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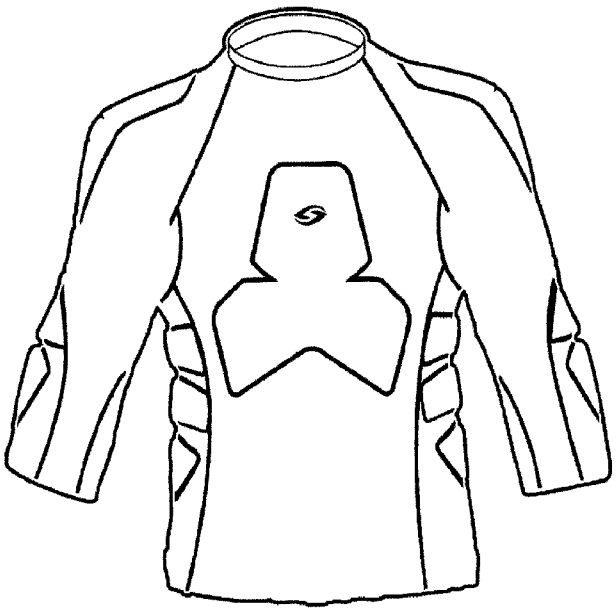
(54) Title: SLOW REBOUND FOAM PADDED SPORTS SHIRT

FIGURE 1.



(57) Abstract: A novel chest pad is attached to or incorporated into the chest area of a jersey, loose undershirt or compression undershirt to help goalkeepers or other players gain control of balls that hit their chests. The novel chest pad is effective to reduce the velocity of a rebounding ball after its impact with the chest while providing protection against impact and abrasion. The slow-rebound foam layer has the property that once compressed, it returns to its pre-compression state slowly relative to other foams. In the context of catching or controlling a soccer ball, this slow-rebound property reduces the foam's pressure on the rebounding ball, thus decreasing its rebounding velocity and allowing a player to catch or control the ball more easily, especially hard shots. A soccer field player wearing a shirt with the chest pad may also find it helpful for trapping soccer balls with their chest.

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— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

TITLE OF INVENTION

SLOW REBOUND FOAM PADDED SPORTS SHIRT

BACKGROUND OF THE INVENTION

[0001] Soccer goalkeepers wear goalkeeper jerseys and sometimes undershirts as part of their uniforms. Often, these jerseys and undershirts have padding around the shoulders, elbows, and along the sides, to protect the goalkeeper from injuries due to impact/collision with the ground, goalposts, and other soccer players. Materials commonly used in these padded areas include yellow foam and ethylene-vinyl acetate (EVA) foam. Goalkeeper jerseys are commonly made of nylon, polyester or other types of synthetic fabric. Goalkeeper undershirts are often made with elastic fabrics, and are meant to adhere closely to the skin of the wearer. These elastic goalkeeper undershirts are commonly referred to as compression shirts.

[0002] Compression shirts and loose fitting undershirts are also commonly worn by players in American-style football, Australian rules football and rugby among other sports in which an outer jersey style overshirt is worn. In many of these sports, a player must control or catch a ball that strikes the player in the chest. Unfortunately there have been no jerseys, undershirts or compression shirts available that include an effective aid in controlling such balls.

SUMMARY OF THE INVENTION

[0003] The present disclosure provides a novel chest pad attached to or incorporated into the chest area of a jersey, loose undershirt or compression undershirt to help goalkeepers or other players gain control of balls that hit their chests. The novel chest pad is effective to reduce the velocity of a rebounding ball after its impact with the chest while providing protection against impact and abrasion. The slow-rebound foam layer has the property that once compressed, it returns to its pre-compression state slowly relative to other foams. In the context of catching or controlling a soccer ball, this slow-rebound property reduces the foam's pressure on the rebounding ball, thus decreasing its rebounding velocity and allowing a player to catch or control the ball more easily, especially hard shots. A soccer field player wearing a shirt with the chest pad may also find it helpful for trapping soccer balls with their chest. While the application of a slow-rebound chest pad described here is directed primarily to soccer, this concept can be applied to any sports where catching or gaining control of the ball is required, including but not limited to American football, Australian rules football, rugby, and baseball.

DESCRIPTION OF THE DRAWING

[0004] The following drawing forms part of the present specification and is included to further demonstrate certain aspects of the present disclosure. The disclosure may be better understood by reference to the drawing in combination with the detailed description of specific embodiments presented herein.

[0005] Fig. 1 is an illustration of a long-sleeve compression shirt with an integrated slow rebound foam pad on the chest. Foams for protection against impacts or abrasion are also shown in the elbow, shoulder and rib areas.

DETAILED DESCRIPTION OF THE INVENTION

[0006] The present disclosure arises at least in part from a need for improved ball control for soccer goalkeepers, soccer field players, football players, or players in any other sport where a fast rebounding ball hampers a player's ability to catch or gain control of the ball. This need is particularly evident in soccer goalkeeper play in which a ball rebounding from a goalkeeper's chest can be played by an opponent into the goal.

[0007] The present disclosure provides, therefore, equipment including a shirt, chest protector, overshirt, undershirt, jersey, or other equipment or clothing in which a player has a need to control a ball that strikes the player's chest during course of play. The slow rebound foam pads of the present disclosure provide this advantage without restricting movement, or preventing dissipation of body heat. The positioning of a chest pad on a shirt, for example, can be anywhere from below the neck to above the waist and is positioned in the most likely place for a ball to strike the player in a particular sport.

[0008] In certain embodiments the pads are composed of one or more foam layers, at least one layer of which is open-cell viscoelastic polyurethane or other foam materials with similar properties. An example of such foam is marketed by Rogers Corporation (Rogers, Connecticut) as Poron® Slow Rebound Foam. The thickness of the slow rebound foam layer can be any appropriate thickness for the sport, level of play or age of the wearer, for example, and in certain embodiments includes one or more layers of from 1 mm to 7 mm inclusive, depending on the amount of rebound absorption required. The durometer of a slow rebound foam can be within the range of 8 to 18. The slow-rebound foam's time to recovery to 90% of pre-compression

thickness is between 0.3 to 0.8 seconds. The compression force deflection of the foam is between 0.3 to 10 psi. The foam can be laminated to other layers of fabric, foam or other sheet material to increase durability or to optimize the impact absorption properties of a chest pad. The foam can also be perforated with holes to improve heat release or ventilation.

[0009] It is an aspect of the present disclosure that sports shirts or equipment incorporating a slow rebound foam pad can include other padded areas for impact protection. In certain embodiments, particularly for a soccer shirt, additional padded areas can include one or more of the elbows, ribs and shoulders. For other sports, such as American football, padding can also be included on at least one of the back, kidney and abdomen areas. The thickness of each padded area will depend on the sport or player position of the user. An example of a soccer shirt with a chest pad as described is shown in Figure 1. Foams for protection against impacts or abrasion are also shown in the elbow, shoulder and rib areas

[0010] In a test to determine the effect on shot absorption of the slow rebound foam, a steel ball of about 0.5 inch diameter and weighing approximately 50 grams was dropped through a tube onto the control foam material and the test material (slow rebound) from a height of approximately 1 meter. The ball dropped on the control rebounded to at least 14 inches while an identical ball dropped on the test material rebounded only about 6 inches, or about half the height of the control. This demonstrates the superior shot absorption of the test material.

[0011] All of the articles, compositions and/or methods disclosed and claimed herein can be made and executed without undue experimentation in light of the present disclosure. While the systems, compositions and methods of this disclosure have been described in terms of certain embodiments, it will be apparent to those of skill in the art that variations may be applied to the systems, compositions and/or methods and in the steps or in the sequence of steps of the method described herein without departing from the concept, spirit and scope of the disclosure. More specifically, it will be apparent that certain physical structures may be substituted for the physical structures described herein and the same or similar results would be achieved. All such similar substitutes and modifications apparent to those skilled in the art are deemed to be within the spirit, scope and concept of the disclosure as defined by the appended claims.

CLAIMS

1. A sports shirt comprising an integrated pad, the pad comprising one or more slow-rebound foam layers affixed to one or more areas of the shirt.

2. The sports shirt of claim 1, wherein a slow-rebound foam layer is affixed to the chest area of the shirt.

3. The sports shirt of claim 1, wherein the one or more slow-rebound foam layer comprises open cell viscoelastic polyurethane.

4. The sports shirt of claim 1, wherein the at least 50% of the pad coverage area has a thickness of from 1 mm to 7 mm.

5. The sports shirt of claim 1, further defined as a goalkeeper's jersey, a soccer jersey, a football jersey, a rugby jersey, an undershirt or a compression shirt.

6. The sports shirt of claim 1, wherein the slow rebound foam has a durometer of from 8 to 18.

7. The sports shirt of claim 1, wherein the slow rebound foam exhibits a time to recovery to 90% of pre-compression thickness of between 0.3 to 0.8 seconds.

8. The sports shirt of claim 1, wherein the compression force deflection of the foam is in the range of 0.3 and 10 psi inclusive.

9. The sports shirt of claim 1, further comprising a protective foam layer affixed to one or more of the elbow, rib, shoulder, back, kidney and abdomen areas of the shirt.

10. An article of sports equipment comprising one or more layers of open cell viscoelastic polyurethane slow-rebound foam effective to reduce ball rebound speed of a ball striking the one or more layers.

11. A soccer goalkeeper's shirt comprising one or more layers of open cell viscoelastic polyurethane slow-rebound foam attached to or incorporated into the chest area of the shirt.

12. The sports shirt of claim 11, wherein the at least 50% of the pad coverage area has a thickness of from 1 mm to 7 mm.

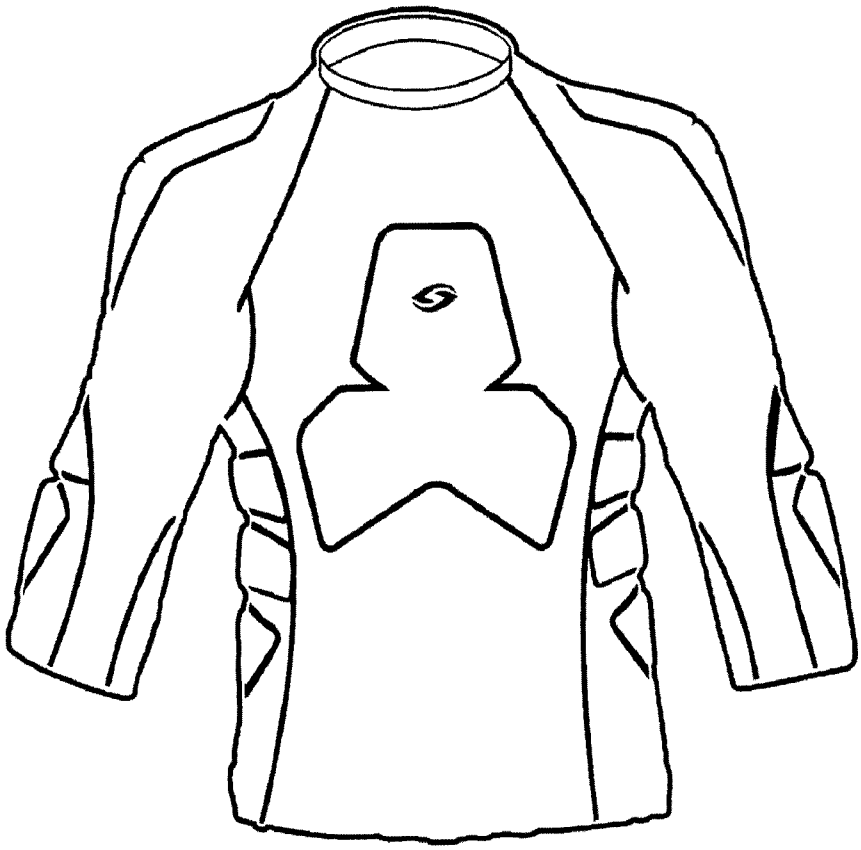
13. The sports shirt of claim 11, wherein the slow rebound foam has a durometer of from 8 to 18.

14. The sports shirt of claim 11, wherein the slow rebound foam exhibits a time to recovery to 90% of pre-compression thickness of between 0.3 to 0.8 seconds.

15. The sports shirt of claim 11, wherein the compression force deflection of the foam is in the range of 0.3 and 10 psi inclusive.

16. The sports shirt of claim 11, further comprising a protective foam layer affixed to one or more of the elbow, rib, shoulder, back, kidney and abdomen areas of the shirt.

FIGURE 1.



INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2011/064189

A. CLASSIFICATION OF SUBJECT MATTER
IPC(8) - A41D 13/05 (2012.01)
USPC - 2/455
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC(8) - A41D 13/015, 13/05 (2012.01)
USPC - 2/455, 463; 521

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
PatBase, Google Patents

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y	US 2005/0081277 A1 (MATECHEN et al) 21 April 2005 (21.04.2005) entire document	1, 3-10 --- 2, 11-16
Y	FR 2 787 298 A1 (GOMARD) 23 June 2000 (23.06.2000) entire document	2, 11-16
A	US 6,391,935 B1 (HAGER et al) 21 May 2002 (21.05.2002) entire document	1-16
A	US 2008/0009556 A1 (SCHNEIDER et al) 10 January 2008 (10.01.2008) entire document	1-16
A	WO 2010/009205 A1 (AOU et al) 21 January 2010 (21.01.2010) entire document	1-16

☐ Further documents are listed in the continuation of Box C. ☐

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
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"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
23 March 2012	26 APR 2012
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201	Authorized officer: Blaine R. Copenheaver PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774