US 20090188045A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2009/0188045 A1

(43) Pub. Date: Jul. 30, 2009

Anikin

(54) UNDER-THIGH SUPPORT

(76) Inventor: **Sergey Anikin**, Atherton, CA (US)

Correspondence Address:
Sergey Anikin
87 Walnut Avenue
Atherton, CA 94027 (US)

(21) Appl. No.: **12/011,316**

(22) Filed: **Jan. 26, 2008**

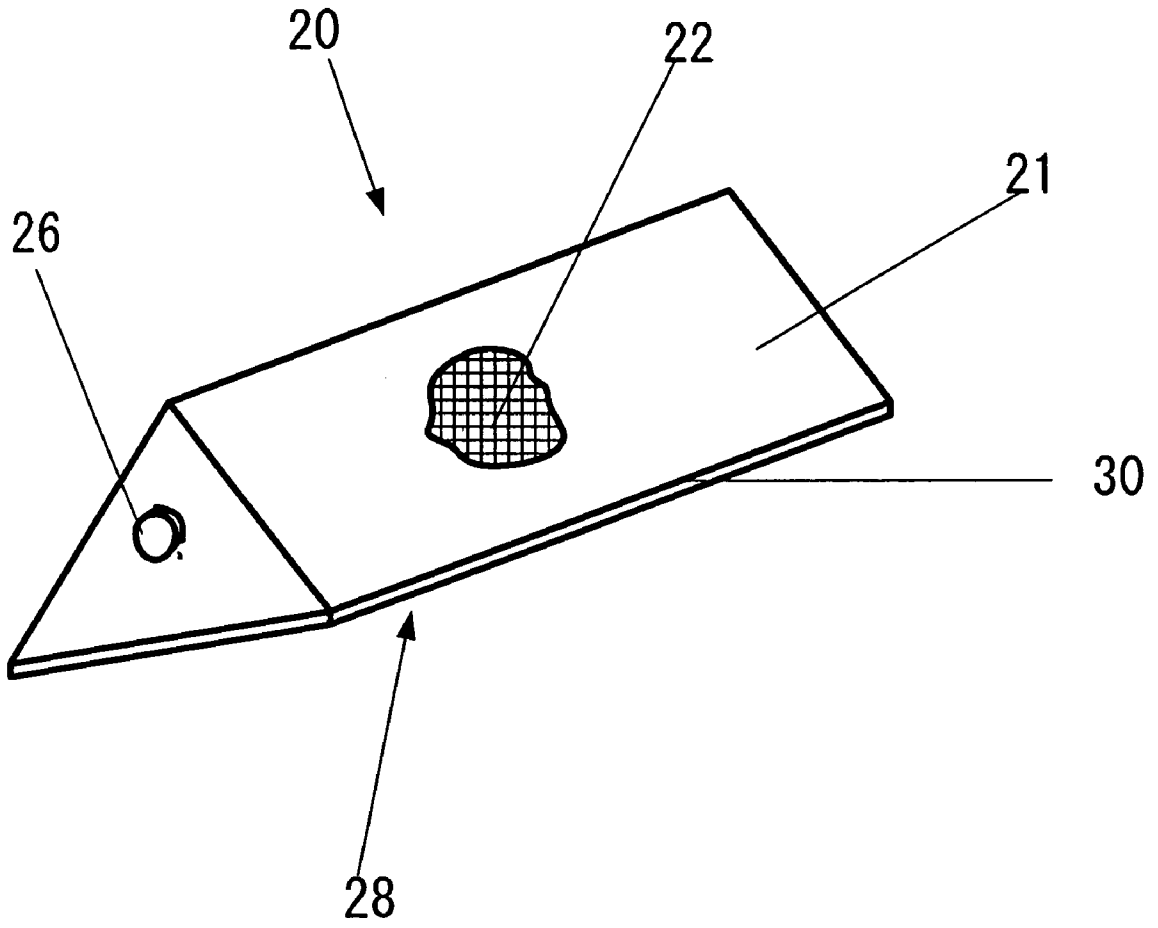
Publication Classification

(51) **Int. Cl.**
A47C 20/02 (2006.01)
A47C 7/02 (2006.01)

(52) **U.S. Cl.** **5/654**; 297/284.1

(57) **ABSTRACT**

A self-inflatable under-thigh support used in combination with a car seat for use by a driver of a vehicle in order to shorten brake-activation reaction time and reduce pressure on the lower side of the thigh for improving blood circulation. The under-thigh support is made in the form of an elongated body of a triangular cross-section that consists of an air-proof inner casing made from a non-stretchable flexible material and a squeezable foam plastic that fills the interior of the casing. The casing is provided with a valve that can be opened for squeezing the pad to a compressed state and then closed for preserving the pad in a compressed state convenient for storage and transportation. For use of the pad, the valve is opened, the squeezed foam plastic is expanded, and then the valve is closed, whereby the pad is maintained in a predetermined shape and with a predetermined rigidity.



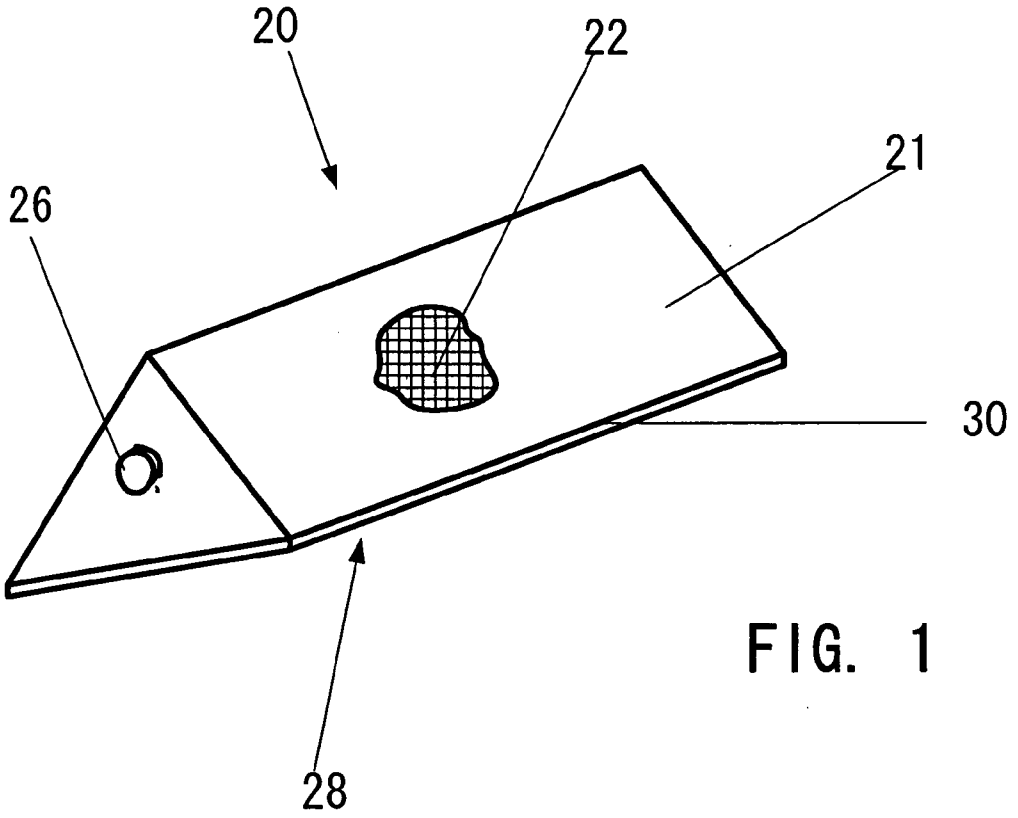


FIG. 1

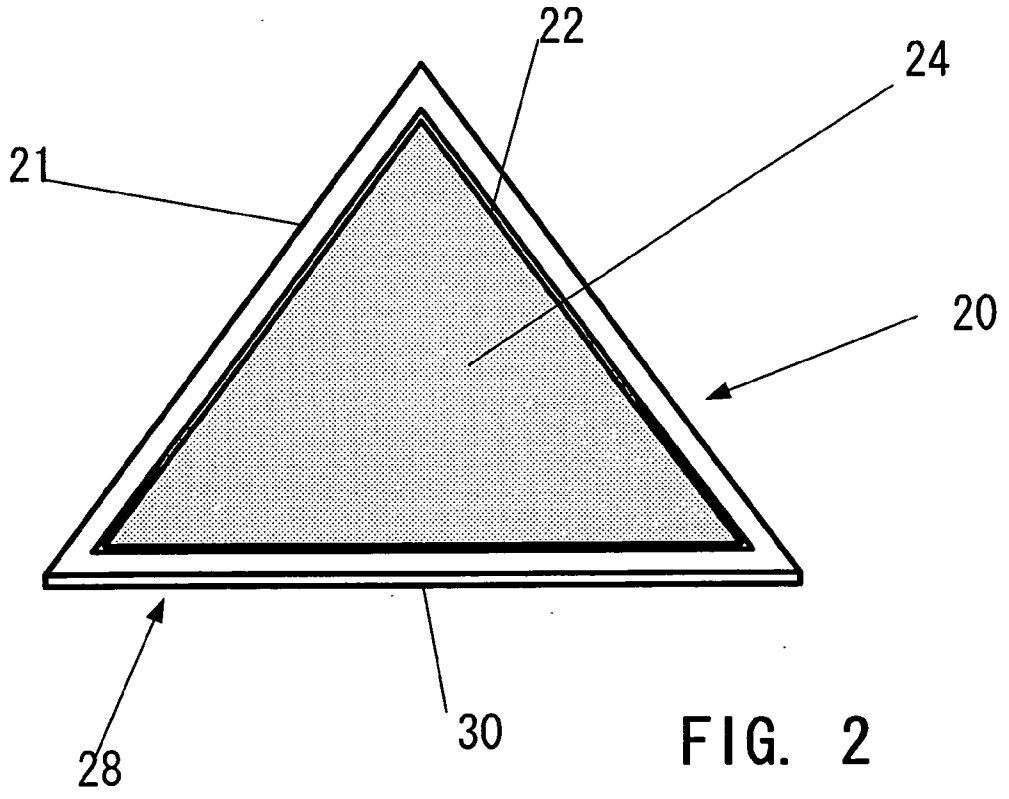


FIG. 2

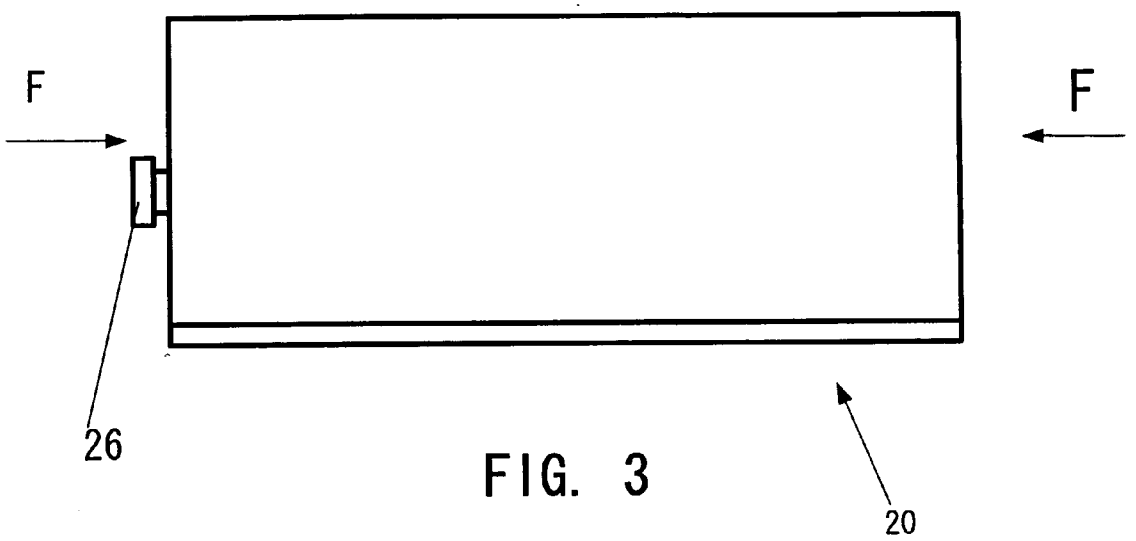


FIG. 3

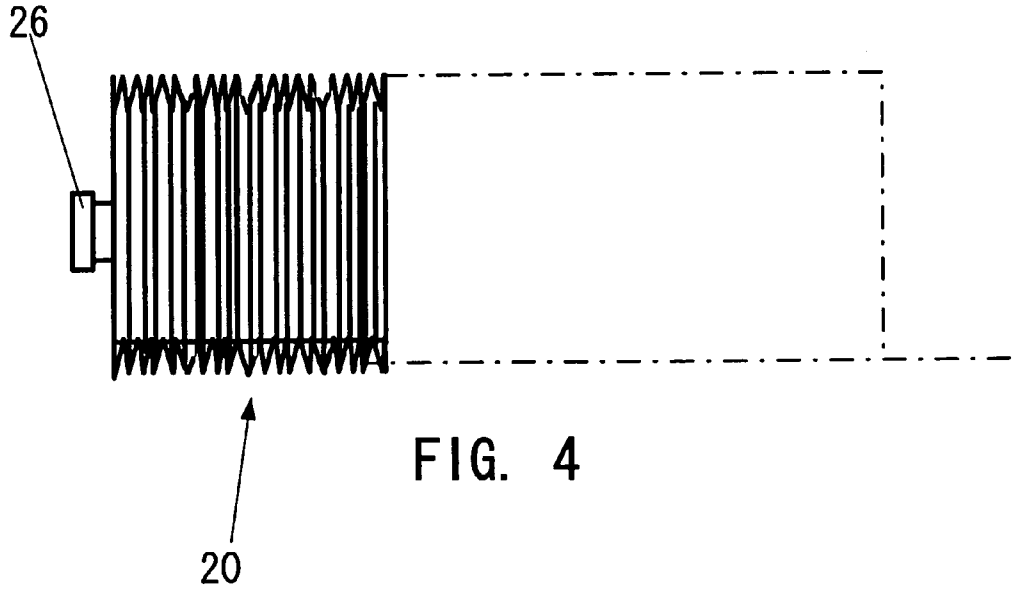


FIG. 4

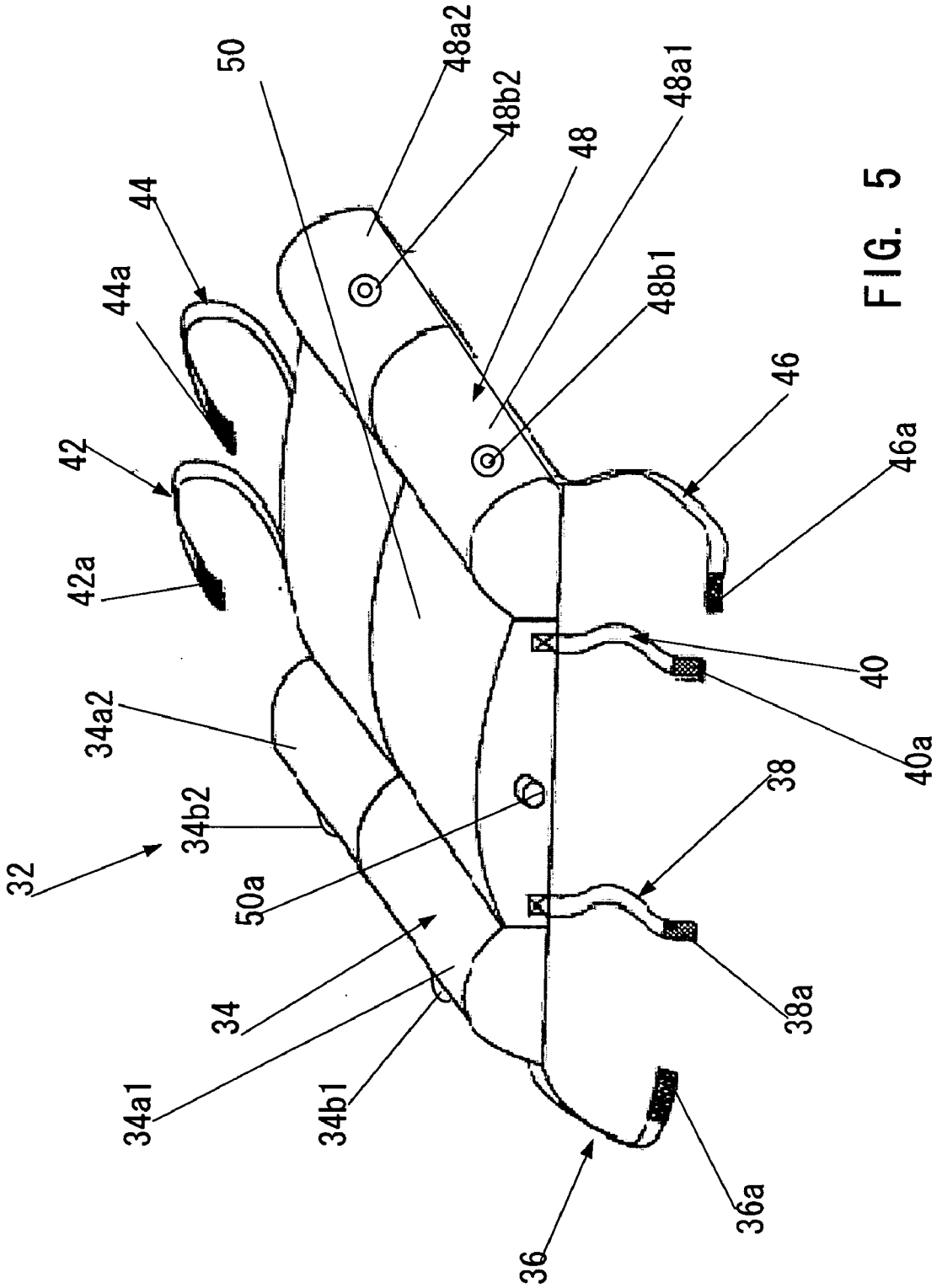

50
48a2
48b2
48
48a1
44
44a
48b1
46
42
46a
42a
40
34a2
40a
38
34b2
32
50a
34
38a
34a1
34b1
36a
36

FIG. 5

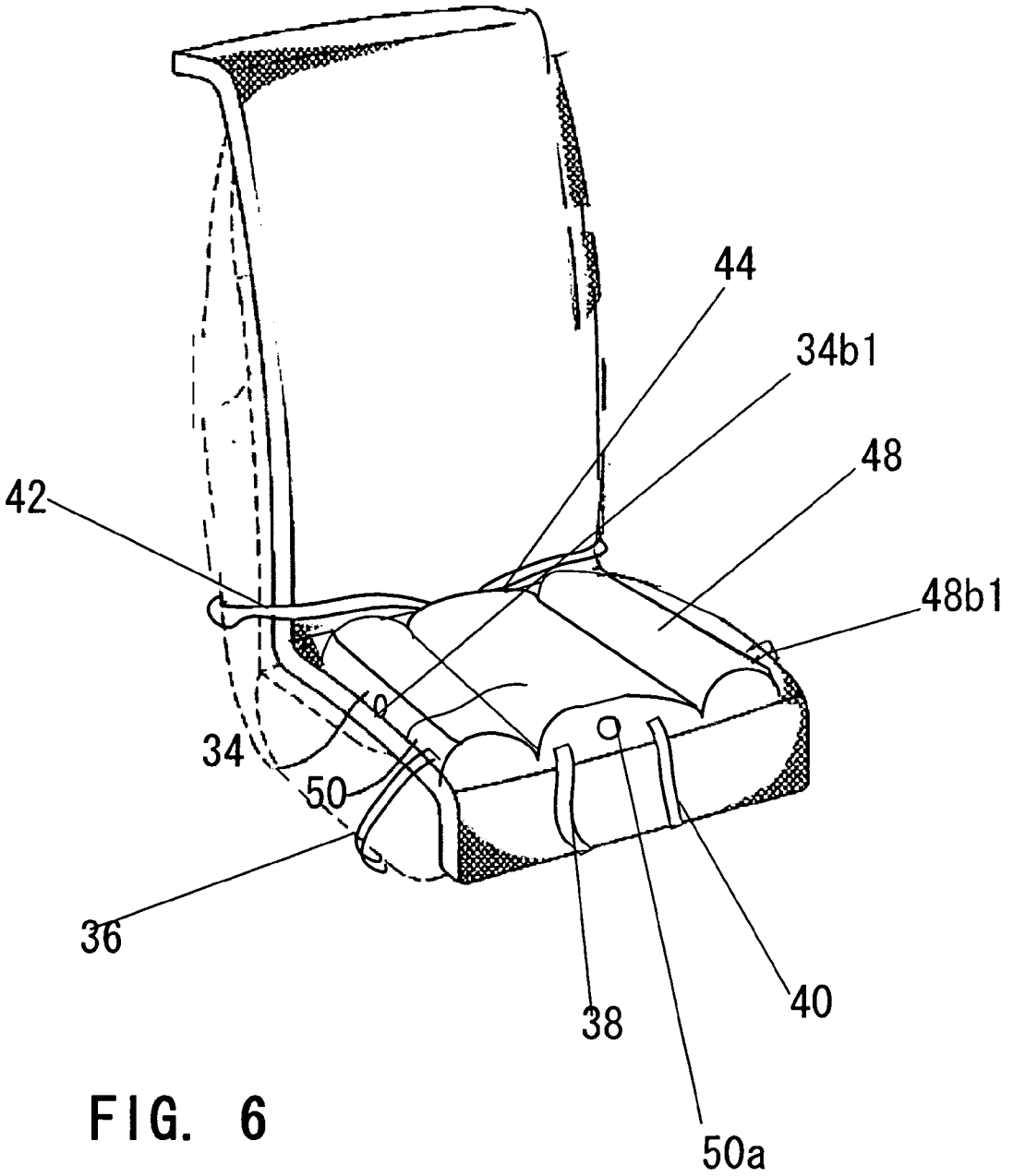


FIG. 6

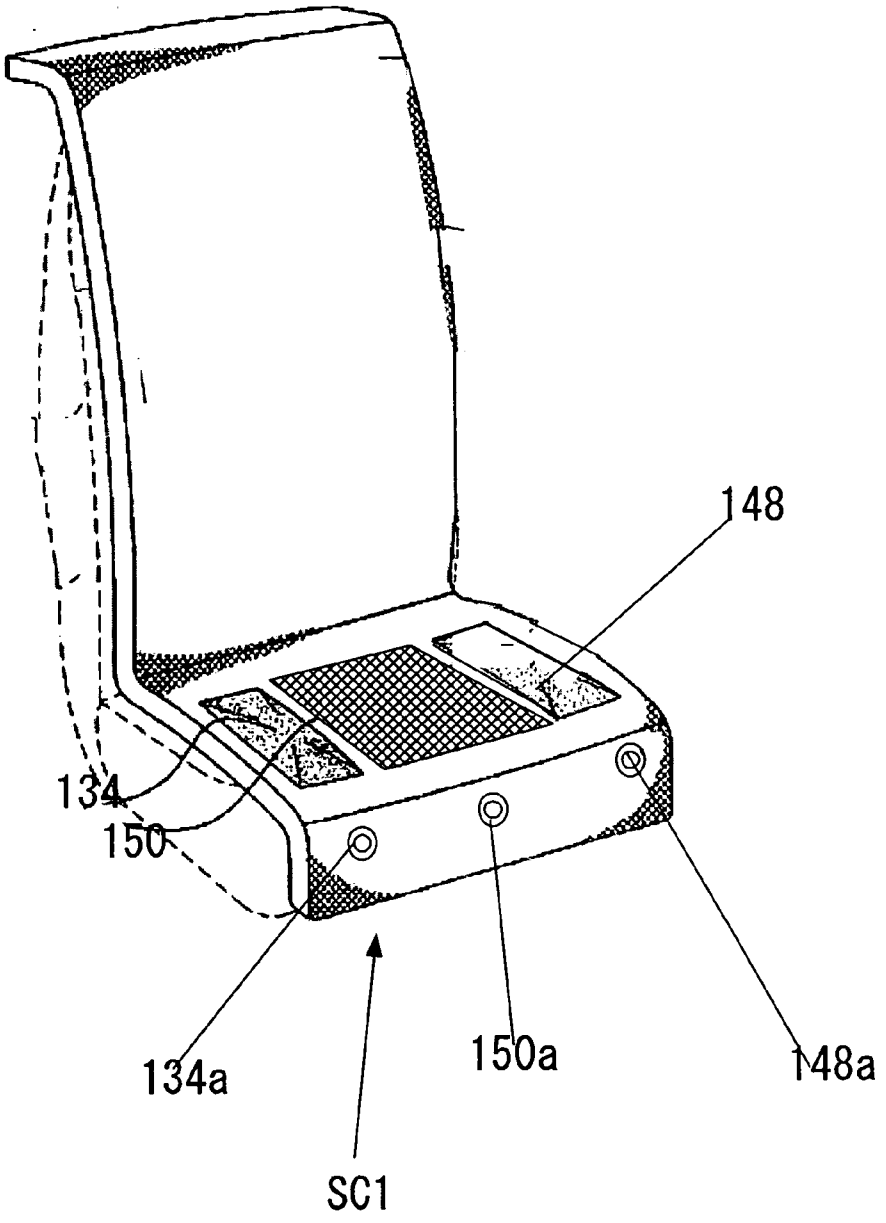


FIG. 7

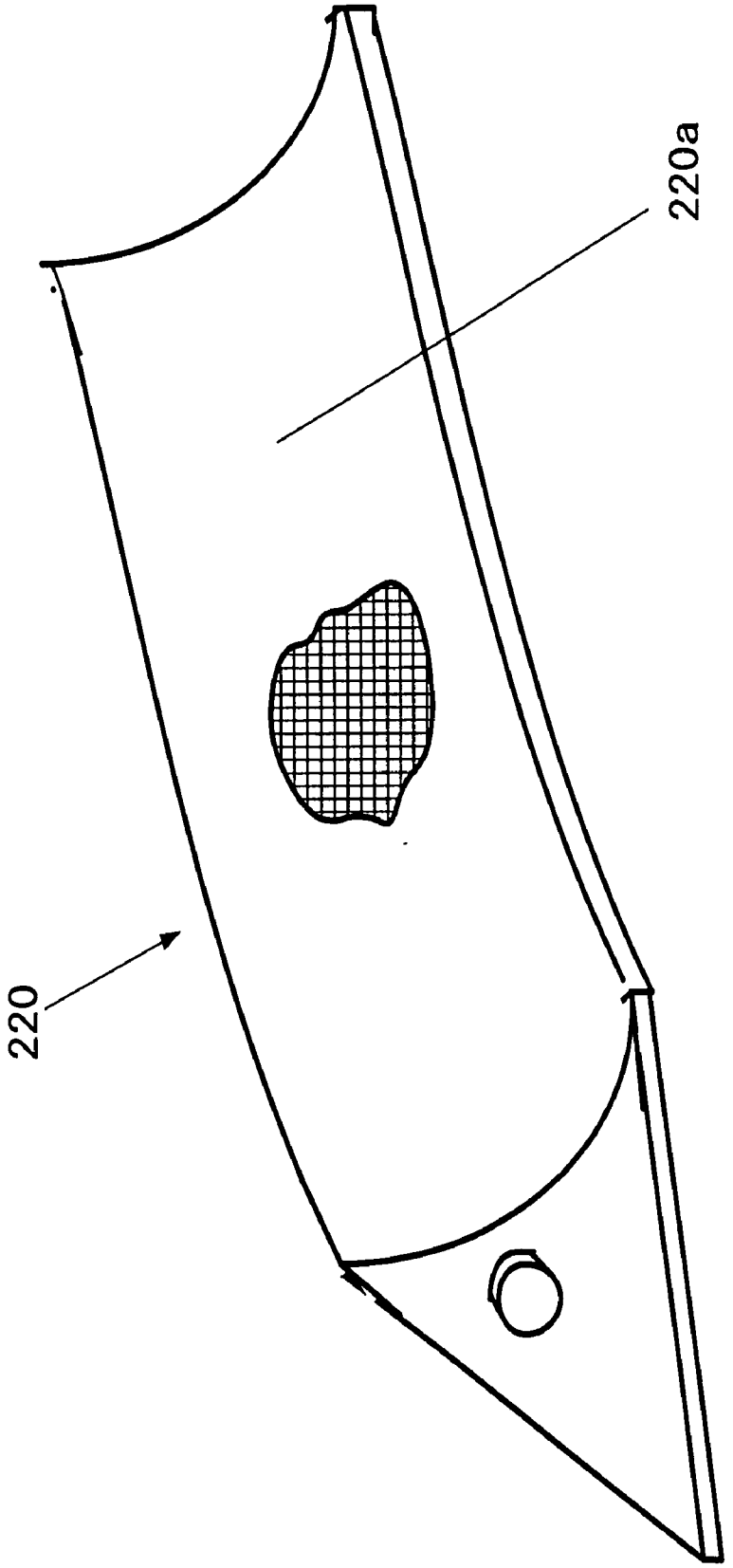


FIG. 8

UNDER-THIGH SUPPORT

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] The present patent application is related to pending U.S. patent application Ser. No. 11/509,376 filed Aug. 24, 2006 under the title "Device for Shortening Brake-Activation Reaction Time."

FIELD OF THE INVENTION

[0002] The present invention relates to an under-thigh support that, in addition to the function of reducing pressure on the lower side of the thigh and thus improving blood-circulating conditions of a sitting person, e.g., a vehicle driver, improves ergonomics, in particular ergonomics of a vehicle driver as a biomechanical system. More specifically, the invention relates to a device for shortening brake-activation reaction time in the form of an under-thigh support used as a combination car seat with a thigh-movement restraining means for use by a driver of a vehicle in order to shorten brake-activation reaction time and to reduce fatigue. In particular, the invention relates to the aforementioned under-thigh support, which has a collapsible and self-inflatable structure that allows deflation of the support by expelling air from the sealed interior thereof for convenience of storage or transportation in a collapsed state or inflation of the support due to the self-expandable properties of its interior. The interior of the support can then be sealed in order to maintain the support at a predetermined rigidity and in a predetermined shape.

BACKGROUND OF THE INVENTION

[0003] Sitting is the most frequent body posture: we sit at work, at school, in the car, on the bus, on the train, in an airplane, and so on. Those who are wheelchair-bound are in sitting positions for an entire day.

[0004] A seat should take the weight off one's feet in order to lessen stress on the legs, and the seat should provide some postural stability while one works or relaxes. One should also be able to relax muscles that are at rest.

[0005] The seat height should not be so high that the occupant's legs are left dangling. This would mean that there would be pressure on the soft tissues under the thighs. This pressure can interfere with the return of blood from the lower limbs, which may cause tingling and numbness in the thighs due to pressure on blood vessels and nerves.

[0006] At the same time, there exists an opinion that prolonged travel in a sitting position can cause venous stasis. Venous stasis refers to loss of proper function of the veins in the legs that would normally carry blood back to the heart.

[0007] N. S. Lee, et al, showed in their "Review of Selected Literature Related to Seating Discomfort" submitted in 1990 to Ikeda Engineering Corporation, MI, USA that in terms of ml/min/100 ml of body segment, blood flow in the leg of a person (4 ml/min/100 ml) in a seated position is much lower than, e.g., in the arm (10 ml/min/100 ml). This means that the legs of a seated person are to a greater extent subject to tingling and numbness in the thighs caused by pressure on blood vessels and nerves.

[0008] It is understood that in the body of a person seated on a chair or on a similar support, the aforementioned abnormalities of blood circulation are caused by areas on the chair that cause increased pressure on the thighs. In the majority of cases, such areas are the edges of a seat.

[0009] Attempts have been made to improve a seat support for redistribution of pressure on the buttocks. For example, Pain Reliever Co., KS, distributes a G-Seat Gel Cushion [hereinafter referred to as the "G-Seat Gel Cushion" below] for improved blood circulation. (See Http://www.autosport-catalog.com/index.cfm/fa/p/pid/2168/cid/57/sc/2737)

[0010] The G-Seat Gel Cushion uses viscoelastic gel and a functional design to disperse pressure and to improve the level of comfort wherever one sits. The G-Seat Gel Cushion features a center relief groove that eliminates soft-tissue compression and suspends the tailbone (coccyx), which eliminates direct pressure on the spine.

[0011] Pressure redistribution occurs because the gel that fills the seat works like a liquid and takes the form of the conforming body part, i.e., the buttocks. In other words, pressure on the buttock and thigh surfaces that is in contact with the G-seat Gel Cushion is redistributed in accordance with Pascal's Law, i.e., in a normal direction and essentially uniformly at all points of contact. However, since the G-seat Gel Cushion is substantially flat, the problem is solved only partially. In other words, localized areas of increased pressure will still exist on the boundaries of the G-seat Gel Cushion.

[0012] German Patent Publication DE10200500243 published on Jul. 27, 2006 (inventor A. Wunder, et al) discloses a chair with a seat that has a backrest, cushion, and an adjustable thigh support. The thigh support comprises a U-shaped unit that is arranged across the chair under the thighs of the occupant and is adjustable opposite to the cushion. A gap is formed between the cushion and the U-shaped unit during adjustment of the U-shaped unit opposite to the cushion. The gap is coverable by an adjustment device, and the cushion is composed of a foam material. The above-described thigh support does not solve the aforementioned problem of localized pressure on the thigh surfaces at the edge of the transverse thigh support and, instead, only shifts the position of the edge.

[0013] A number of patents, such as U.S. Pat. No. 4,636,002 (published on Jan. 13, 1987, inventor T. Genjiro); U.S. Pat. No. 4,712,834 (published on Dec. 15, 1987, inventor J. Warrick, et al); and U.S. Pat. No. 4,838,509 (published on Jun. 13, 1989, inventor J. Klink, et al), etc., disclose car seats with adjustable features that include thigh supports. However, all of these devices are permanently built into the structure of the seat, operate with the use of complicated and expansive mechanisms, and change only vertical and angular positions of the transverse thigh support.

[0014] U.S. Pat. No. 7,093,898 issued in 2006 to L. De Guevara discloses a portable air-pressure-applying assembly for seats. Proposed in this patent is an air-pressure-applying assembly for a seat, having an occupant holding portion for selectively applying a desired pressure to the body of the seat occupant. This assembly includes an air-bag assembly, an air-pressure source, an inlet-conduit assembly, an exhaust valve assembly, and a control assembly. The air-bag assembly is removably attached to the seat occupant holding portion. The inlet-conduit assembly is in fluid communication at one end with the air-pressure source and at another source with the air-bag assembly. The exhaust valve assembly is in fluid communication at one end with the inlet conduit assembly and has an air-outlet at the other end. A control assembly is linked to the air pressure source and to the exhaust valve assembly. The control assembly is configured so as to selec-

tively signal the air-pressure source to inflate the air bag assembly so as to apply the desired pressure to the body of the seat occupant and to selectively signal the exhaust valve assembly to release air from the air-bag assembly.

[0015] Although the above system provides selective inflation of different areas of contact of the seat occupant's body with the seat, the system is complicated and expensive, and the inflated portions of the inflatable air bags, which are built into the structure of the seat, do not possess their own rigidity, thereby conforming to the shape of the occupant's body rather than maintaining its own shape.

[0016] Furthermore, the inflating method has been a shortcoming in the design of fluid-filled products. Most fluid-filled products assume the use of common inflating methods: (A) blow-up valve systems, or (B) pump and compressor systems. There are many negative characteristics of blow-up valve systems. First, putting a blow-up valve in one's mouth is unhygienic. This is true even if the article is used exclusively by a single person. Second, the blower's ears can experience popping and discomfort during inflation. Third, depending on the volume of air required to fill the article, the blower may be subject to hyperventilation. Fourth, also depending on the volume of air required, blowing up an inflatable article can be too time-consuming. Pump and compressor systems also have negative characteristics. First, these systems tend to be expensive and can add considerably to the cost of an inflatable article. A pump or compressor can often make an inflatable article uneconomical to produce and sell. Second, pumps and compressors can be heavy and usually tend to be bulky. These qualities are especially negative when associated with inflatable articles. Inflatable articles are often used precisely because they are light and collapsible. These benefits will be at least partially defeated if the inflating system is heavy and bulky. For example, a portable air mattress may no longer be portable once a pump or compressor is added to the package. If a pump is compact and not bulky, then it probably is suitable only for inflating small volumes. Inflating large volumes would probably be too time-consuming.

[0017] On the other hand, there exist a number of self-inflatable products such as mattresses and various supports. Normally, such products comprise an inner shell or casing made from a strong air-proof fabric which is filled with a foam plastic that can be compressed and self-expanded when released from compression. After expansion and filling of the foam-plastic cells with air, the interior of the product is sealed by closing a valve. An example of such a product is a geometrically efficient self-inflating seat cushion disclosed in U.S. Pat. No. 5,469,592 issued in 1995 to M. Johnson.

[0018] The above patent describes a self-inflating seat that has an airtight hollow body comprising a flexible material and a resilient structure member such as foam. The hollow, resilient structure member made of flat portions of material can lie on the inside or attach to the outside of an airtight hollow body. During inflation, the resilient structure member expands. A proportionate volume of air flows into the chamber. During use, the chamber flattens and deforms, the airtight hollow body volume diminishes, its internal pressure increases proportionately, and the seat cushions and supports weight.

[0019] The devices described above are seats and supports used for the general purpose of cushioning the seat occupant's body and do not concern specific purposes of ergonomics of the driver's seat from the viewpoint of shortening the time required for shifting the driver's foot from the gas pedal to the brake pedal. The applicant of the present patent application has made an attempt to improve the ergonomics of a driver's seat (see pending U.S. patent application Ser. No. 11/509,376 of Aug. 24, 2006) for achieving the aforementioned specific goal. The invention of the aforementioned application provides a thigh support and restrainer for use in combination with a driver's car seat. The device is made in the form of a triangular pad that is attached to the car seat cushion and supports the driver's leg in a position required for minimal time needed for movement of the driver's foot from the accelerator pedal to the brake pedal at the moment of danger. The pad is filled with a foam plastic material in a sealed external casing made of a flexible and non-stretchable material, e.g., fabric, and is provided with straps that can be wrapped around the driver's right thigh for restraining the driver's leg in the aforementioned position of the minimal time for reaching the brake pedal. For optimization of the position of the thigh support on the driver's seat, the support is provided with straps that are attached to the seat and have means for securing the thigh support in a selected position. Another pending U.S. patent application Ser. No. 11/515,192 filed by the same applicant in 2006 relates to a method and device for finding the position of a seat support most optimal from the viewpoint of shortening the time required for the driver to push on a brake pedal after the driver is confronted with an obstacle.

[0020] Although the thigh support of the aforementioned patent perfectly fulfills its function of shortening the time required for braking, it has a specific use and only partially solves the problem of uniformity of pressure distribution on the thigh surface in contact with the driver's seat.

[0021] In order to solve the above problem, the inventor herein has developed a pad for supporting the thigh of a person sitting on a seat in a position that alleviates pressure applied to the lower surface of the thigh and thus for improving blood circulation through the leg without numbness or similar phenomena associated with long-time sitting. This pad is disclosed in U.S. Pat. No. 7,255,396 issued to the applicant of the present patent application in 2007. The pad is made in the form of a soft deformable body filled, e.g., with a silicone gel. The pad has a flat rectangular bottom surface and curvilinear lateral sides. In the plane perpendicular to the bottom, the pad has a triangular cross-section with heights of the triangles gradually reduced from one end face of the pad to the opposite end face of the pad so that the ridge that connects the apexes of the triangular cross-sections from one end face to the other is inclined with respect to the flat bottom.

[0022] However, the pads permanently filled with the foam plastic or with a silicone gel in an airtight casing are not collapsible and have a constant volume. Since they always occupy a large volume, they are not convenient for storage and transportation, which is especially important when a user of such a pad is traveling in a vehicle or by plane where the pad may occupy a significant part of the luggage volume.

OBJECTS AND SUMMARY OF THE INVENTION

[0023] It is an object of the invention to provide a device for shortening brake-activation reaction time in the combination of a car seat with an under-thigh support that has a collapsible and self-inflatable structure that allows deflating of the support by expelling air from the sealed interior thereof for convenience of storage or transportation in a collapsed state or filling the interior of the support with air due to self-expandable properties of its interior and then sealing the

interior for maintaining the support at a predetermined rigidity and in a predetermined shape. It is a further object to provide the self-inflatable under-thigh support of the aforementioned type that can be compressed to a low volume for convenience of storage and transportation. It is a further object to provide a seat-attachable structure that incorporates one or several pads of the invention. It is another object to provide self-inflatable pads of the invention built into the structure of a car seat.

[0024] According to one aspect of the invention, the self-inflatable under-thigh pad of the invention comprises an elongated body of a substantially triangular cross-section that contains an air-proof inner shell or casing made from non-stretchable flexible materials, such as rubberized fabric, plastic, or reinforced rubber, and a foam plastic inner filler made e.g., of a polyurethane foam that fills the entire interior of the inner casing. The inner casing is provided with a valve capable of either closing the sealed interior of the casing or opening it to the surrounding atmosphere, which may be needed during compression of the pad or during expansion and self-inflation for filling the cells of the foam plastic with air. On the surface intended for contact with the seat, the pad may be provided with means for connection to the surface of the seat, such as tiny hooks and loops known under trademark Velcro® and produced, e.g., by FastenNation, Inc., NJ, USA. For use, the pad is allowed to expand by opening the valve, and, after self-inflation to the full-volume state with air that fills the cells of the foam plastic interior, the valve is closed, thus sealing the air of the foam-plastic cells in the interior of the air-proof casing. If necessary, rigidity of the pad can be adjusted by opening the valve and compressing the pad to the degree required for obtaining predetermined rigidity of the pad. The valve is then closed.

[0025] According to another aspect of the invention, one or two pads of the aforementioned type can be incorporated into an integral structure attachable to a car seat. The structure may consist of a seat cover made from a fabric that incorporates at least one pad for use as an under-thigh support. The seat cover is provided with straps for attachment to a car seat. For securing to the seat, the straps can be guided around the frame elements of the seat and tied to each other or can be attached to the seat by means of frictional elements such as tiny hooks and loops known under trademark Velcro® and produced, e.g., by FastenNation, Inc., NJ, USA. When the seat cover is secured to the seat, the self-inflatable pad assumes the under-thigh position and can be adjusted to the height and rigidity required to provide the position and conditions most optimal for shortening the time needed to move the driver's foot from the gas pedal to the brake pedal. If necessary, two or more pads may be incorporated into the seat cover, including two on both sides for use as under-thigh supports and one in the middle for optional use. Such a structure will allow selective adjustment of the pressure over the surface of contact of the user's body with the weight-supporting seat cushion.

[0026] According to still another aspect of the invention, the structure of the invention is similar to one described above and contains at least one or several self-inflatable pads, with the exception that the self-inflatable pads are built into the seat cushion while the valves for letting air into and out from each of the foam-plastic-filled interiors of the pads are arranged in conveniently reachable sides of the seat cushion.

BRIEF DESCRIPTION OF THE DRAWINGS

[0027] FIG. **1** is a three-dimensional view of the thigh-supporting pad according to one embodiment of the invention.

[0028] FIG. **2** is a sectional view of the pad in FIG. **1** in the direction of lines II-II.

[0029] FIG. **3** is a side view of the pad in FIGS. **1** and **2** during deflation of the pad interior by compressing the pad when the valve is open.

[0030] FIG. **4** is a side view of the pad in FIGS. **1** and **2** in a compressed state with the valve being closed.

[0031] FIG. **5** is a three-dimensional view of a seat-attachable structure that incorporates pads of the invention.

[0032] FIG. **6** is a three-dimensional view of the structure in FIG. **5** attached to a vehicle seat.

[0033] FIG. **7** is a three-dimensional view of a car seat equipped with the self-inflatable pads of the invention built into the structure of the seat.

DETAILED DESCRIPTION OF THE INVENTION

[0034] FIGS. **1** to **4** illustrate a self-inflatable under-thigh pad made according to one aspect of the invention, where FIG. **1** is a three-dimensional view of a thigh-supporting pad according to one embodiment of the invention, FIG. **2** is a sectional view of the pad in FIG. **1** in the direction of lines II-II, FIG. **3** is a side view of the pad in FIGS. **1** and **2** during deflation of the pad interior by compressing the pad when the valve is open, and FIG. **4** is a side view of the pad in FIGS. **1** and **2** in a compressed state with the valve being closed.

[0035] As shown in FIGS. **1** and **2**, the under-thigh support pad of the invention, which in general is designated by reference numeral **20**, consists of an elongated body of a substantially triangular cross-section which has an air-proof inner shell or casing **22** made from a non-stretchable flexible material such as rubberized fabric, plastic, or reinforced rubber, etc., and an inner filler **24** made e.g., of a squeezable and self-expandable foam plastic having a plurality of pores, e.g., polyurethane foam that fills the entire interior of the inner casing **22**. The inner casing **22**, in turn, may be placed into an external casing **21** (FIGS. **1** and **2**) made from a spot-cleanable or washable material that is closed by a zipper-type fastener, buttons, or the like (not shown), and that can be opened for extraction of the inner casing **22** with the plastic foam for replacement or for cleaning the outer casing. The outer casing **21** can be made from velvet or a similar material.

[0036] The inner casing is provided with a valve **26** capable of either closing the sealed interior of the casing or opening it to the surrounding atmosphere, which may be needed during compression of the pad or during expansion and self-inflation for filling the cells of the foam plastic with air. On the bottom surface **28** intended for contact with the seat, the pad **20** may be provided with means **30** for frictional connection to the surface of the seat. Means **30** may comprise a frictional surface of tiny hooks and loops known under the trademark Velcro® and produced, e.g., by FastenNation, Inc., NJ, USA.

[0037] The valve **26** may have the construction of one used in a self-inflatable mattress described in U.S. Pat. No. 4,694,515 issued in 1987 to Rogers, Jr. In general, the valve is made as a rotating plug with communicating openings, which are open or closed depending on the rotary and axial positions of the plug stem.

[0038] For use, the pad **20** is allowed to expand to the condition shown in FIGS. **1** and **2** by opening the valve **26**. After self-inflation to a full-volume state of filling the cells of the foam plastic **24**, the valve **26** is closed, thus sealing the air of the foam-plastic cells in the interior of the air-proof casing **22**. If necessary, rigidity of the pad can be adjusted by opening the valve **26** and deflating air pressure in the pad to a required

degree. FIG. **3** shows compression of the pad to the state shown in FIG. **4** convenient for storing and transportation. This is achieved by opening the valve **26** and squeezing it by applying oppositely directed forces F. After the air is displaced from the cells of the foam plastic **24**, the valve **26** is closed, securing the pad **20** in the collapsed condition.

[0039] According to another aspect of the invention, one or two pads of the aforementioned type can be incorporated into an integral structure attachable to the car seat. The device of this type is shown in FIGS. **5** and **6**, where FIG. **5** is a three-dimensional view of a seat-attachable structure that incorporates pads of the invention, FIG. **6** is a three-dimensional view of the structure of FIG. **5** in a position attached to a vehicle seat.

[0040] The structure may comprise a seat cover **32** made from a fabric that incorporates at least one pad **34** for use as an under-thigh support. The seat cover **32** is provided with straps **36**, **38**, **40**, **42**, **44**, and **46** for attachment to a car seat (FIG. **5**). For securing to the seat S (FIG. **6**), the straps **36** to **46** can be guided around the frame elements of the seat S and tied to each other or can be attached to the seat by means of frictional elements such as tiny hooks and loops **36***a*, **38***a*, **40***a*, **42***a*, **44***a*, and **46***a* known under the trademark Velcro® and produced, e.g., by FastenNation, Inc., NJ, USA. When the seat cover **32** is secured to the seat S, the self-inflatable pad **34** assumes the under-thigh position and can be adjusted to the height and rigidity required for providing the position and conditions most optimal for shortening the time needed to move the driver's foot from the gas pedal to the brake pedal (not shown). If necessary, two or more additional pads **48** and **50** may be incorporated into the seat cover **32**, thus forming under-thigh supports on both sides of the car-seat cushion and one in the middle for optional use. Such a structure will allow selective adjustment of pressure over the surface of contact of the user's body with the weight-supporting seat cushion SC. Each self-expandable pad **34**, **48** can, in turn, be subdivided into two parts, such as **34***a***1**, **34***a***2** that form the pad **34**, and **48***a***1**, **48***a***2** that form the pad **48**. Use of the pad **50** is optional. Each part of the pad has the same structure as the pad **20** (FIGS. **1** and **2**) and is provided with an appropriate valve located in an easily reachable area on the side of the seat cover **32**. Thus, the pad part **34***a***1** has a valve **34***b***1**, the pad part **34***a***2** has a valve **34***b***2**, the pad part **48***a***1** has a valve **48***b***1**, and the pad part **48***a***2** has a valve **48***b***2**. Reference numeral **50***a* designates a valve of the pad **50**.

[0041] According to still another aspect of the invention, which is shown in FIG. **7**, the structure of the invention may be similar to one described with reference to FIG. **6** and may contain at least one self-inflatable pad **134** or two additional self-inflatable pads **148** and **150**, which are equivalent to the previously mentioned self-inflatable pads **48**, and **50**, with the exception that the self-inflatable pads **134**,**148**, and **150** are built into the seat cushion SC**1**, while respective valves **134***a*, **148***a*, and **150***a* for letting air into and out from the foam-plastic-filled interiors of the pads are arranged in conveniently reachable sides of the seat cushion SC**1**.

[0042] FIG. **8** shows a self-inflatable pad **220** which is similar to one shown in FIGS. **1** and **2**, except that one side surface **220***a* of the triangular profile is curved for conforming to the shape of the thigh, which is to be supported by the self-inflatable pad **220**. Experiments show that optimal selection of this curvilinear profile may significantly improve thigh-supporting conditions and provide more uniform pressure on the thigh. The interior structure of the pad **220** is the same as the structure of the pad **20**.

[0043] Thus, it has been shown that the invention provides an under-thigh support that has a collapsible and self-inflatable structure to allow deflating of the support by expelling air from the sealed interior thereof for convenience of storage or transportation in a collapsed state or filling the interior of the support with air due to self-expandable properties of its interior and then sealing the interior for maintaining the support at a predetermined rigidity and in a predetermined shape. The invention further provides a self-inflatable under-thigh support for use in combination with a car seat as a thigh-positioning and thigh-movement-restraining means in order to shorten brake-activation reaction time and to reduce fatigue. The self-inflatable under-thigh support of the invention can be compressed to a low volume for convenience of storage and transportation. The invention also provides a system of the aforementioned under-thigh support that can be attached to the car seat or can be built into the car-seat structure.

[0044] Although the invention has been shown and described with reference to specific examples, it is understood that these examples should not be construed as limiting the invention and that any changes and modifications can be made with regard to materials, shapes, and other features of the illustrated embodiments without departure from the scope of the patent claims. For example, the flat bottoms of the pads are not necessarily rectangular and may have, e.g., trapezoidal or other shapes. Means for attachment to the seat may be made in a form different from tiny hooks and loops and may comprise, e.g., buttons, snapping fasteners, etc.

1. An under-thigh support comprising a combination of at least one under-thigh supporting pad with a car seat, wherein the aforementioned under-thigh supporting pad is a self-expandable under-thigh supporting pad.

2. The under-thigh support of claim **1**, wherein the aforementioned self-expandable under-thigh supporting pad comprises a casing made from a flexible non-stretchable air-impermeable material, a filler that fills the interior of the aforementioned casing and is made from a squeezable and self-expandable foam plastic having a plurality of pores, and a valve attached to the casing that can be closed for sealing the interior of the casing and opened for communication of the interior of the casing with the atmosphere.

3. The under-thigh support of claim **2**, wherein the self-expandable under-thigh supporting pad comprises an elongated body having a triangular cross-section having a support surface and side surfaces.

4. The under-thigh support of claim **2**, further comprising means for attaching the self-expandable under-thigh supporting pad to the car seat.

5. The under-thigh support of claim **3**, further comprising means for attaching the self-expandable under-thigh supporting pad to the car seat.

6. The under-thigh support of claim **5**, wherein the means for attaching the self-expandable under-thigh supporting pad to the car seat comprise tiny hooks and loops formed on the bottom surface of the self-expandable under-thigh supporting pad and capable of frictionally engaging the car seat.

7. The under-thigh support of claim **5**, wherein one of the side surfaces has a curvature.

8. The under-thigh support of claim **4**, wherein the aforementioned means for attaching the self-expandable under-thigh supporting pad to the car seat comprises straps.

9. The under-thigh support of claim **5**, wherein the aforementioned means for attaching the self-expandable under-thigh supporting pad to the car seat comprises straps.

10. The under-thigh support of claim **2**, wherein the aforementioned at least one self-expandable under-thigh supporting pad is built into the car seat.

11. The under-thigh support of claim **7**, wherein the means for attaching the self-expandable under-thigh supporting pad to the car seat comprise tiny hooks and loops formed on the bottom surface of the self-expandable under-thigh supporting pad and capable of frictionally engaging with the car seat.

12. The under-thigh support of claim **8**, that contains at least two of the aforementioned self-expandable under-thigh supporting pads, each being arranged on a thigh-supporting side of the car seat.

13. The under-thigh support of claim **10**, that contains at least two of the aforementioned self-expandable under-thigh supporting pads, each being arranged on a thigh-supporting side of the car seat.

14. The under-thigh support of claim **9**, wherein the means for attaching the self-expandable under-thigh supporting pad to the car seat comprise tiny hooks and loops formed on one side of the self-expandable under-thigh supporting pad and capable of frictionally engaging with the car seat.

* * * * *