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(54) **OUTDOOR SEAT CUSHIONS**

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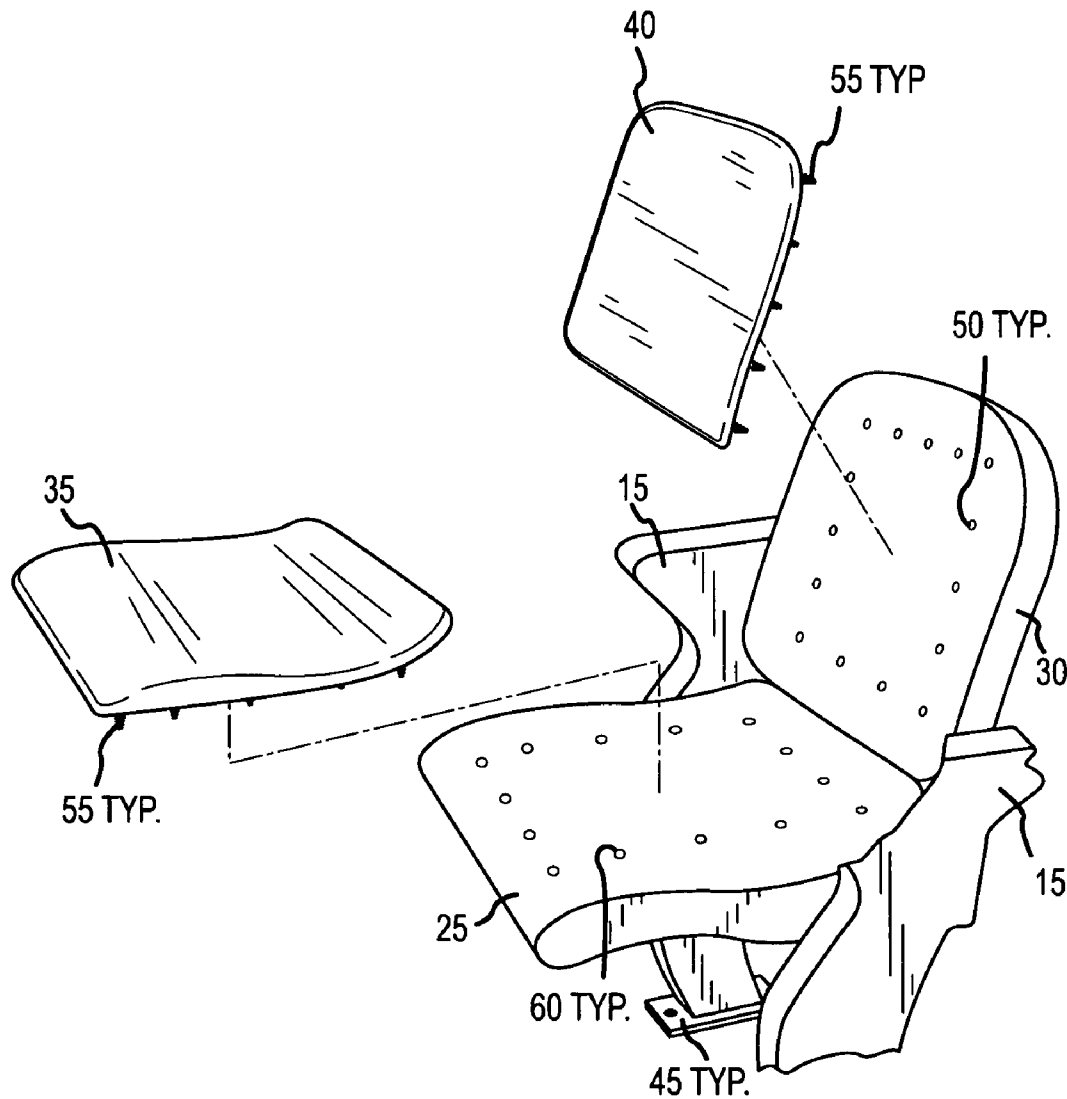
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(57) **ABSTRACT**

An embodiment of a cushioning pad for use on the seat backs and seat bottoms of outdoor stadium seating is described along with embodiments of stadium seats incorporating the cushioning pads. Additionally in another embodiment, a method of retrofitting stadium seating is further described. One embodiment of the cushioning pad comprises a self-skinning polyurethane foam having attachment fasteners integrally formed therein.

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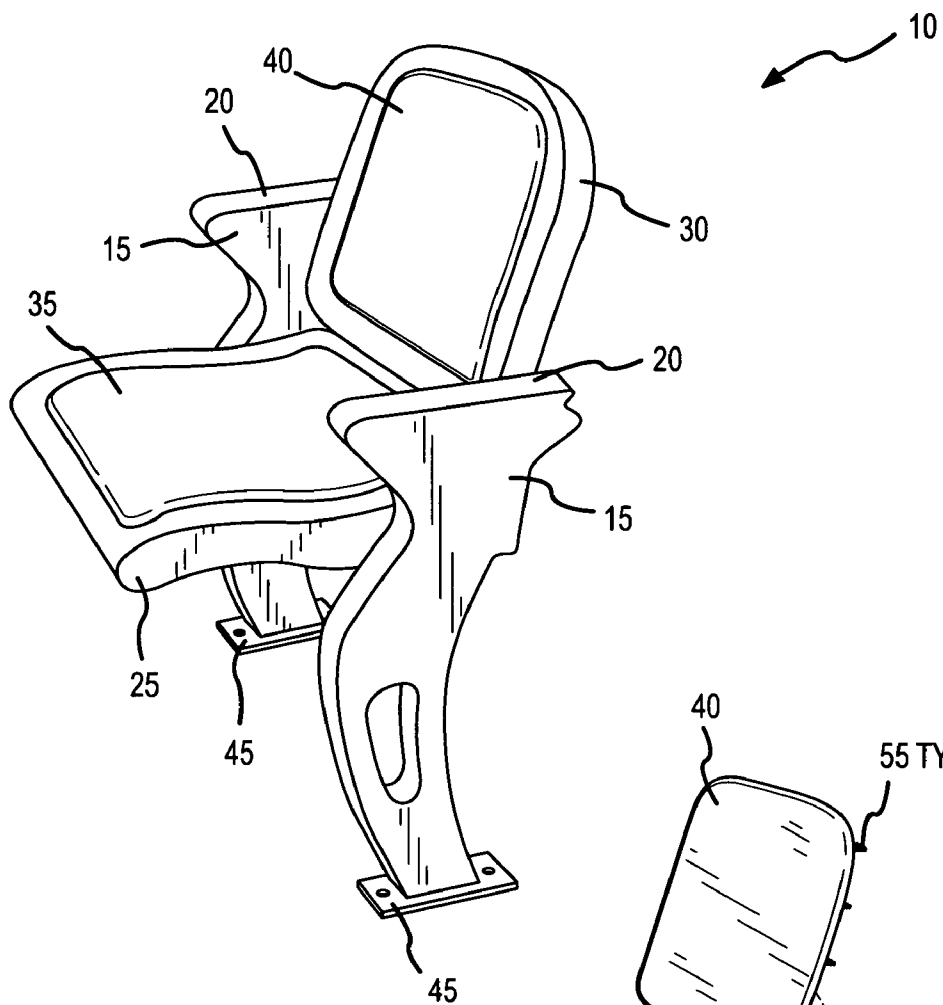


FIG. 1

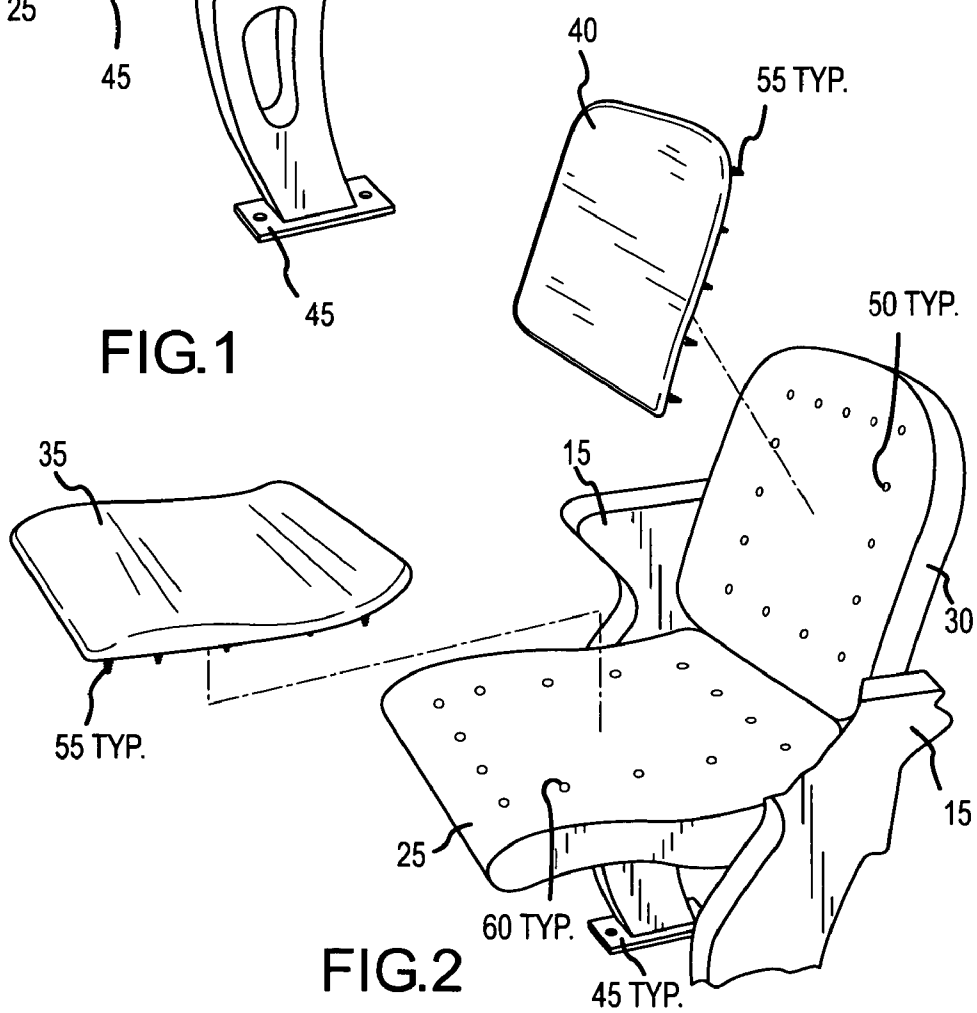


FIG. 2

35 OR 40

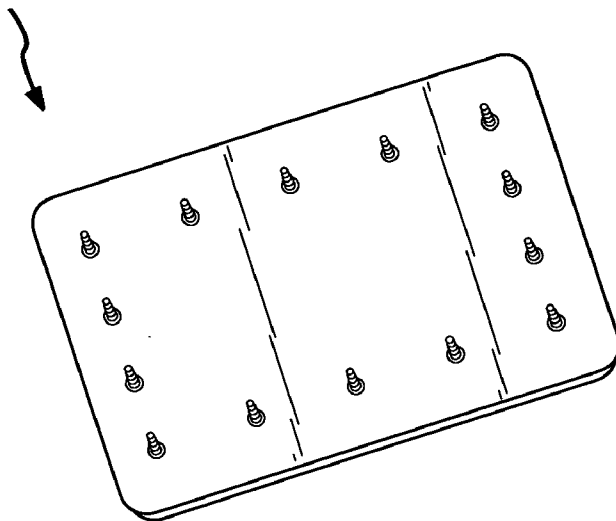


FIG. 3

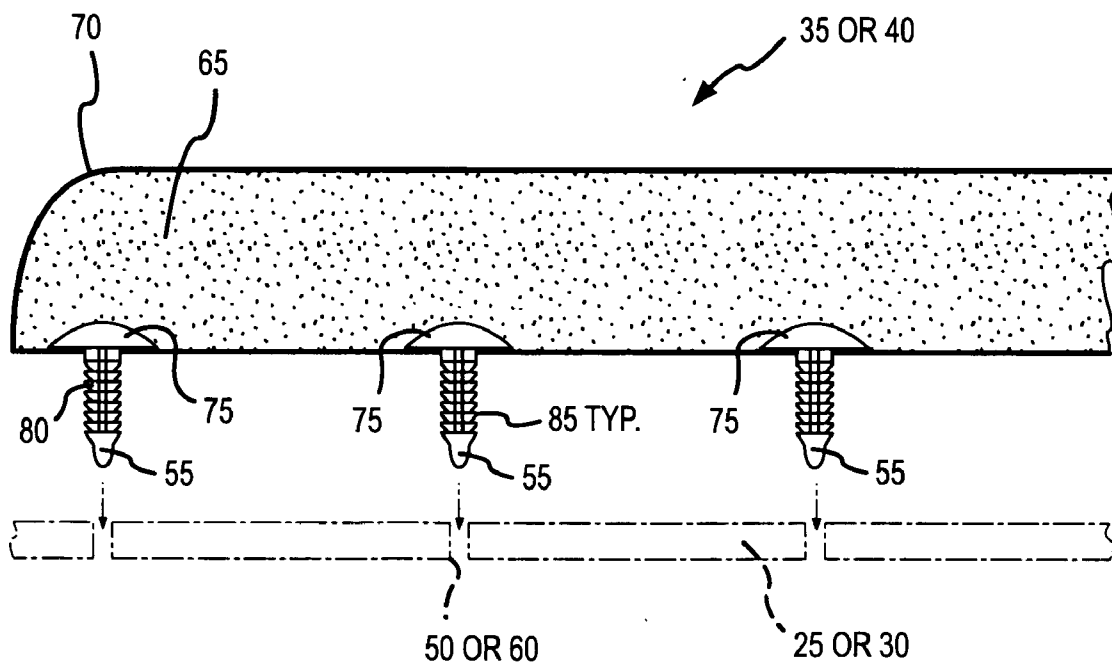


FIG. 4

OUTDOOR SEAT CUSHIONS

FIELD OF THE INVENTION

[0001] This invention relates to outdoor seating and associated padded seat cushions.

BACKGROUND

[0002] Outdoor stadium seats typically comprise a hard plastic, wood or metallic seat back, a hard plastic, wood or metallic seat bottom that pivots or folds upwardly to allow people to more easily pass in front of the seat when accessing their seats or leaving their seats. Stadium seats may also comprise wood, plastic or metallic benches with or without back rests. Stadium seats are not known for their comfort and one can surmise the lack of comfort of stadium seating help give rise to the popular baseball tradition known as the "Seventh Inning Stretch". Stadium seat comfort has improved substantially in the last 15-20 years with the advent of somewhat ergonomically shaped molded plastic seat bottoms and backs, but stadium seats are still not particularly comfortable.

[0003] While most outdoor stadium seating continues to comprise hard seating services, such as plastic and wood, in the more expensive "club" levels of some stadiums, cushioned seat bottoms and/or backs are sometimes provided. The cushion typically comprises a foam pad overlying a thin plastic substrate, such as polyethylene or polypropylene sheet, and a vinyl fabric stretched tautly over the top of the foam and secured to the bottom side of the plastic substrate with staples. Means for securing cushion to the seat back or seat bottom of an associated stadium seat are typically secured to the plastic substrate.

[0004] While the cushions do significantly increase the comfort of the outdoor stadium seats over uncushioned seats, they present additional drawbacks. Most significantly, seats having cushioned backs and/or bottoms are significantly more expensive to maintain. The vinyl fabric is easily ripped, punctured or otherwise damaged. Further, the vinyl fabric tends to degrade quickly when exposed to ultraviolet light cause the color to fade and the strength of the fabric to be reduced substantially. Finally, the foam used in relatively thin thicknesses is not particularly effective in providing cushioning. Experience in various stadiums using these cushions has shown their effective lifespan to be a single season or less. Because of the propensity for the seat cushions to become damaged, stadium maintenance personnel must regularly inspect the cushions, and as required, replace the damaged cushions. Accordingly, the cost of outfitting a section of a stadium with cushioned seats includes not only the cost of the cushions and cushion replacements but also the additional labor cost of regularly inspecting and repairing the seating. These costs would be prohibitive if cushioned seating were utilized in the entirety of a stadium as opposed to just the premium level club seating.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] FIG. 1 is isometric view of a stadium seat including cushion seat pads according to one embodiment of the present invention.

[0006] FIG. 2 is a partially exploded view of a stadium seat according to one embodiment of the present invention.

[0007] FIG. 3 is an isometric bottom view of a bottom cushioned seat pad according to one embodiment of the present invention.

[0008] FIG. 4 is cross sectional side view of a cushion pad according to one embodiment of the present invention.

DETAILED DESCRIPTION

[0009] Embodiments of seat back and seat bottom cushioning pads that are comprised of a self-skinning polymeric closed cell foam material, such as urethane, and outdoor stadium seats incorporating the same are described. The cushioning pads are adapted to be secured to stadium seating to substantially increase the comfort of a person using the seat when compared to typical hard plastic or wood seating. The skins of self-skinning urethanes are inherently tough and resistant to puncturing. Even when punctured or slit, the damaged area is self-healing thereby reducing (i) the tendency of the damaged area to grow or spread and (ii) the visibility of the damage to a person using the associated seat. Accordingly, the seats have a longer lifespan than traditional outdoor stadium cushions that comprise vinyl fabric over foam.

[0010] The cushioning pads are typically molded in closed molds into which the urethane constituents in liquid form (or constituents of another foaming polymer) are injected. The ensuing reaction generates a gaseous byproduct that causes the urethane to foam. The high pressures generated during the fabrication process facilitate the formation of a skin on all surfaces of the mold. In some embodiments of the cushioning pads, fasteners used to join the cushions to an associated seat are placed in the mold prior to the molding operation such that the resulting skin forms over a portion of each fastener to effectively secure it in place. The labor required to fabricate each cushioning pad is low when compared to the labor required to fabricate a prior art outdoor stadium cushion, thereby making embodiments of the cushioning pads cost-competitive with prior art cushions. Further, stadiums using embodiments of the cushioning pads described herein may be able to eliminate or reduce the staffing of upholstery departments thereby realizing overhead expense reductions.

Terminology

[0011] The term "or" as used in this specification and the appended claims is not meant to be exclusive rather the term is inclusive meaning "either or both".

[0012] References in the specification to "one embodiment", "an embodiment", "a preferred embodiment", "an alternative embodiment" and similar phrases means that a particular feature, structure, or characteristic described in connection with the embodiment is included in at least an embodiment of the invention. The appearances of the phrase "in one embodiment" in various places in the specification are not necessarily all referring to the same embodiment.

[0013] Directional and/or relationary terms such as, but not limited to, left, right, nadir, apex, top, bottom, vertical, horizontal, back, front and lateral are relative to each other and are dependent on the specific orientation of an applicable element or article, and are used accordingly to aid in the description of the various embodiments and are not necessarily intended to be construed as limiting.

[0014] The term "coupled" refers to two or more elements that are connected together but not necessarily directly connected together.

[0015] The term "about" unless otherwise specifically indicated herein means plus or minus 10%.

One Embodiment Outdoor Stadium Seat

[0016] Referring to **FIG. 1**, an outdoor stadium seat **10** according to one embodiment of the present invention is illustrated as might be found in a typical baseball, football, soccer or other stadium used for outdoor events. The seat comprises: a pair of support legs **15** that include integrally formed arm rests **20**; a seat bottom **25** with an associated seat bottom cushioning pad **35**; a seat back **30** with an associated seat back cushioning pad **40**.

[0017] The support legs **15** are typically cast or forged steel although other metals can be used such as aluminum and iron. The legs are usually painted to prevent corrosion. In most applications, the base **45** of the legs are bolted to ground surface therebeneath to support the seat in the upright position, as well as, to prevent the seat from moving during use. In certain variations, the support legs may also or alternatively bolt to a vertical riser behind the seat. As shown, the top ends of the legs extend above the seat bottom **25** and form arm rests **40**. The arm rests can be padded. An associated pair of legs are spaced from each other a sufficient distance to permit an associated seat bottom and seat back **30** to fit therebetween and be secured to both legs on either side thereof. Although not illustrated, each leg of the pair may be utilized to support more than a single set of seat backs and seat bottoms as stadium seats are typically arranged in a row and all but the end legs will have a set of seat backs and bottoms attached to both its left and right sides.

[0018] The seat back **30** as illustrated is comprised of a hollow molded plastic material. Typical plastic materials utilized include high density polyethylene and polypropylene, although others can be utilized as well. A colorant is typically added to the plastic material during fabrication give the seat back a desired color. The seat back includes one or more mounting locations (not shown) wherein it is fixedly secured to an associated pair of support legs **15** directly or through the use of suitable brackets. On the front face of the seat back a plurality of holes **50** are arranged in a generally rectangular pattern spaced inwardly of the edges of the seat back. These holes are used for securing the seat back's associated cushioning pad **40** to the seat back by way of a corresponding plurality of plastic ratchet fasteners **55** of the cushioning pad as shown in **FIG. 2**.

[0019] The seat bottom **25** typically comprises a hollow molded plastic seating member similar in materials and construction as the associated seat back. However, the seat bottom also typically includes swivel mechanisms on either side of the plastic seating member that permits the seat bottom to be pivoted between a generally horizontal position when in use and a generally vertically disposed position when not in use. The swivel mechanisms (not shown) often include a biasing mechanism to return the seat bottom to its vertical position when it is not in use and stops to fully support the seat bottom and the weight of a user. While the swivel mechanisms can be a component of the seat bottom, they can also be integrated into the support legs **15**. In other embodiments, the swivel mechanisms can be dispensed with

entirely and the seat bottom can be fixedly secured to the support legs such that the seat bottom cannot be pivoted.

[0020] Referring specifically to **FIG. 2**, the top face of the seat bottom **25** includes a plurality of holes **60** are arranged in a generally rectangular pattern spaced inwardly of the edges of the seat bottom. These holes are used for securing the seat back's associated cushioning pad **35** to the seat back by way of a corresponding plurality of plastic ratchet fasteners **55** of the cushioning pad.

[0021] A typical cushioning pad **35** or **40** for either the seat bottom or the seat back is illustrated in **FIGS. 3 and 4**. It is to be appreciated that either cushioning pad will be generally similar to each other differing only in size and the positioning and number of ratchet fasteners. The cushioning pad is preferably 0.5" to 2" thick and more preferably 0.75-1.25" thick. The cushion pad comprises polyurethane foam **65** that forms a tough skin **70** during fabrication against the outside surfaces of an associated mold. Preferably, the foam and the skin has a density of about 8-16 pounds per cubic feet and more preferably 10-14 pounds per cubic foot, and most preferably about 12 pounds per cubic foot. The skin, which is typically about 0.090-0.135" thick, is substantially denser preferably having a density of 40-90 pounds per cubic foot and more preferably 60-70 pound per cubic foot. Because the skin and the foam are integrally formed, the skin is integrated with the foam. Accordingly, a tear or puncture to the cushioning pad does not cause the skin to separate from the underlying foam. Further, the foam located beneath and immediately proximate the tear or puncture acts to pull the edges of the skin at the tear or puncture together. Additionally, the underlying foam helps limit the expansion or growth of a tear. A foam pad exhibiting aforementioned properties is often referred to in the art as being self healing since (i) the edges of a puncture or tear are pulled together such that the puncture or tear may not be particularly visible, and (ii) the structure of the pad effectively limits the growths of tears and punctures thereby limiting the life span reducing effect of a tear or puncture.

[0022] In some embodiments of the cushioning pad, an ultraviolet-resistant aliphatic polyurethane layer covers the skin of the entire foam pad. This coating imparts resistance to ultraviolet radiation that would otherwise cause the underlying polyurethane material to degrade much more quickly when exposed to sunlight. The aliphatic layer bonds with the skin during pad formation and once the fabrication process is complete is inseparably bonded to the skin. The aliphatic layer is preferably 0.004-0.007" thick and more preferably 0.005-0.006" thick. The aliphatic layer has extremely good elongation (about 600%) and flexibility, thereby helping ensure its integrity is maintained and the underlying foam pad is protected.

[0023] A plurality of plastic ratchet fasteners **55** extend generally perpendicularly outwardly from the lower or rear faces of the respective seat bottom and seat back cushioning pads. As best illustrated in **FIG. 4**, the flared button heads **75** of the fasteners are secured under the skin of the pad. Essentially, the skin and the associated pads of the foam are molded around the plurality of button heads to secure them to the pad. The shank **80** of the fastener comprises a plurality of thin generally annular disks **85** that extend radially outwardly of a central shaft. The outside diameters of the annular disks are greater than the corresponding holes in the

respective seat back and bottom. One plastic ratchet fastener includes Cat. No. PC47617 available from Index Fasteners, Inc. of Ontario, Calif. It is to be appreciated that the annular disks of the referenced fastener are not fully annular as opposing coaxial grooves extend along the length of the shank essentially splitting each annular disk into two.

[0024] The cushioning pad is coupled to the respective seat back or seat bottom by pushing the pad's ratchet fasteners into the corresponding holes in the seat back or seat bottom as illustrated in **FIG. 2**. The annular disks flex inwardly when pushed into a corresponding hole and once fully pushed through the hole, they spring back to prevent the fastener from being easily pulled from the hole.

Fabrication of a Cushioning Pad According to One Embodiment of the Present Invention

[0025] The cushion pad with integrated fasteners is produced using a self-skinning polyurethane foam in a pressure sealed clam shell mold. One preferred fabricator is Universal Urethanes, Inc. of Las Vegas, Nev.

[0026] Initially, prior to producing a cushioning pad, the interior surfaces of the top and bottom portions of the clam shell mold are treated with a release agent to prevent the pad from sticking to the mold during removal therefrom. Depending on the particular release agent used, the mold may require periodic reapplication of the release agent after a certain number of cushioning pads are produced.

[0027] Next, an aliphatic polyurethane coating is sprayed onto the interior surfaces and permitted to dry. Prior to spraying the aliphatic coating, the coating can be compounded with a desired colorant the ratchet fasteners are placed into openings on one side of the clam shell. The button heads of the fasteners are placed in one half of the mold offset inwardly of the mold's interior surfaces by about 0.12" to 0.25" to provide space between the interior side of the button head and the interior surface of the mold in which a skin can form to secure and hold the fastener in place.

[0028] The proper ratios of MBI isocyanate and resin polyol are then metered into the mold as would be obvious to one with ordinary skill in the art to produce a self skinning foam pad of the specifications indicated above. Prior to metering one or both the components are also compounded with a desired colorant. The top and bottom portions of the clam shell mold are married and clamped together. The mold is warmed to about 100 degrees Fahrenheit to speed and facilitate the chemical reaction between the two components.

[0029] The reaction typically requires about 20 minutes to complete. During the reaction both solid polyurethane and a reaction gas are produced. The reaction gas causes the polyurethane to foam. Because the mold is sealed, high pressures build up in the mold and the polyurethane proximate the mold surfaces is compressed against the mold surfaces forming a skin. The polyurethane skin while still viscous is also forced between the bottoms of the ratchet fasteners and the adjacent corresponding surfaces of the mold to effectively secure the fasteners in place. Once the cure is complete, the cushioning pad is removed from the mold.

Retrofitting Outdoor Stadium Seating

[0030] One application of embodiments of the cushioning pad **35** & **40** is to retrofit stadium seats that have prior art

seat bottom and seat back cushions installed thereon. Initially, the current stadium seating is examined to determine the means by which the prior art cushioning is secured to the seat bottoms and/or backs. While in many instances, the prior art cushioning will be attached using ratchet fasteners, it is appreciated that other means can be used as well including but not limited to snaps, adhesives, threaded bosses, and screws. The configuration and number of the attachment means is determined along with the dimensions of the cushioning.

[0031] Molds for the seat bottom and/or seat back cushioning are designed and produced based on the information gathered concerning the prior art cushioning and the associated seats. The molds are configured to receive and permit the polyurethane material to mold around the appropriate type of attachment means. In the case where cushioning for adhesive bonding to the seat is being molded, the surface of the mold corresponding to the cushioning pad's back or rear face may be left flat or ridges or other formation may be placed on the mold surface to provide divots or channels in which an adhesive can be received to facilitate installation of the new cushioning pad.

[0032] The appropriate colorant additive is chosen and compounded with the polyurethane components to give the resulting cushioning pads a desired color. Typically, although not necessarily, the pads will be matched to one or both the color of the seats which are being retrofitted or the cushioning that is being replaced.

[0033] Next, the cushioning pads are produced in the necessary quantities to retrofit the stadium or a section thereof typically using the process described above.

[0034] The old cushioning is removed from the applicable seating and the replacement cushioning pads are installed as a made to fit replacement. Periodically, the cushioning pads are inspected by the stadium maintenance crew, but the frequency of such inspection can be reduced given the greater longevity and durability of the replacement cushioning pads.

[0035] Embodiments of the cushioning pads can also be used to retrofit stadium seating that was not previously cushioned. In this instance, the size and shape of the cushioning pads would be determined based on the size and shape of the targeted seat backs and seat bottoms. Also, the number and type of attachment means is determined based on the seat back's and bottom's configuration. Typically, where the seat backs and bottoms comprise a hollow molded plastic material, ratchet fasteners will be utilized; however, in certain situations or were other types of seat backs and/or bottoms are used different attachment means may be necessitated. For instance, when fitting cushioning pads to wood slat backs or bottoms, ratchet fasteners which are generally designed to be secured to thin planar substrates may not be suitable in a thick piece of wood. In such an instance, snap fasteners or threaded bosses that receive screws therein from the opposite side of the respective seat back or bottom can be utilized.

[0036] When the seats have not been previously fitted with cushioning, the backs and bottoms will have to be configured to accept the cushioning pads. When ratchet fasteners are utilized, the surfaces of the seat backs and seat bottoms need only be drilled in the appropriate locations to corre-

spond to the fasteners on the associated cushioning pad. However, once the seats are configured, the cushioning pads can be installed in essentially the same manner as indicated above when prior art cushioning is being replaced.

Alternative Embodiments and Other Variations

[0037] The embodiments of the exercise device as illustrated in the accompanying figures and described above are merely exemplary and are not meant to limit the scope of the invention. It is to be appreciated that numerous variations to the invention have been contemplated as would be obvious to one of ordinary skill in the art with the benefit of this disclosure. All variations of the invention that read upon the appended claims are intended and contemplated to be within the scope of the invention.

[0038] Although self-skinning polyurethane foam is specified, other types of self-skinning polymeric foam materials can be used in place of the polyurethane. The type of fasteners molded into the cushioning pad can vary substantially as well as indicated above. The process used to fabricate embodiments of the cushioning pads as indicated above can also vary as would be obvious to one of ordinary skill in the art with the benefit of this disclosure. In at least one alternative embodiment, the self-skinning cushioning can be molded directly to a seat back or seat bottom substructure such that the cushioning is fully integrated with the respective back or bottom. In such an embodiment, the design of the seat back or bottom is designed specifically to securely receive the cushioning thereon. Further, the molds used to fabricate the cushioning, is designed to receive the seat back or bottom therein so that the self-skinning foam can form around the respective seat back or bottom. In another embodiment the seat can comprise bench seating wherein individual seat bottom cushioning pads are provided or an elongated seat bottom cushioning pad is provided that spans all or a significant portion of the bench.

I claim:

1. An outdoor stadium seat comprising:
 - a support structure, the support structure being adapted to be secured to a ground surface;
 - a seat back, the seat back being coupled with the support structure and being adapted to support a back of a person sitting in the outdoor stadium seat;
 - a seat bottom, the seat bottom being coupled with the support structure and being adapted to support the person sitting thereon; and
 - a first cushioning pad, the first cushioning pad comprising (i) a self-skinning foam polymeric material and (ii) a first plurality of fasteners around which the self skinning foam polymeric material is at least partially molded;
 - wherein the first plurality fasteners are fixedly coupled with one of the seat back and the seat bottom on a seating surface thereof.
2. The outdoor stadium seat of claim 1, wherein the seat bottom is pivotally coupled to the support structure and is adapted to move between a generally horizontal orientation and a generally vertical orientation.
3. The outdoor stadium seat of claim 1, further comprising a second cushioning pad, the second cushioning pad comprising (i) the self-skinning foam polymeric material and (ii)

a second plurality of fasteners around which the self skinning foam polymeric material is at least partially molded, wherein the second plurality fasteners are fixedly coupled with the other of the seat back and the seat bottom on a seating surface thereof.

4. The outdoor stadium seat of claim 1, wherein the first cushioning pad is 0.75"-1.25" thick.
5. The outdoor stadium seat of claim 4, wherein the self-skinning foam polymeric material includes a foam portion and a skin portion, the foam portion having a density of about 10-14 pounds per cubic foot, and the skin has a density of about 40-90 pounds per cubic foot.
6. The outdoor stadium seat of claim 1, wherein the self-skinning foam polymeric material comprises polyurethane.
7. The outdoor stadium seat of claim 6, wherein the first cushioning pad further includes an ultraviolet radiation resistant layer overlying the self-skinning foam polymeric material.
8. The outdoor stadium seat of claim 7, wherein the ultraviolet radiation resistant layer comprises an aliphatic material that integrally bonds with the self-skinning foam polymeric material during the formation of the first cushioning pad.
9. The outdoor stadium seat of claim 1, wherein the first plurality of fasteners each comprise a plastic ratchet fastener.
10. A row of interconnected seats in an outdoor stadium comprising the stadium seat of claim 1.
11. A section of stadium seating comprising a plurality of the rows of interconnected seats of claim 10.
12. A cushion adapted for use in outdoor stadium seating, the cushion comprising:
 - a generally rectangularly-shaped pad 0.75-1.25" thick comprising a self skinning polyurethane material and including an integrally formed skin and foam portions, the skin portion having a density of about 40-90 pound per square foot with a thickness of 0.90"-0.135", the foam portion having a density of about 10-14 pounds per cubic foot; and
 - a plurality of plastic ratchet fasteners with a shank extending generally perpendicularly outwardly from a first face of the pad, each ratchet fastener including a head, the pad being molded around the head during fabrication of the cushion.
13. The cushion of claim 12, wherein the skin portion further comprises a ultraviolet radiation resistant layer, the ultraviolet radiation resistant layer covering substantially the entire exterior surface of the pad and being about 0.004-0.007" thick.
14. The cushion of claim 13, wherein the plurality of plastic ratchet fasteners comprise Catalog Number PC47617 from Index Fasteners, Inc. of Ontario, Calif.
15. The cushion of claim 12, wherein the ultraviolet radiation resistant layer comprises an aliphatic polyurethane material.
16. A method of retrofitting a plurality of seats in an outdoor stadium, the method comprising:
 - determining the size of a cushioning pad to be added to the seats by measuring one of (i) a representative seat

of the plurality of seats and (ii) an old cushion from the representative seat;

determining the type, location and number of fasteners to be included on the cushioning pad based on one of (a) the location and type of fastening points on the representative seat relative to the old cushion, and (b) the size of a seating surface on the representative seat on which the cushioning pad is to be fitted;

fabricating a plurality of cushioning pads, each cushioning pad being generally rectangularly shaped and comprising (1) a self skinning polyurethane material including integrally formed skin and foam portions, and (2) a plurality of fasteners molded into the self skinning urethane material during fabrication of the cushioning pad;

installing the plurality of cushioning pads on a plurality of seats.

17. The method of claim 16, further comprising: removing a plurality of old cushions from the plurality of seats.

18. The method of claim 16, further comprising preparing each seat of the plurality of seats to receive the cushioning pad by drilling a plurality of holes in the seating surface of the seat corresponding to locations of the plurality of fasteners on an associated cushioning pad of the plurality of cushioning pads.

19. The method of claim 16, wherein each cushioning pad is 0.75-1.25" thick and includes a skin portion and a foam portion, the foam portion having a density of about 10-14 pounds per cubic foot, and the skin portion having a thickness of about 0.90"-0.135" with a density of about 40-90 pound per square foot.

20. The method of claim 19, wherein the skin portion of each cushioning pad includes an ultraviolet radiation resistant layer cover the exterior of the cushioning pad, the ultraviolet radiation resistant layer being 0.004-0.007" thick and comprising an aliphatic polyurethane material.

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