

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
19 February 2004 (19.02.2004)

PCT

(10) International Publication Number  
**WO 2004/014168 A3**

(51) International Patent Classification<sup>7</sup>: **A42B 3/00**

(21) International Application Number:  
PCT/US2003/022501

(22) International Filing Date: 8 August 2003 (08.08.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
60/401,758 8 August 2002 (08.08.2002) US  
60/429,064 26 November 2002 (26.11.2002) US  
60/474,924 3 June 2003 (03.06.2003) US

(71) Applicant and

(72) Inventor: SCHNEIDER, Marc, S. [US/US]; 16620 Bobcat Court, Fort Myers, FL 33908 (US).

(74) Agents: KASPER, Alan, J. et al.; Sughrue Mion, PLLC, 2100 Pennsylvania Ave., N.W., Suite 800, Washington, DC 20037-3213 (US).

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

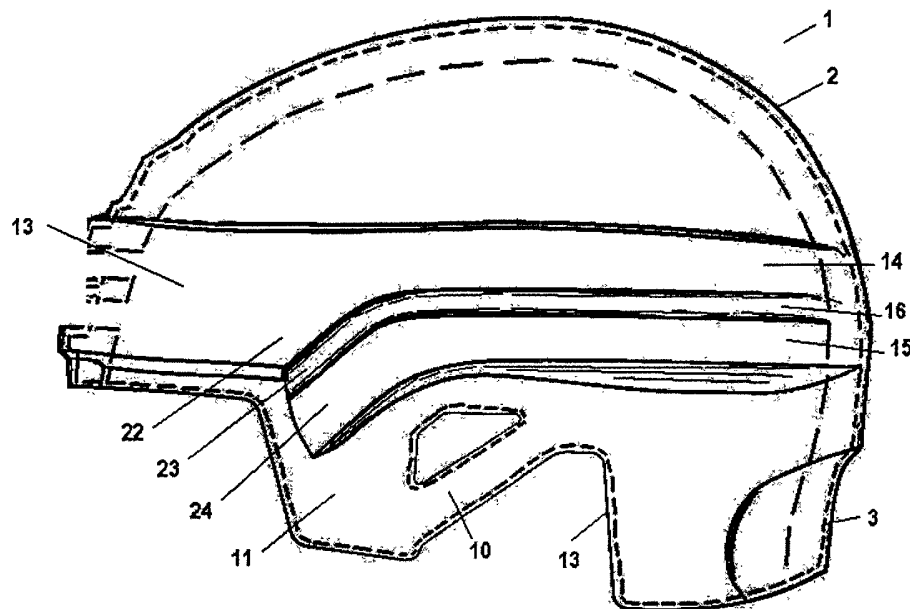
(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

**Published:**

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

[Continued on next page]

(54) Title: ENERGY ABSORBING SPORTS HELMET



(57) Abstract: Slow recovery viscoelastic polyurethane foam (6) with a surface impregnation of silicone (7), coupled with a rigid helmet shell (2), is used for athletic headgear (1). The helmet shell (2) should have a rigid construct to provide dispersion of impact energy, absorbing at least thirty percent of the impact energy delivered to the helmet shell (2). The slow recovery viscoelastic polyurethane foam (6) has unique characteristics making it suitable for use as an energy absorbing liner (4) for athletic headgear (1). The energy absorbing liner (4) can be made with varying thickness and size, so retail establishments can custom fit a helmet (1) to a particular customer.

WO 2004/014168 A3



---

**(88) Date of publication of the international search report:**

21 May 2004

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/22501

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : A42B 3/00  
 US CL : 2/411

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)  
 U.S. : 2/411,412,414,417,418,425

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)  
 Please See Continuation Sheet

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2002/0002730 A1 (DENNIS et al.) 10 January 2002 (10.01.2002), See paragraph 0032.	1,2,4,5,7
---		-----
Y		3,6,8-22
Y	US 6,025,067 A (FAY) 15 February 2000 (15.02.2000), See column 5, lines 53-60.	3,6,16,21
Y	US 6,298,497 B1 (CHARTRAND) 09 October 2001 (09.10.2001), See column 2, lines 45-48.	8,10,13-15,17-20,22
Y	US 4,101,983 A (DERA et al.) 25 July 1978 (25.07.1978), See column 2, lines 22-25.	9
Y	US 3,946,441 A (JOHNSON) 30 March 1976 (30.03.1976), See column 1, lines 17-24.	11
Y	US 3,462,763 A (SCHNEIDER et al.) 26 August 1969 (26.08.1969), See column 4, lines 6-20.	12
A	US 4,027,339 A (BRUCKER) 07 June 1977 (07.06.1977). See all.	1-22
A	US 4,766,610 A (MATTES) 30 August 1988 (30.08.1988). See all.	1-22



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"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
"E" earlier application or patent published on or after the international filing date	"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
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&"	document member of the same patent family
"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		

Date of the actual completion of the international search

17 February 2004 (17.02.2004)

Date of mailing of the international search report

**31 MAR 2004**

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. (703)305-3230

Authorized officer

Rodney M. Lindsey

Telephone No. (703) 872-9301

## INTERNATIONAL SEARCH REPORT

## C. (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 3,366,971 A (SCHERZ) 06 February 1968 (06.02.1968). See all.	1-22
A	US 5,950,244 A (FOURNIER et al.) 14 September 1999 (14.09.1999). See all.	1-22
A	US 4,477,929 A (MATTSSON) 23 October 1984 (23.10.1984). See all.	1-22
A	US 5,946,734 A (VOGAN) 07 September 1999 (07.09.1999). See all.	1-22
A	US 4,808,469 A (HILES) 28 February 1989 (28.02.1989). See all.	1-22
A	US 2,785,404 A (STROHM) 19 March 1957 (19.03.1957). See all.	1-22
A, P	US 6,446,270 B1 (DURR) 10 September 2002 (10.09.2002). See all.	1-22
A	US 3,783,450 A (O'CONNOR) 08 January 1974 (08.01.1974). See all.	1-22
A, T	US 6,604,246 B1 (OBREJA) 12 August 2003 (12.08.2003). See all.	1-22

**INTERNATIONAL SEARCH REPORT**

PCT/US03/22501

**Continuation of B. FIELDS SEARCHED Item 3:**

EAST

search terms: silicone, waterproof, moisture, perspiration, sweat, shell, thickness, pad, liner, hockey, helmet