present invention is in no way limited by the design of child safety seat 10 and that the present invention can be incorporated into any type of child safety seat. For example, seat body 12 can be made from metal, molded plastic, or a combination of metal and molded plastic. The particular configuration of seat body 12 does not limit the present invention. Harness 14 can be configured in a variety of other ways and also does not limit the present invention. Seat cushion 16 can be included or eliminated when using the present invention.

Referring now to FIG. 2, a cushion system for use with a safety seat (e.g., seat 10) is shown and is referenced generally by numeral 100. It is to be understood that cushion system 100 can be used with any existing child safety seat or can be incorporated into the structure of any new child safety seat. Although not a requirement of the present invention, it will be assumed herein that cushion system 100 will be used with a child safety seat that is adaptable to multiple uses such as a car seat, stroller, high chair, bed, rocker, etc. In general, cushion system 100 is designed to keep a child (positioned therein) comfortable and properly supported regardless of the safety seat use and orientation.

Cushion system 100 has a plurality of bladders 102 that, when joined or assembled together, form a seat cushion. Each of bladders 102 is individually pressurized with a pressurization system to define a support configuration of the seat cushion. The pressurization system is coupled to the sensors and is responsive to their signals. Specifically, the pressurization system is disabled when the signal indicates that the tension in the safety harness has attained a threshold level.
Each of bladders 102 is individually filled or pressurized by a compressor 106 that supplies pressurized air to a central valve system 108. Controller 110 can be used to control the compressor 106 and to regulate pressurization of each of bladders 102. The support configurations provided by the cushion system 100 can be regulated for maximum child comfort. As a result, the child will be happier when in the child safety seat. When a car seat is equipped with the present invention, the child's comfort translates into general happiness which, in turn, allows a parent/driver of a vehicle to concentrate on driving situations.

Although the invention has been described relative to a specific embodiment thereof, there are numerous variations and modifications that will be readily apparent to those skilled in the art in light of the above teachings. For example, controllers and sensors can be coupled to a child's harness to provide additional safeguards. It is to be understood that these are merely exemplary situations and that the particular bladder pressurizations and resulting support configurations, as well as the number thereof, are not limitations of the present invention.

What is claimed is new and desired to be secured by Letters Patent of the United States is:

1. A cushion system for use with a child safety seat, comprising:
   a plurality of bladders assembled to form a seat cushion adapted to be (i) positioned in a child safety seat equipped with a safety harness and (ii) cooperative with the safety harness;
   sensing means adapted to be coupled to the safety harness for sensing tension therein and for generating a signal indicative of said tension and pressurizing means for individually pressurizing each of said plurality of bladders wherein a support configuration of said seat cushion is defined, said pressurizing means coupled to said sensing means and responsive to said signal wherein said pressurizing means is disabled when said signal indicates that said tension has attained a threshold level.

2. A cushion system as in claim 1 further comprising a moisture wicking material covering said seat cushion.

3. A cushion system as in claim 1 wherein said pressurizing means comprises:
   a compressor for generating pressurized air; and
   valve means coupled between said compressor and each of said plurality of bladders, said valve means having operating positions that permit (i) introduction of said pressurized air from said compressor into selected ones of said plurality of bladders, (ii) egress of said pressurized air from selected ones of said plurality of
bladders, and (iii) sealing of said plurality of bladders wherein said pressurized air is retained therein; and a controller coupled to said valve means for controlling said operating positions to achieve said support configuration.

4. A cushion system as in claim 1 wherein said pressurizing means is programmed with a plurality of pre-defined pressures for each of said plurality of bladders wherein a corresponding plurality of support configurations are defined.

5. A cushion system as in claim 1 further comprising user controls coupled to said pressurizing means for receiving instructions governing the pressurizing of each of said plurality of bladders to define said support configuration.

6. A cushion system as in claim 5 wherein said user controls comprise at least one of (i) manually-operated controls, (ii) voice-activated controls, and (iii) remotely-operated controls.

7. A cushion system as in claim 1 further comprising an alarm coupled to said sensing means for generating at least one of an audible alarm and a visible alarm when said signal indicates that said tension has attained a threshold level.

8. A cushion system for use with a child safety seat, comprising:

- a plurality of individually-inflatable bladders;

- assembly means coupled to said plurality of bladders for facilitating assembly of said plurality of bladders into a seat cushion adapted to be positioned in a child safety seat equipped with a safety harness, said assembly means permitting passage of the safety harness through said seat cushion;

- sensing means adapted to be coupled to the safety harness for sensing tension therein and for generating a signal indicative of said tension; and

- pressurizing means for individually pressurizing each of said plurality of bladders wherein a support configuration of said seat cushion is defined, said pressurizing means coupled to said sensing means and responsive to said signal wherein said pressurizing means is disabled when said signal indicates that said tension has attained a threshold level.

9. A cushion system as in claim 8 further comprising a moisture wicking material covering said seat cushion.

10. A cushion system as in claim 8 wherein said pressurizing means comprises:

- a compressor for generating pressurized air;

- valve means coupled between said compressor and each of said plurality of bladders, said valve means having operating positions that permit (i) introduction of said pressurized air from said compressor into selected ones of said plurality of bladders, (ii) egress of said pressurized air from selected ones of said plurality of bladders, and (iii) sealing of said plurality of bladders wherein said pressurized air is retained therein; and

- a controller coupled to said valve means for controlling said operating positions to achieve said support configuration.

11. A cushion system as in claim 8 wherein said pressurizing means is programmed with a plurality of pre-defined pressures for each of said plurality of bladders wherein a corresponding plurality of support configurations are defined.

12. A cushion system as in claim 8 further comprising user controls coupled to said pressurizing means for receiving instructions governing the pressurizing of each of said plurality of bladders to define said support configuration.

13. A cushion system as in claim 12 wherein said user controls comprise at least one of (i) manually-operated controls, (ii) voice-activated controls, and (iii) remotely-operated controls.

14. A cushion system as in claim 8 further comprising an alarm coupled to said sensing means for generating at least one of an audible alarm and a visible alarm when said signal indicates that said tension has attained a threshold level.

15. A cushioned child safety seat, comprising:

- a child safety seat having a safety harness;

- a plurality of bladders positioned in said child safety seat to form a seat cushion therefor;

- sensing means adapted to be coupled to said safety harness for sensing tension therein and for generating a signal indicative of said tension; and

- pressurizing means for individually pressurizing each of said plurality of bladders wherein a support configuration of said seat cushion is defined, said pressurizing means coupled to said sensing means and responsive to said signal wherein said pressurizing means is disabled when said signal indicates that said tension has attained a threshold level.

16. A cushioned child safety seat as in claim 15 further comprising a moisture wicking material covering said seat cushion.

17. A cushioned child safety seat as in claim 15 wherein said pressurizing means comprises:

- a compressor for generating pressurized air;

- valve means coupled between said compressor and each of said plurality of bladders, said valve means having operating positions that permit (i) introduction of said pressurized air from said compressor into selected ones of said plurality of bladders, (ii) egress of said pressurized air from selected ones of said plurality of bladders, and (iii) sealing of said plurality of bladders wherein said pressurized air is retained therein; and

- a controller coupled to said valve means for controlling said operating positions to achieve said support configuration.