

POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(b).

I hereby appoint:

☒ Practitioners associated with the Customer Number:

19694

OR

☐ Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

Name	Registration Number	Name	Registration Number

as attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignment documents attached to this form in accordance with 37 CFR 3.73(b).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(b) to:

☒ The address associated with Customer Number:

19694

OR

☐ Firm or Individual Name			
Address			
City	State	Zip	
Country			
Telephone	Email		

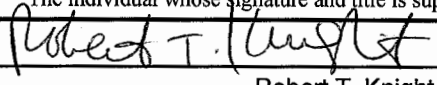
Assignee Name and Address:

Brainguard Technologies, Inc.
1395 Rifle Range Road
El Cerrito, CA 94530

A copy of this form, together with a statement under 37 CFR 3.73(b) (Form PTO/SB/96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(b) may be completed by one of the practitioners appointed in this form if the appointed practitioner is authorized to act on behalf of the assignee, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record

The individual whose signature and title is supplied below is authorized to act on behalf of the assignee

Signature		Date	11-3-11
Name	Robert T. Knight	Telephone	510-237-5285
Title	Founder Brainguard Technologies		

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

REVELYST 1003

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

STATEMENT UNDER 37 CFR 3.73(c)Applicant/Patent Owner: Robert T. KnightApplication No./Patent No.: Not Yet Assigned Filed/Issue Date: HerewithTitled: BIOMECHANICS AWARE HELMETBrainguard Technologies, Inc., a Corporation

(Name of Assignee)

(Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that, for the patent application/patent identified above, it is (choose one of options 1, 2, 3 or 4 below):

1. ☒ The assignee of the entire right, title, and interest.
2. ☐ An assignee of less than the entire right, title, and interest (check applicable box):
- ☐ The extent (by percentage) of its ownership interest is _____%. Additional Statement(s) by the owners holding the balance of the interest must be submitted to account for 100% of the ownership interest.
- ☐ There are unspecified percentages of ownership. The other parties, including inventors, who together own the entire right, title and interest are:

Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

3. ☐ The assignee of an undivided interest in the entirety (a complete assignment from one of the joint inventors was made). The other parties, including inventors, who together own the entire right, title, and interest are:

Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

4. ☐ The recipient, via a court proceeding or the like (e.g., bankruptcy, probate), of an undivided interest in the entirety (a complete transfer of ownership interest was made). The certified document(s) showing the transfer is attached.

The interest identified in option 1, 2 or 3 above (not option 4) is evidenced by either (choose one of options A or B below):

- A. ☒ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel 029836, Frame 0912, or for which a copy thereof is attached.
- B. ☐ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:
1. From: _____ To: _____
- The document was recorded in the United States Patent and Trademark Office at
- Reel _____, Frame _____, or for which a copy thereof is attached.
2. From: _____ To: _____
- The document was recorded in the United States Patent and Trademark Office at
- Reel _____, Frame _____, or for which a copy thereof is attached.

[Page 1 of 2]

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

STATEMENT UNDER 37 CFR 3.73(c)

3. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
 Reel _____, Frame _____, or for which a copy thereof is attached.

4. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
 Reel _____, Frame _____, or for which a copy thereof is attached.

5. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
 Reel _____, Frame _____, or for which a copy thereof is attached.

6. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
 Reel _____, Frame _____, or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

☐ As required by 37 CFR 3.73(c)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/Audrey Kwan/

Signature

Avery Audrey Kwan

Printed or Typed Name

2015-07-24

Date

46850

Title or Registration Number

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Robert T. Knight

Attorney Docket No.: BRGDP001C3

Application No.: Not Yet Assigned

Examiner: Not Yet Assigned

Filed: Herewith

Group: Not Yet Assigned

Title: BIOMECHANICS AWARE HELMET

Confirmation No.: Not Yet Assigned

CERTIFICATE OF EFS-WEB TRANSMISSION

I hereby certify that this correspondence is being transmitted electronically through EFS-WEB to the Commissioner for Patents, P.O. Box 1450 Alexandria, VA 22313-1450 on July 24, 2015.

Signed: /Amber Lundy/
Amber Lundy

INFORMATION DISCLOSURE STATEMENT
37 CFR §§1.56 AND 1.97(b)

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

The references listed in the attached PTO Form 1449 may be material to examination of the above-identified patent application. The Examiner is requested to make the identified references of official record in this application. The above-identified application is a continuation of prior application U.S. Patent Application No. 14/714,093, which is a continuation of prior applications U.S. Patent Application No. 14/485,993. Because some of the listed references were either cited by the USPTO, or submitted to the USPTO in the prior applications, under 37 CFR § 1.98(d), Applicants submit that copies of these references need not be provided. Copies of non-U.S. references that were not cited in the priority applications are attached.

This Information Disclosure Statement is not to be construed as a representation that a search has been made, that additional information material to the examination of this application does not exist, or that the reference(s) indeed constitutes prior art.

This Information Disclosure Statement is: (i) filed within three (3) months of the filing date of the above-referenced application, (ii) believed to be filed before the mailing date of a first Office Action on the merits, or (iii) believed to be filed before the mailing of a first Office Action after the filing of a Request for Continued Examination under §1.114.

Accordingly, it is believed that no fees are due in connection with the filing of this Information Disclosure Statement. However, if it is determined that any fees are due, the Commissioner is hereby authorized to charge such fees to Deposit Account 50-6367. (Order No. BRGDP001C3).

Respectfully submitted,
Kwan & Olynick LLP

/ Audrey Kwan /

Avery Audrey Kwan
Registration No. 46,850

2000 Hearst Avenue, Ste 305
Berkley, CA 94709
510-900-9501 x705

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	Not Yet Assigned
	Filing Date	Herewith
	First Named Inventor	Robert T Knight
	Art Unit	Not Yet Assigned
	Examiner Name	Not Yet Assigned
	Attorney Docket Number	BRGDP001C3

U.S.PATENTS						
Examiner Initial*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		3946441		1976-03-30	Johnson, John R.	
		4352484		1982-10-05	Gertz, David C., et al.	
		5713082		1998-02-03	Bassette, Aldean B., et al.	
		5815846		1998-10-06	Calonge, Rafael	
		5956777		1999-09-28	Popovich, Darko D.	
		6103641		2000-08-15	Gehring Jr., George G.	
		6145348		2000-11-14	Hardegree, Mike et al.	
		6378140		2002-04-30	Abraham, Carl J., et al.	
		6434755		2002-08-20	Halstead, David P., et al.	
		20030088906	A1	2003- 05-15	Baker, Gregg S.	
		6658671		2003-12-09	Von Holst, Hans et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	Not Yet Assigned
	Filing Date	Herewith
	First Named Inventor	Robert T Knight
	Art Unit	Not Yet Assigned
	Examiner Name	Not Yet Assigned
	Attorney Docket Number	BRGDP001C3

		6728969		2004- 05-04	Zeiler, Bernard	
		20040126565	A1	2004-07-01	Naganathan, Ganapathy et al.	
		6996856		2006-02-14	Puchalski, lone G.	
		20060059605	A1	2006-03-23	Ferrara, Vincent R.	
		7076811		2006-07-18	Puchalski, lone G.	
		7254843		2007-08-14	Talluri, Srikrishna	
		20080066217	A1	2008-03-20	Depreitere, Bart et al.	
		20110004980	A1	2011-01-13	Leatt, Christopher J., et al.	
		8176574		2012- 05-15	Bryant, Mark et al.	
		20130019384	A1	2013-01-24	Knight, Robert T.	
		8533869		2013-09-17	Capuano, Sonya A.	
		8863319		2014-10-21	Knight, Robert T.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	Not Yet Assigned
	Filing Date	Herewith
	First Named Inventor	Robert T Knight
	Art Unit	Not Yet Assigned
	Examiner Name	Not Yet Assigned
	Attorney Docket Number	BRGDP001C3

		20150000014	A1	2015-01-01	Knight, Robert T.	
		9060561		2015-06-23	Knight, Robert T.	

U.S.PATENT APPLICATION PUBLICATIONS

Examiner Initial*	Cite No	Publication Number	Kind Code ¹	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
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FOREIGN PATENT DOCUMENTS

Examiner Initial*	Cite No	Foreign Document Number ³	Country Code ²	Kind Code ⁴	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T ⁵
		0145526	WO	A1	2001-06-28	Von Holst, Hans et al.		
		2004032659	WO	A1	2004-04-22	Madey, Steven M., et al.		
		1050905	SE	A1	2011-07-14	Halldin, Peter et al.		
		2011087435	WO	A1	2011-07-21	Halldin, Peter et al.		
		2012109381	WO	A1	2012-08-16	Weber, Robert et al.		
		2013013180	WO	A1	2013-01-24	Knight, Robert		
		2734071	EP		2014- 05-28	Knight, Robert T.		

NON-PATENT LITERATURE DOCUMENTS

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	Not Yet Assigned
	Filing Date	Herewith
	First Named Inventor	Robert T Knight
	Art Unit	Not Yet Assigned
	Examiner Name	Not Yet Assigned
	Attorney Docket Number	BRGDP001C3

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ⁵
		"Application Serial No. 13/554,471, Non Final Office Action mailed 05-22-14", 5 pgs.	
		"Application Serial No. 13/554,471, Notice of Allowance mailed 07-15-14", 5 pgs.	
		"Application Serial No. 14/485,993, Non Final Office Action mailed 10-28-14", 6 pgs.	
		"Application Serial No. 14/485,993, Notice of Allowance mailed 03-19-15", 5 pgs.	
		"European Application Serial No. 12814787.3, Search Report and Opinion mailed 03-30-15", 6 pgs.	
		"Helmet with Fluid Layer that Protects Against a Common Cause of Head Injury", Office of Technology Licensing, University of Florida, [Online]. Retrieved from the Internet: < http://apps.research.ufl.edu/otl/pdf/marketing/13586.pdf > Accessed on 7/12/12, 2 pgs.	
		"International Application Serial No. PCT/US2012/047662, Written Opinion mailed 10-05-12", 8 pgs.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	Not Yet Assigned
	Filing Date	Herewith
	First Named Inventor	Robert T Knight
	Art Unit	Not Yet Assigned
	Examiner Name	Not Yet Assigned
	Attorney Docket Number	BRGDP001C3

		"International Application Serial No. PCTUS2012/047662, Search Report and Written Opinion mailed 10-05-12", 7 pgs.	
		"Int'l Application Serial No. PCT/US2012/047662, Preliminary Report on Patentability mailed 01-30-14", 7 pgs.	
		"Lazer Helmets", [Online]. Retrieved from the Internet: < http://www.lazerhelmets.com/wp-content/uploads/2011/04/Catalogue-Motorcycling-2010-UK.pdf >, 14 pgs.	
		"Proposal for a Novel Helmet Design", Brainguard Technologies, 14 pgs.	
		BOSCH, HENRICUS V. , "Crash Helmet Testing and Design Specifications", University Press Facilities, Eindhoven, The Netherlands, 2006, 179 pgs.	
		COLLINS, MICKY , "Examining Concussion Rates and Return to Play in High School Football Players Wearing Newer Helmet Technology: A Three-Year Prospective Cohort Study", Neurosurgery, Vol. 58, No. 2, February 2006, 12 pgs.	
		GOEL, R , "Design of an Advanced Helmet Liner User Simulations", [Online]. Retrieved from the Internet: < http://mvl.mit.edu/MVLpubs/MVL_10.07_Goel.pdf > Accessed on 3/13/12, 8 pgs.	
		MAY, PHILIP R. , "Woodpecker Drilling Behavior: An Endorsement of the Rotational Theory of Impact Brain Injury", Arch Neural, Vol. 36,, June 1979, pgs. 370-373	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	Not Yet Assigned
	Filing Date	Herewith
	First Named Inventor	Robert T Knight
	Art Unit	Not Yet Assigned
	Examiner Name	Not Yet Assigned
	Attorney Docket Number	BRGDP001C3

		VIANO, DAVID C. , "Concussion in Professional Football: Brain Responses by Finite Element Analysis: Part 9", Neurosurgery, Vol. 57, No. 5, November 2005, pgs. 891-916	
		WANG, LIZHEN , "Why do Woodpeckers Resist Head Impact Injury: A Biomechanical Investigation", PLoS One, Vol. 6, No. 10, October 2011, 8 pgs.	
EXAMINER SIGNATURE			
Examiner Signature		Date Considered	
*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.			
¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.			

Electronic Patent Application Fee Transmittal

Application Number:

Filing Date:

Title of Invention:

BIOMECHANICS AWARE HELMET

First Named Inventor/Applicant Name:

Robert T. Knight

Filer:

Avery Audrey Kwan/Amber Lundy

Attorney Docket Number:

BRGDP001C3

Filed as Small Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Utility filing Fee (Electronic filing)	4011	1	70	70
Utility Search Fee	2111	1	300	300
Utility Examination Fee	2311	1	360	360

Pages:

Claims:

Miscellaneous-Filing:

Petition:

Patent-Appeals-and-Interference:

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				730

Electronic Acknowledgement Receipt

EFS ID:	23021619
Application Number:	14809142
International Application Number:	
Confirmation Number:	5385
Title of Invention:	BIOMECHANICS AWARE HELMET
First Named Inventor/Applicant Name:	Robert T. Knight
Customer Number:	19694
Filer:	Avery Audrey Kwan/Amber Lundy
Filer Authorized By:	Avery Audrey Kwan
Attorney Docket Number:	BRGDP001C3
Receipt Date:	24-JUL-2015
Filing Date:	
Time Stamp:	22:06:19
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$730
RAM confirmation Number	6575
Deposit Account	506367
Authorized User	KWAN, AVERY AUDREY

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		BRGDP001C3_Application_file d_07-24-15.pdf	2427864	yes	47
			aab196a427e0ca73e5cf29eef9c50d77cfa72d60		
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Application Data Sheet		1	6	
	Specification		7	25	
	Claims		26	28	
	Abstract		29	29	
	Drawings-only black and white line drawings		30	35	
	Oath or Declaration filed		36	36	
	Power of Attorney		37	37	
	Assignee showing of ownership per 37 CFR 3.73		38	39	
	Transmittal Letter		40	41	
	Information Disclosure Statement (IDS) Form (SB08)		42	47	
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	35216	no	2
			2c2e12ffc4bcd7f73aa8d682f700f32233281d40		
Warnings:					
Information:					
Total Files Size (in bytes):			2463080		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	BRGDP001C3
		Application Number	
Title of Invention	BIOMECHANICS AWARE HELMET		
The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76. This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.			

Secrecy Order 37 CFR 5.2

☐	Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)
--------------------------	---

Inventor Information:

Inventor 1					Remove	
Legal Name						
Prefix	Given Name	Middle Name	Family Name	Suffix		
	Robert	T.	Knight			
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service						
City	Berkeley	State/Province	CA	Country of Residence	US	
Mailing Address of Inventor:						
Address 1		1395 Rifle Range Road				
Address 2						
City	El Cerrito	State/Province	CA			
Postal Code	94530	Country	US			
All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the Add button.						

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below. For further information see 37 CFR 1.33(a).			
☐ An Address is being provided for the correspondence information of this application.			
Customer Number	19694		
Email Address	docket@kwanip.com	Add Email	Remove Email

Application Information:

Title of the Invention	BIOMECHANICS AWARE HELMET		
Attorney Docket Number	BRGDP001C3	Small Entity Status Claimed	☒
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	6	Suggested Figure for Publication (if any)	

Filing By Reference :

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	BRGDP001C3
		Application Number	
Title of Invention	BIOMECHANICS AWARE HELMET		

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32). Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	☒ Customer Number	☐ US Patent Practitioner	☐ Limited Recognition (37 CFR 11.9)
Customer Number	19694		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.

When referring to the current application, please leave the application number blank.

Prior Application Status	Pending	Remove			
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)		
Herewith	Continuation of	14714093	2015-05-15		
Prior Application Status	Patented	Remove			
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
14714093	Continuation of	14485993	2014-09-15	9060561	2015-06-23
Prior Application Status	Patented	Remove			

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	BRGDP001C3
		Application Number	
Title of Invention	BIOMECHANICS AWARE HELMET		

Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
14485993	Continuation of	13554471	2012-07-20	8863319	2014-10-21
Prior Application Status	Expired		Remove		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)		
13554471	Claims benefit of provisional	61510401	2011-07-21		
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Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(d). When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)ⁱ the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(h)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

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Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.

☐ NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

Authorization to Permit Access:

☐ Authorization to Permit Access to the Instant Application by the Participating Offices

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	BRGDP001C3
		Application Number	
Title of Invention	BIOMECHANICS AWARE HELMET		

If checked, the undersigned hereby grants the USPTO authority to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the World Intellectual Property Office (WIPO), and any other intellectual property offices in which a foreign application claiming priority to the instant patent application is filed access to the instant patent application. See 37 CFR 1.14(c) and (h). This box should not be checked if the applicant does not wish the EPO, JPO, KIPO, WIPO, or other intellectual property office in which a foreign application claiming priority to the instant patent application is filed to have access to the instant patent application.

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☒ Assignee		☐ Legal Representative under 35 U.S.C. 117	
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If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:			
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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	BRGDP001C3
		Application Number	
Title of Invention	BIOMECHANICS AWARE HELMET		

Email Address	
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Assignee Information including Non-Applicant Assignee Information:

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If the Assignee or Non-Applicant Assignee is an Organization check here. ☒	
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Signature:

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Signature	/Audrey Kwan/			Date (YYYY-MM-DD)	2015-07-24
First Name	Avery Audrey	Last Name	Kwan	Registration Number	46850
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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	BRGDP001C3
		Application Number	
Title of Invention	BIOMECHANICS AWARE HELMET		

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

BIOMECHANICS AWARE HELMET

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BIOMECHANICS AWARE HELMET

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims benefit under 35 U.S.C. § 120 to U.S. Application No. 14/714,093, entitled BIOMECHANICS AWARE PROTECTIVE GEAR, filed May 15, 2015 (Attorney Docket No. BRGDP001C2), which claims benefit under 35 U.S.C. § 120 to U.S. Application No. 14/485,993, entitled BIOMECHANICS AWARE HELMET, filed September 15, 2014, now issued as U.S Patent No. 9,060,561 on June 23, 2015 (Attorney Docket No. BRGDP001C1), which claims benefit under 35 U.S.C. § 120 to U.S. Application No.13/554,471, entitled BIOMECHANICS AWARE PROTECTIVE GEAR, filed July 20, 2012, now issued as U.S. Patent No. 8,863,319 on October 21, 2014 (Attorney Docket No. BRGDP001), which claims priority to U.S. Provisional Patent Application No. 61/510,401, entitled SMART BIOMECHANICS AWARE ENERGY CONSCIOUS PROTECTIVE GEAR WITH TISSUE PROTECTION, filed on July 21, 2011 (Attorney Docket No. BRGDP001P), all of which are incorporated herein by reference for all purposes.

TECHNICAL FIELD

[0002] The present disclosure relates to biomechanics aware protective gear.

DESCRIPTION OF RELATED ART

[0003] Protective gear such as sports and safety helmets are designed to reduce direct impact forces that can mechanically damage an area of contact. Protective gear will typically include padding and a protective shell to reduce the risk of physical head injury. Liners are provided beneath a hardened exterior shell to reduce violent deceleration of the head in a smooth uniform manner and in an extremely short distance, as liner thickness is typically limited based on helmet size considerations.

[0004] Protective gear is reasonably effective in preventing injury. Nonetheless, the effectiveness of protective gear remains limited. Consequently, various mechanisms are provided to improve protective gear in a biomechanically aware manner.

Brief Description of the Drawings

[0005] The disclosure may best be understood by reference to the following description taken in conjunction with the accompanying drawings, which illustrate particular embodiments.

[0006] Figure 1 illustrates types of forces on axonal fibers.

[0007] Figure 2 illustrates one example of a piece of protective gear.

[0008] Figure 3 illustrates one example of a container device system.

[0009] Figure 4 illustrates another example of a container device system.

[0010] Figure 5 illustrates one example of a multiple shell system.

[0011] Figure 6 illustrates one example of a multiple shell helmet.

DESCRIPTION OF EXAMPLE EMBODIMENTS

[0012] Reference will now be made in detail to some specific examples of the invention including the best modes contemplated by the inventors for carrying out the invention. Examples of these specific embodiments are illustrated in the accompanying drawings. While the invention is described in conjunction with these specific embodiments, it will be understood that it is not intended to limit the invention to the described embodiments. On the contrary, it is intended to cover alternatives, modifications, and equivalents as may be included within the spirit and scope of the invention as defined by the appended claims.

[0013] For example, the techniques of the present invention will be described in the context of helmets. However, it should be noted that the techniques of the present invention apply to a wide variety of different pieces of protective gear. In the following description, numerous specific details are set forth in order to provide a thorough understanding of the present invention. Particular example embodiments of the present invention may be implemented without some or all of these specific details. In other instances, well known process operations have not been described in detail in order not to unnecessarily obscure the present invention.

[0014] Various techniques and mechanisms of the present invention will sometimes be described in singular form for clarity. However, it should be noted that some embodiments include multiple iterations of a technique or multiple instantiations of a mechanism unless noted otherwise. For example, a protective device may use a single strap in a variety of contexts. However, it will be appreciated that a system can use multiple straps while remaining within the scope of the present invention unless otherwise noted. Furthermore, the techniques and mechanisms of the present invention will sometimes describe a connection between two entities. It should be noted that a connection between two entities does not necessarily mean a direct, unimpeded connection, as a variety of other entities may reside between the two entities. For example, different layers may be connected using a variety of materials. Consequently, a connection does not necessarily mean a direct, unimpeded connection unless otherwise noted.

[0015] Overview

[0016] Protective gear includes an outer shell layer connected to a middle shell layer through an outer energy and impact transformer layer. The middle shell layer is connected to an inner shell layer through an inner energy and impact transformer layer. The outer and inner energy and impact transformer layers flexibly connect the shell layers to absorb impact forces, rotational forces, shear forces, etc., and allow the various shell layers to move and slide relative to the other shell layers. The outer and inner energy and impact transformer layers may be constructed using gels, fluids, electro-rheological elements, magneto-rheological elements, etc. The protective gear may be formed as helmets or body protection for various activities and may be used to protect users from not only impact and penetrative forces, but rotational and shear forces as well.

[0017] Example Embodiments

[0018] Protective gear such as knee pads, shoulder pads, and helmets are typically designed to prevent direct impact injuries or trauma. For example, many pieces of protective gear reduce full impact forces that can structurally damage an area of contact such as the skull or knee. Major emphasis is placed on reducing the likelihood of cracking or breaking of bone. However, the larger issue is preventing the tissue and neurological damage caused by rotational forces, shear forces, oscillations, and tension/compression forces.

[0019] For head injuries, the major issue is neurological damage caused by oscillations of the brain in the cranial vault resulting in coup-contracoup injuries manifested as direct contusions to the central nervous system (CNS), shear injuries exacerbated by rotational, tension, compression, and /or shear forces resulting in demyelination and tearing of axonal fibers; and subdural or epidural hematomas. Because of the emphasis in reducing the likelihood of cracking or breaking bone, many pieces of protective gear do not sufficiently dampen, transform, dissipate, and/or distribute the rotational, tension, compression, and/or shear forces, but rather focus on absorbing the direct impact forces over a small area, potentially exacerbating the secondary forces on the CNS. Initial mechanical damage results in a secondary

cascade of tissue and cellular damage due to increased glutamate release or other trauma induced molecular cascades.

[0020] Traumatic brain injury (TBI) has immense personal, societal and economic impact. The Center for Disease Control and Prevention documented 1.4 million cases of TBI in the USA in 2007. This number was based on patients with a loss of consciousness from a TBI resulting in an Emergency Room visit. With increasing public awareness of TBI this number increased to 1.7 million cases in 2010. Of these cases there were 52,000 deaths and 275,000 hospitalizations, with the remaining 1.35 million cases released from the ER. Of these 1.35 million discharged cases at least 150,000 people will have significant residual cognitive and behavioral problems at 1-year post discharge from the ER. Notably, the CDC believes these numbers under represent the problem since many patients do not seek medical evaluation for brief loss of consciousness due to a TBI. These USA numbers are similar to those observed in other developed countries and are likely higher in third-world countries with poorer vehicle and head impact protection. To put the problem in a clearer perspective, the World Health Organization (WHO) anticipates that TBI will become a leading cause of death and disability in the world by the year 2020.

[0021] The CDC numbers do not include head injuries from military actions. Traumatic brain injury is widely cited as the “signature injury” of Operation Enduring Freedom and Operation Iraqi Freedom. The nature of warfare conducted in Iraq and Afghanistan is different from that of previous wars and advances in protective gear including helmets as well as improved medical response times allow soldiers to survive events such as head wounds and blast exposures that previously would have proven fatal. The introduction of the Kevlar helmet has drastically reduced field deaths from bullet and shrapnel wounds to the head. However, this increase in survival is paralleled by a dramatic increase in residual brain injury from compression and rotational forces to the brain in TBI survivors. Similar to that observed in the civilian population the residual effects of military deployment related TBI are neurobehavioral symptoms such as cognitive deficits and emotional and somatic complaints. The statistics provided by the military cite an incidence of 6.2% of head injuries in combat zone veterans. One might expect these numbers to hold in other countries.

[0022] In addition to the incidence of TBI in civilians from falls and vehicular accidents or military personnel in combat there is increasing awareness that sports-related repetitive forces applied to the head with or without true loss of consciousness can have dire long-term consequences. It has been known since the 1920's that boxing is associated with devastating long-term issues including "dementia pugilistica" and Parkinson-like symptoms (i.e. Mohammed Ali). We now know that this repetitive force on the brain dysfunction extends to many other sports. Football leads the way in concussions with loss of consciousness and post-traumatic memory loss (63% of all concussions in all sports), wrestling comes in second at 10% and soccer has risen to 6% of all sports related TBIs. In the USA 63,000 high school students suffer a TBI per year and many of these students have persistent long-term cognitive and behavioral issues. This disturbing pattern extends to professional sports where impact forces to the body and head are even higher due to the progressive increase in weight and speed of professional athletes. Football has dominated the national discourse in the area but serious and progressive long-term neurological issues are also seen in hockey and soccer players and in any sport with the likelihood of a TBI. Repetitive head injuries result in progressive neurological deterioration with neuropathological findings mimicking Alzheimer's disease. This syndrome with characteristic post-mortem neuropathological findings on increases in Tau proteins and amyloid plaques is referred to as Chronic Traumatic Encephalopathy (CTE).

[0023] The human brain is a relatively delicate organ weighing about 3 pounds and having a consistency a little denser than gelatin and close to that of the liver. From an evolutionary perspective, the brain and the protective skull were not designed to withstand significant external forces. Because of this poor impact resistance design, external forces transmitted through the skull to the brain that is composed of over 100 billion cells and up to a trillion connecting fibers results in major neurological problems. These injuries include contusions that directly destroy brain cells and tear the critical connecting fibers necessary to transmit information between brain cells.

[0024] Contusion injuries are simply bleeding into the substance of the brain due to direct contact between the brain and the bony ridges of the inside of the skull. Unfortunately, the brain cannot tolerate blood products and the presence of blood kicks off a biological cascade that further damages the brain. Contusions are due to

the brain oscillating inside the skull when an external force is applied. These oscillations can include up to three cycles back and forth in the cranial vault and are referred to as coup-contra coup injuries. The coup part of the process is the point of contact of the brain with the skull and the contra-coup is the next point of contact when the brain oscillates and strikes the opposite part of the inside of the skull.

[0025] The inside of the skull has a series of sharp bony ridges in the front of the skull and when the brain is banged against these ridges it is mechanically torn resulting in a contusion. These contusion injuries are typically in the front of the brain damaging key regions involved in cognitive and emotional control.

[0026] Shear injuries involve tearing of axonal fibers. The brain and its axonal fibers are extremely sensitive to rotational forces. Boxers can withstand hundreds of punches directly in the face but a single round-house punch or upper cut where the force comes in from the side or bottom of the jaw will cause acute rotation of the skull and brain and typically a knock-out. If the rotational forces are severe enough, the result is tearing of axons.

[0027] Figure 1 below shows how different forces affect axons. Compression 101 and tension 103 can remove the protective coating on an axon referred to as a myelin sheath. The myelin can be viewed as the rubber coating on a wire. If the internal wire of the axon is not cut the myelin can re-grow and re-coat the “wire” which can resume axonal function and brain communication. If rotational forces are significant, shear forces 105 tear the axon. This elevates the problem since the ends of cut axons do not re-attach. This results in a permanent neurological deficit and is referred to as diffuse axonal injury (DAI), a major cause of long-term neurological disability after TBI.

[0028] Some more modern pieces of protective gear have been introduced with the awareness that significant injuries besides musculoskeletal or flesh injuries in a variety of activities require new protective gear designs.

[0029] U.S. Patent 7,076,811 issued to Puchalski describes a helmet with an impact absorbing crumple or shear zone. "The shell consists of three (or more) discrete panels that are physically and firmly coupled together providing rigid protection

under most circumstances, but upon impact the panels move relative to one another, but not relative to the user's head, thereby permitting impact forces to be dissipated and/or redirected away from the cranium and brain within. Upon impact to the helmet, there are sequential stages of movement of the panels relative to each other, these movements initially being recoverable, but with sufficient vector forces the helmet undergoes structural changes in a pre-determined fashion, so that the recoverable and permanent movements cumulatively provide a protective 'crumple zone' or 'shear zone'."

[0030] U.S. Patent 5,815,846 issued to Calonge describes "An impact resistant helmet assembly having a first material layer coupled to a second material layer so as to define a gas chamber therebetween which contains a quantity that provides impact dampening upon an impact force being applied to the helmet assembly. The helmet assembly further includes a containment layer disposed over the second material layer and structured to define a fluid chamber in which a quantity of fluid is disposed. The fluid includes a generally viscous gel structured to provide some resistance against disbursement from an impacted region of the fluid chamber to non-impacted regions of the fluid chamber, thereby further enhance the impact distribution and dampening of the impact force provided by the helmet assembly."

[0031] U.S. Patent 5,956,777 issued to Popovich describes "A helmet for protecting a head by laterally displacing impact forces, said helmet comprising: a rigid inner shell formed as a single unit; a resilient spacing layer disposed outside of and in contact with said inner shell; and an articulated shell having a plurality of discrete rigid segments disposed outside of and in contact with said resilient spacing layer and a plurality of resilient members which couple adjacent ones of said rigid segments to one another."

[0032] U.S. Patent 6,434,755 issued to Halstead describes a football helmet with liner sections of different thicknesses and densities. The thicker, softer sections would handle less intense impacts, crushing down until the thinner, harder sections take over to prevent bottoming out.

[0033] Still other ideas relate to using springs instead of crushable materials to manage the energy of an impact. Springs are typically associated with rebound, and energy stored by the spring is returned to the head. This may help in some instances, but can still cause significant neurological injury. Avoiding energy return to the head is a reason that non-rebounding materials are typically used.

[0034] Some of the protective gear mechanisms are not sufficiently biomechanically aware and are not sufficiently customized for particular areas of protection. These protective gear mechanisms also are not sufficiently active at the right time scales to avoid damage. For example, in many instances, materials like gels may only start to convert significant energy into heat after significant energy has been transferred to the brain. Similarly, structural deformation mechanisms may only break and absorb energy after a significant amount of energy has been transferred to the brain.

[0035] Current mechanisms are useful for particular circumstances but are limited in their ability to protect against numerous types of neurological damage. Consequently, an improved smart biomechanics aware and energy conscious protective gear mechanism is provided to protect against mechanical damage as well as neurological damage.

[0036] According to various embodiments, protective gear such as a helmet includes a container device to provide a structural mechanism for holding an energy and impact transformer. The design of this element could be a part of the smart energy conscious biomechanics aware design for protection. The energy and impact transformer includes a mechanism for the dissipation, transformation, absorption, redirection or force/energy at the right time scales (in some cases as small as a few milliseconds or hundreds of microseconds).

[0037] In particular embodiments, the container mechanism provides structure to allow use of an energy and impact transformer. The container mechanism may be two or three shells holding one or more layers of energy and impact transformer materials. That is, a multiple shell structure may have energy and impact transformer materials between adjacent shell layers. The shells may be designed to prevent direct penetration from any intruding or impeding object. In some examples, the outer shell

may be associated with mechanisms for impact distribution, energy transformation, force dampening, and shear deflection and transformation. In some examples, the container mechanism can be constructed of materials such as polycarbonate, fiberglass, Kevlar, metal, alloys, combinations of materials, etc.

[0038] According to various embodiments, the energy and impact transformer provides a mechanism for the dissipation, transformation, absorption, and redirection of force and energy at the appropriate time scales. The energy and impact transformer may include a variety of elements. In some examples, a mechanical transformer element connects multiple shells associated with a container mechanism with mechanical structures or fluids that help transform the impact or shear forces on an outer shell into more benign forces or energy instead of transferring the impact or shear forces onto an inner shell.

[0039] In some examples, a mechanical transformer layer is provided between each pair of adjacent shells. The mechanical transform may use a shear truss-like structure connecting an outer shell and an inner shell that dampens any force or impact. In some examples, shear truss structure layers connect an outer shell to a middle shell and the middle shell to an inner shell. According to various embodiments, the middle shell or center shell may slide relative to the inner shell and reduce the movement and/or impact imparted on an outer shell. In particular embodiments, the outer shell may slide up to several centimeters relative to the middle shell. In particular embodiments, the material used for connecting the middle shell to the outer shell or the inner shell could be a material that absorbs/dissipates mechanical energy as thermal energy or transformational energy. The space between the outer shell, the middle shell, and the inner shell can be filled with absorptive/dissipative material such as fluids and gels.

[0040] According to various embodiments, the energy and impact transformer may also include an electro-rheological element. Different shells may be separated by an electro-rheological element with electric field dependent viscosity. The element may essentially stay solid most of the time. When there is stress/strain on an outer shell, the electric field is activated so that the viscosity changes depending on the level of

stress/strain. Shear forces on an inner shell are reduced to minimize impact transmission.

[0041] In particular embodiments, the energy and impact transformer also includes a magneto-rheological element. Various shells may be separated by magneto rheological elements with magnetic field dependent viscosity. The element may essentially stay solid most of the time. When there is stress/strain on an outer shell, the magnetic field is activated so that the viscosity changes depending on the level of stress/strain. Shear forces on an inner shell are reduced to minimize impact transmission.

[0042] Electro-rheological and magneto-rheological elements may include smart fluids with properties that change in the presence of electric field or a magnetic field. Some smart fluids undergo changes in viscosity when a magnetic field is applied. For example, a smart fluid may change from a liquid to a gel when magnets line up to create a magnetic field. Smart fluids may react within milliseconds to reduce impact and shear forces between shells.

[0043] In other examples, foam and memory foam type elements may be included to absorb and distribute forces. In some examples, foam and memory foam type elements may reside beneath the inner shell. A magnetic suspension element may be used to actively or passively reduce external forces. An inner core and an outer core may be separated by magnets that resist each other, e.g. N-poles opposing each other. The inner and outer cores naturally would want to move apart, but are pulled together by elastic materials. When an outer shell is impact and the magnets are pushed closer, forces between the magnets increase through the air gap.

[0044] According to various embodiments, a concentric geodesic dome element includes a series of inner shells, each of which is a truss based geodesic dome, but connected to the outer geodesic through structural or fluidic mechanisms. This allows each geodesic structure to fully distribute its own shock load and transmit it in a uniform manner to the dome underneath. The sequence of geodesic structures and the separation by fluid provides uniform force distribution and/or dissipation that protects the inner most shell from these impacts.

[0045] In particular embodiments, a fluid/accordion element would separate an inner shell and an outer shell using an accordion with fluid/gel in between. This would allow shock from the outer core to be transmitted and distributed through the enclosed fluid uniformly while the accordion compresses to accommodate strain. A compressed fluid/piston/spring element could include piston/cylinder like elements with a compressed fluid in between that absorbs the impact energy while increasing the resistance to the applied force. The design could include additional mechanical elements like a spring to absorb/dissipate the energy.

[0046] In still other examples, a fiber element involves using a rippled outer shell with texture like that of a coconut. The outer shell may contain dense coconut fiber like elements that separate the inner core from the outer core. The shock can be absorbed by the outer core and the fibrous filling. Other elements may also be included in an inner core structure. In some examples, a thick stretchable gel filled bag wrapped around the inner shell could expand and contract in different areas to instantaneously transfer and distribute forces. The combination of the elasticity of a bag and the viscosity of the gel could provide for cushioning to absorb/dissipate external forces.

[0047] According to various embodiments, a container device includes multiple shells such as an outer shell, a middle shell, and an inner shell. The shells may be separated by energy and impact transformer mechanisms. In some examples, the shells and the energy and impact transformer mechanisms can be integrated or a shell can also operate as an energy and impact transformer.

[0048] Figure 2 illustrates one example of a particular piece of protective gear. Helmet 201 includes a shell layer 211 and a lining layer 213. The shell layer 211 includes attachment points 215 for a visor, chin bar, face guard, face cage, or face protection mechanism generally. In some examples, the shell layer 211 includes ridges 217 and/or air holes for breathability. The shell layer 211 may be constructed using plastics, resins, metal, composites, etc. In some instances, the shell layer 211 may be reinforced using fibers such as aramids. The shell layer 211 helps to distribute mechanical energy and prevent penetration. The shell layer 211 is typically made using lighter weight materials to prevent the helmet itself from causing injury.

[0049] According to various embodiments, a chin strap 221 is connected to the helmet to secure helmet positioning. The shell layer 211 is also sometimes referred to as a container or a casing. In many examples, the shell layer 211 covers a lining layer 213. The lining layer 213 may include lining materials, foam, and/or padding to absorb mechanical energy and enhance fit. A lining layer 213 may be connected to the shell layer 211 using a variety of attachment mechanisms such as glue or Velcro. According to various embodiments, the lining layer 213 is pre-molded to allow for enhanced fit and protection. According to various embodiments, the lining layer may vary, e.g. from 4mm to 40mm in thickness, depending on the type of activity a helmet is designed for. In some examples, custom foam may be injected into a fitted helmet to allow for personalized fit. In other examples, differently sized shell layers and lining layers may be provided for various activities and head sizes.

[0050] The shell layer 211 and lining layer 213 protect the skull nicely and have resulted in a dramatic reduction in skull fractures and bleeding between the skull and the brain (subdural and epidural hematomas). Military helmets use Kevlar to decrease penetrating injuries from bullets, shrapnel etc. Unfortunately, these approaches are not well designed to decrease direct forces and resultant coup-contr coup injuries that result in both contusions and compression-tension axon injuries. Furthermore, many helmets do not protect against rotational forces that are a core cause of a shear injury and resultant long-term neurological disability in civilian and military personnel. Although the introduction of Kevlar in military helmets has decreased mortality from penetrating head injuries, the survivors are often left with debilitating neurological deficits due to contusions and diffuse axonal injury.

[0051] Figure 3 illustrates one example of a container device system. According to various embodiments, protective gear includes multiple container devices 301 and 303. In particular embodiments, the multiple container devices are loosely interconnected shells holding an energy and impact transformer 305. The multiple container devices may be multiple plastic and/or resin shells. In some examples, the containers devices 301 and 303 may be connected only through the energy and impact transformer 305. In other examples, the container devices 301 and 303 may be loosely connected in a manner supplementing the connection by the energy and impact transformer 305.

[0052] According to various embodiments, the energy and impact transformer 305 may use a shear truss-like structure connecting the container 301 and container 303 to dampen any force or impact. In some examples, the energy and impact transformer 305 allows the container 301 to move or slide with respect to container 303. In some examples, up to several centimeters of relative movement is allowed by the energy and impact transformer 305.

[0053] In particular embodiments, the energy and impact transformer 305 could be a material that absorbs/dissipates mechanical energy as thermal energy or transformational energy and may include electro-rheological, magneto-rheological, foam, fluid, and/or gel materials.

[0054] Figure 4 illustrates another example of a container device system. Container 401 encloses energy and impact transformer 403. In some examples, multiple containers or multiple shells may not be necessary. The container may be constructed using plastic and/or resin. And may expand or contract with the application of force. The energy and impact transformer 403 may similarly expand or contract with the application of force. The energy and impact transformer 403 may receive and convert energy from physical impacts on a container 401.

[0055] Figure 5 illustrates one example of a multiple shell system. An outer shell 501, a middle shell 503, and an inner shell 505 may hold energy and impact transformative layers 511 and 513 between them. Energy and impact transformer layer 511 residing between shells 501 and 503 may allow shell 501 to move and/or slide with respect to middle shell 503. By allowing sliding movements that convert potential head rotational forces into heat or transformation energy, shear forces can be significantly reduced.

[0056] Similarly, middle shell 503 can move and slide with respect to inner shell 505. In some examples, the amount of movement and/or sliding depends on the viscosity of fluid in the energy and impact transformer layers 511 and 513. The viscosity may change depending on electric field or voltage applied. In some other examples, the amount of movement and/or sliding depends on the materials and structures of materials in the energy and impact transformer layers 511 and 513.

[0057] According to various embodiments, when a force is applied to an outer shell 501, energy is transferred to an inner shell 505 through a suspended middle shell 503. The middle shell 503 shears relative to the top shell 501 and inner shell 505. In particular embodiments, the energy and impact transformer layers 511 and 513 may include thin elastomeric trusses between the shells in a comb structure. The energy and impact transformer layers 511 and 513 may also include energy dampening/absorbing fluids or devices.

[0058] According to various embodiments, a number of different physical structures can be used to form energy and impact transformer layers 511 and 513. In some examples, energy and impact transformer layer 511 includes a layer of upward or downward facing three dimensional conical structures separating outer shell 501 and middle shell 503. Energy and impact transformer layer 513 includes a layer of upward or downward facing conical structures separating middle shell 503 and inner shell 505. The conical structures in energy and impact transformer layer 511 and the conical structures in energy and impact transformer layer 513 may or may not be aligned. In some examples, the conical structures in layer 511 are misaligned with the conical structures in layer 513 to allow for improved shear force reduction.

[0059] In some examples, conical structures are designed to have a particular elastic range where the conical structures will return to the same structure after force applied is removed. The conical structures may also be designed to have a particular plastic range where the conical structure will permanently deform if sufficient rotational or shear force is applied. The deformation itself may dissipate energy but would necessitate replacement or repair of the protective gear.

[0060] Conical structures are effective in reducing shear, rotational, and impact forces applied to an outer shell 501. Conical structures reduce shear and rotational forces applied from a variety of different directions. According to various embodiments, conical structures in energy and impact transformer layers 511 are directed outwards with bases situated on middle shell 503 and inner shell 505 respectively. In some examples, structures in the energy and impact transformer layer may be variations of conical structures, including three dimensional pyramid structures and three

dimensional parabolic structures. In still other examples, the structures may be cylinders,

[0061] Figure 6 illustrates one example of a multiple shell helmet. According to various embodiments, helmet 601 includes an outer shell layer 603, an outer energy and impact transformer 605, a middle shell layer 607, an inner energy and impact transformer 609, and an inner shell layer 611. The helmet 601 may also include a lining layer within the inner shell layer 611. In particular embodiments, the inner shell layer 611 includes attachment points 615 for a chin strap for securing helmet 601. In particular embodiments, the outer shell layer 603 includes attachment points for a visor, chin bar, face guard, face cage, and/or face protection mechanism 615 generally. In some examples, the inner shell layer 611, middle shell layer 607, and outer shell layer 603 includes ridges 617 and/or air holes for breathability. The outer shell layer 603, middle shell layer 607, and inner shell layer 611 may be constructed using plastics, resins, metal, composites, etc. In some instances, the outer shell layer 603, middle shell layer 607, and inner shell layer 611 may be reinforced using fibers such as aramids. The energy and impact transformer layers 605 and 609 can help distribute mechanical energy and shear forces so that less energy is imparted on the head.

[0062] According to various embodiments, a chin strap 621 is connected to the inner shell layer 611 to secure helmet positioning. The various shell layers are also sometimes referred to as containers or casings. In many examples, the inner shell layer 611 covers a lining layer (not shown). The lining layer may include lining materials, foam, and/or padding to absorb mechanical energy and enhance fit. A lining layer may be connected to the inner shell layer 611 using a variety of attachment mechanisms such as glue or Velcro. According to various embodiments, the lining layer is pre-molded to allow for enhanced fit and protection. According to various embodiments, the lining layer may vary, e.g. from 4mm to 40mm in thickness, depending on the type of activity a helmet is designed for. In some examples, custom foam may be injected into a fitted helmet to allow for personalized fit. In other examples, differently sized shell layers and lining layers may be provided for various activities and head sizes.

[0063] The middle shell layer 607 may only be indirectly connected to the inner shell layer 611 through energy and impact transformer 609. In particular embodiments, the middle shell layer 607 floats above inner shell layer 611. In other examples, the middle shell layer 607 may be loosely connected to the inner shell layer 611. In the same manner, outer shell layer 603 floats above middle shell layer 607 and may only be connected to the middle shell layer through energy and impact transformer 605. In other examples, the outer shell layer 603 may be loosely and flexibly connected to middle shell layer 607 and inner shell layer 611. The shell layers 603, 607, and 611 provide protection against penetrating forces while energy and impact transformer layers 605 and 609 provide protection against compression forces, shear forces, rotational forces, etc. According to various embodiments, energy and impact transformer layer 605 allows the outer shell 603 to move relative to the middle shell 607 and the energy and impact transformer layer 609 allows the outer shell 603 and the middle shell 607 to move relative to the inner shell 611. Compression, shear, rotation, impact, and/or other forces are absorbed, deflected, dissipated, etc., by the various layers.

[0064] According to various embodiments, the skull and brain are not only provided with protection against skull fractures, penetrating injuries, subdural and epidural hematomas, but also provided with some measure of protection against direct forces and resultant coup-contra coup injuries that result in both contusions and compression-tension axon injuries. The skull is also protected against rotational forces that are a core cause of a shear injury and resultant long-term neurological disability in civilian and military personnel.

[0065] In some examples, the energy and impact transformer layers 605 and 609 may include passive, semi-active, and active dampers. According to various embodiments, the outer shell 603, middle shell 607, and the inner shell 611 may vary in weight and strength. In some examples, the outer shell 603 has significantly more weight, strength, and structural integrity than the middle shell 607 and the inner shell 611. The outer shell 603 may be used to prevent penetrating forces, and consequently may be constructed using higher strength materials that may be more expensive or heavier.

[0066] Although the foregoing invention has been described in some detail for purposes of clarity of understanding, it will be apparent that certain changes and modifications may be practiced within the scope of the appended claims. Therefore, the present embodiments are to be considered as illustrative and not restrictive and the invention is not to be limited to the details given herein, but may be modified within the scope and equivalents of the appended claims.

CLAIMS

1. A helmet comprising:
an outer shell layer;
an inner shell layer connected to the outer shell layer through a shear mechanism allowing the outer shell layer to slide relative to the inner shell layer, wherein the shear mechanism includes a first energy transformer having a first absorptive/dissipative material, the inner shell layer configured to conform to a human head;
a chin strap attached to the inner shell layer to maintain the position of the inner shell layer on the human head during rotational force impact while the outer shell layer is allowed to slide.
2. The helmet of claim 1, wherein the shear mechanism is a shear layer.
3. The helmet of claim 2, wherein the shear layer is connected to the outer shell layer through the first energy transformer, the first energy transformer operable to absorb energy from forces imparted onto the outer shell layer, wherein the first energy transformer includes a first absorptive/dissipative material to allow the outer shell layer to slide relative to the inner shell layer.
4. The helmet of claim 3, wherein the inner shell layer is connected to the shear layer, the inner shell layer configured to conform to a human head, the inner shell layer associated with a second energy transformer, the second energy transformer including a second absorptive/dissipative material, the second energy transformer operable to absorb energy from forces imparted onto the shear layer through the outer shell layer and the first energy transformer.
5. The helmet of claim 1, wherein the first absorptive/dissipative material comprises a gel.
6. The helmet of claim 1, wherein the first absorptive/dissipative material comprises a fluid.
7. The helmet of claim 1, wherein the first absorptive/dissipative material comprises an electro-rheological element.
8. The helmet of claim 1, wherein a lining layer is connected to the inner shell layer, wherein the lining layer is configured to conform to a human head.

9. Protective gear comprising:

an outer shell layer;

an inner conforming layer connected to the outer shell layer through a shear mechanism allowing the outer shell layer to slide relative to the inner conforming layer, wherein the shear mechanism includes a first energy transformer having a first absorptive/dissipative material, the inner conforming layer configured to conform to a human head;

a chin strap attached to the inner conforming layer to maintain the position of the inner conforming layer on the human head during rotational force impact while the outer shell layer is allowed to slide.

10. The protective gear of claim 9, wherein the shear mechanism is a shear layer.

11. The protective gear of claim 10, wherein the shear layer is connected to the outer shell layer through the first energy transformer, the first energy transformer operable to absorb energy from forces imparted onto the outer shell layer, wherein the first energy transformer includes a first absorptive/dissipative material to allow the outer shell layer to slide relative to the inner conforming layer.

12. The protective gear of claim 11, wherein the inner conforming layer is connected to the shear layer, the inner conforming layer configured to conform to a human head, the inner conforming layer associated with a second energy transformer, the second energy transformer including a second absorptive/dissipative material, the second energy transformer operable to absorb energy from forces imparted onto the shear layer through the outer shell layer and the first energy transformer.

13. The protective gear of claim 9, wherein the first absorptive/dissipative material comprises a gel.

14. The protective gear of claim 9, wherein the first absorptive/dissipative material comprises a fluid.

15. The protective gear of claim 9, wherein the first absorptive/dissipative material comprises an electro-rheological element.

16. The protective gear of claim 9, wherein the inner conforming layer is associated with a lining material configured to conform to a human head.

17. A helmet comprising:

an outer shell layer;

an inner conforming layer connected to the outer shell layer through a shear mechanism allowing the outer shell layer to slide relative to the inner conforming layer, wherein the shear mechanism includes a first energy transformer having a first absorptive/dissipative material, the inner conforming layer configured to conform to a human head;

a chin strap attached to the inner conforming layer to maintain the position of the inner conforming layer on the human head during rotational force impact while the outer shell layer is allowed to slide.

18. The helmet of claim 17, wherein the shear mechanism is a shear layer.

19. The helmet of claim 18, wherein the shear layer is connected to the outer shell layer through the first energy transformer, the first energy transformer operable to absorb energy from forces imparted onto the outer shell layer, wherein the first energy transformer includes a first absorptive/dissipative material to allow the outer shell layer to slide relative to the inner conforming layer.

20. The helmet of claim 19, wherein the inner conforming layer is connected to the shear layer, the inner conforming layer configured to conform to a human head, the inner conforming layer associated with a second energy transformer, the second energy transformer including a second absorptive/dissipative material, the second energy transformer operable to absorb energy from forces imparted onto the shear layer through the outer shell layer and the first energy transformer.

BIOMECHANICS AWARE HELMET

ABSTRACT OF THE DISCLOSURE

Protective gear includes an outer shell layer connected to a middle shell layer through an outer energy and impact transformer layer. The middle shell layer is connected to an inner shell layer through an inner energy and impact transformer layer. The outer and inner energy and impact transformer layers flexibly connect the shell layers to absorb impact forces, rotational forces, shear forces, etc., and allow the various shell layers to move and slide relative to the other shell layers. The outer and inner energy and impact transformer layers may be constructed using gels, fluids, electro-rheological elements, magneto-rheological elements, etc. The protective gear may be formed as helmets or body protection for various activities and protect users from not only impact and penetrative forces, but rotational and shear forces as well.

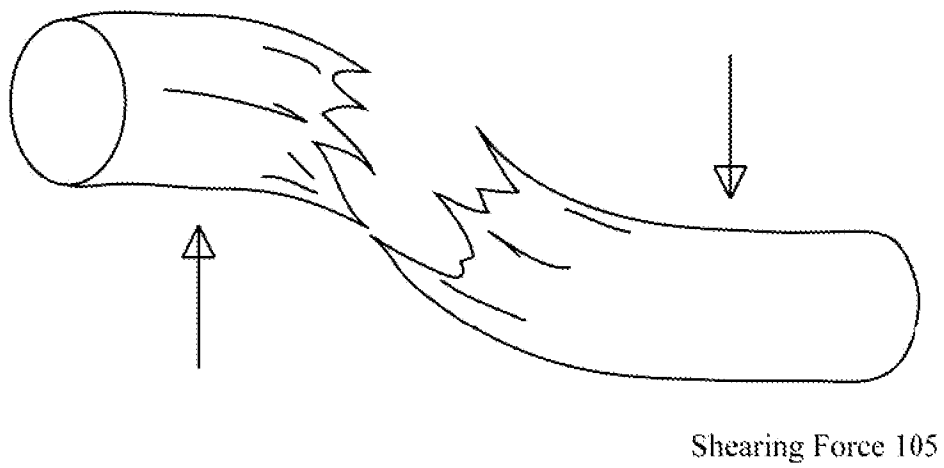
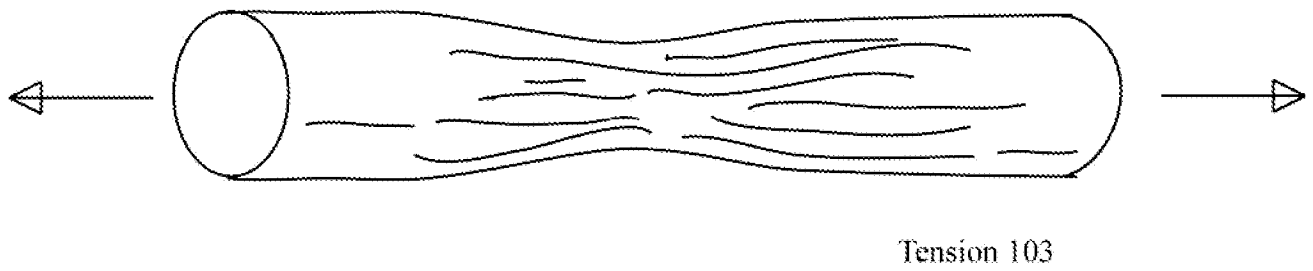
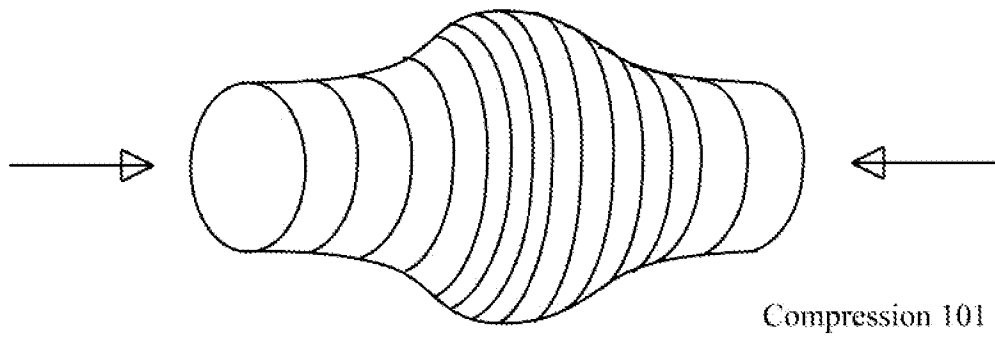


Figure 1

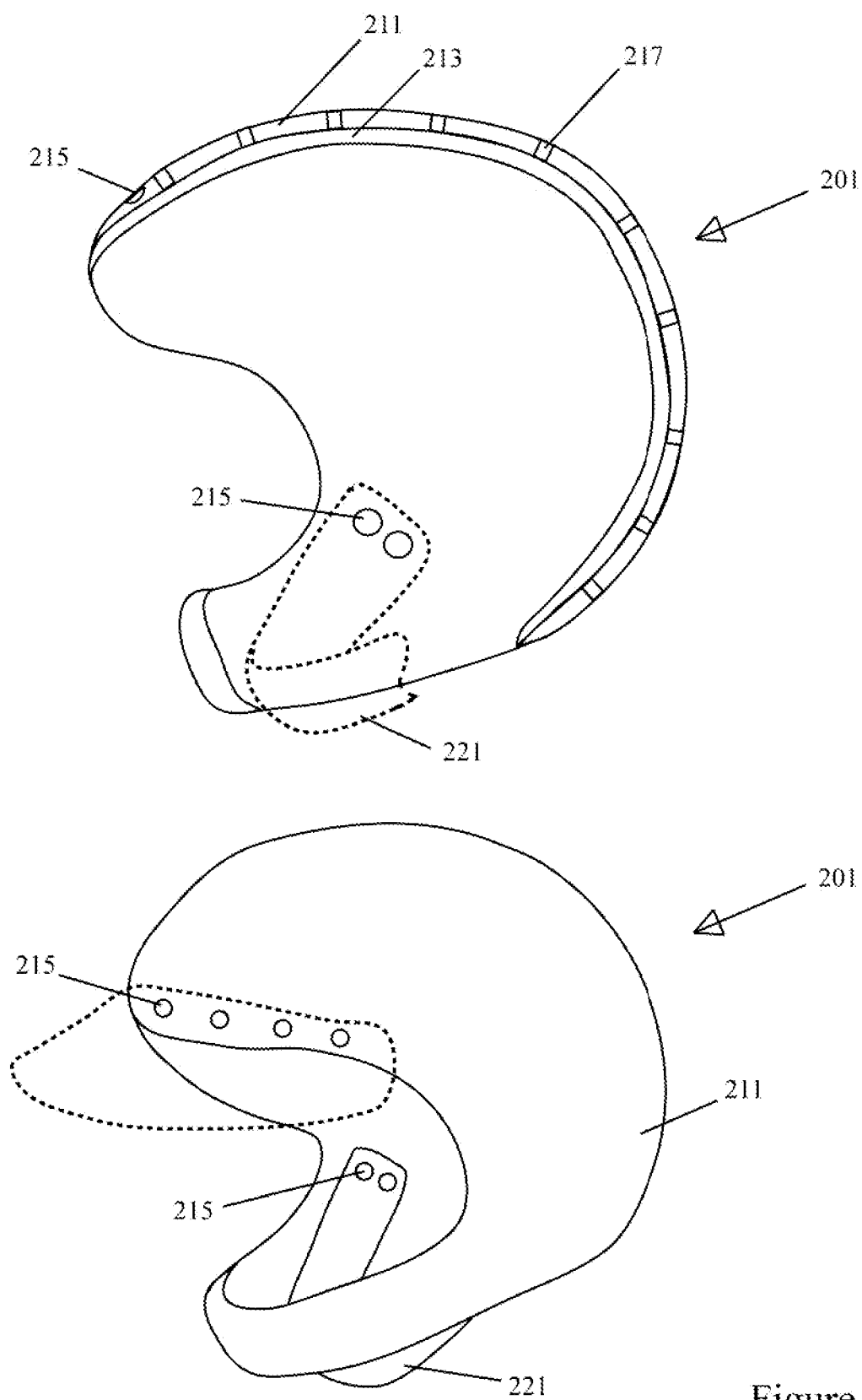


Figure 2

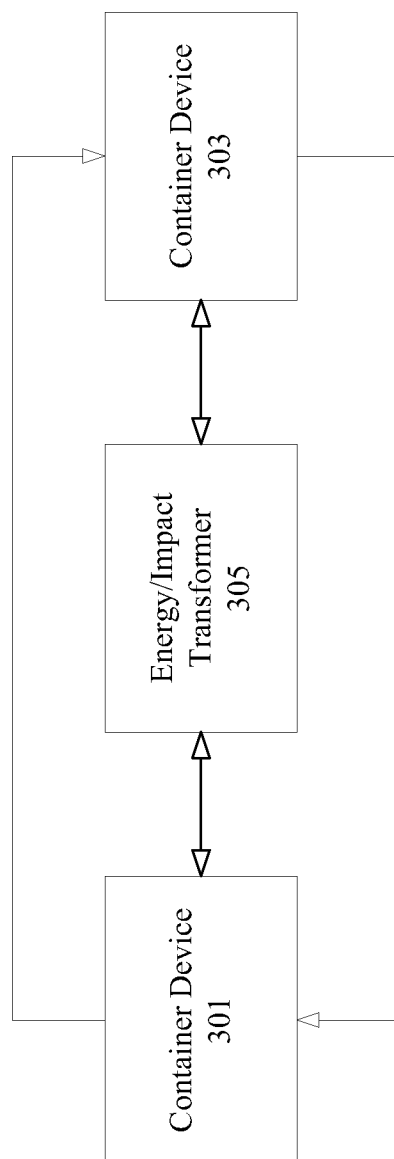


Figure 3

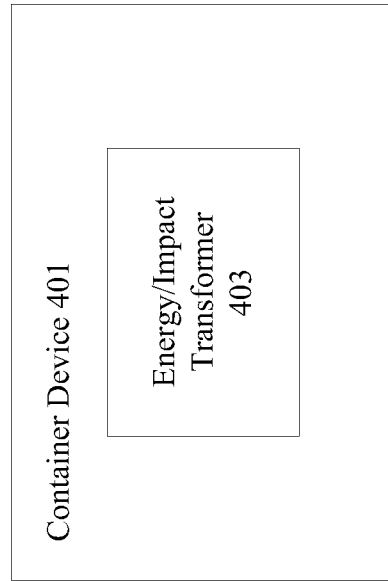


Figure 4

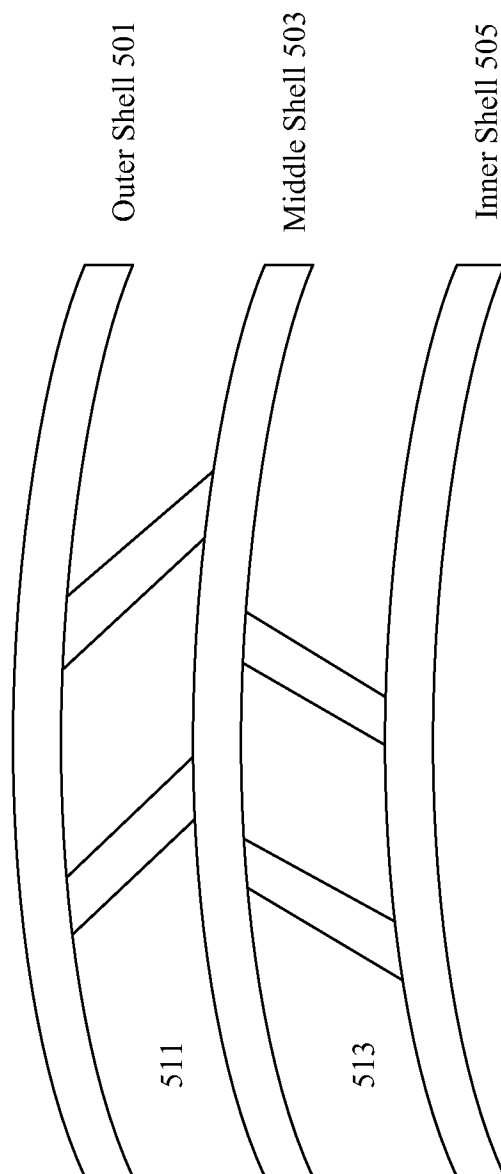


Figure 5

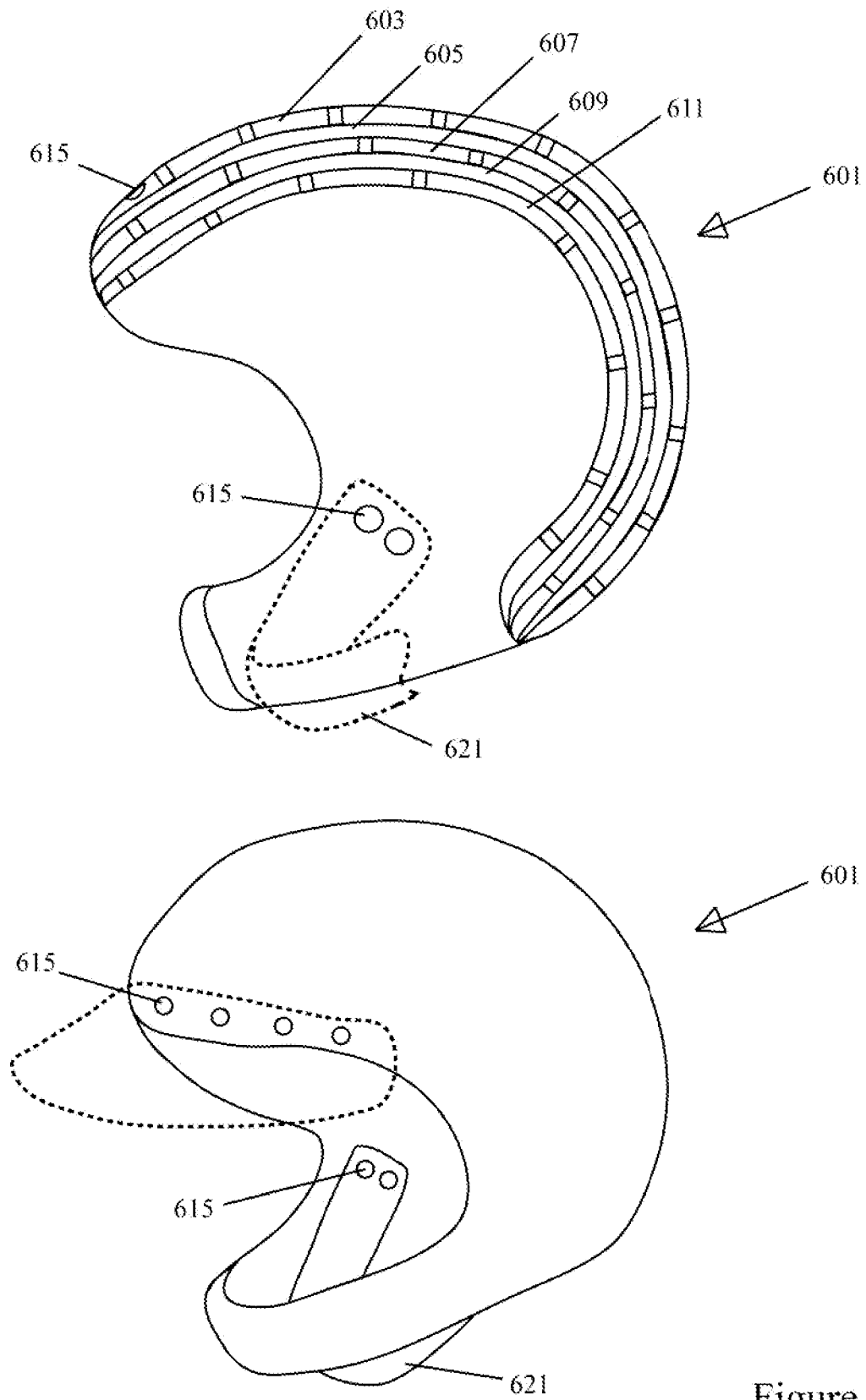


Figure 6

**DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN
APPLICATION DATA SHEET (37 CFR 1.76)**

**Title of
Invention**

BIOMECHANICS AWARE HELMET

As the below named inventor, I hereby declare that:

This declaration
is directed to:



The attached application, or



United States application or PCT international application number _____
filed on _____.

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

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LEGAL NAME OF INVENTOR

Inventor: Robert T. Knight

Date (Optional): _____

Signature:

Robert T. Knight

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form.
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875						Application or Docket Number 14/809,142				
APPLICATION AS FILED - PART I										
(Column 1)		(Column 2)		SMALL ENTITY		OR OTHER THAN SMALL ENTITY				
FOR	NUMBER FILED	NUMBER EXTRA	RATE(\$)	FEE(\$)		RATE(\$)	FEE(\$)			
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	70		N/A				
SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A	300		N/A				
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	360		N/A				
TOTAL CLAIMS (37 CFR 1.16(j))	20	minus 20 = *	x 40 =	0.00	OR					
INDEPENDENT CLAIMS (37 CFR 1.16(h))	3	minus 3 = *	x 210 =	0.00						
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			0.00						
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				0.00						
			TOTAL	730		TOTAL				
* If the difference in column 1 is less than zero, enter "0" in column 2.										
APPLICATION AS AMENDED - PART II										
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OR OTHER THAN SMALL ENTITY		
AMENDMENT A		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)
	Total (37 CFR 1.16(i))	*	Minus	**	=	x	=	OR	x	=
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x	=	OR	x	=
	Application Size Fee (37 CFR 1.16(s))							OR		
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OR OTHER THAN SMALL ENTITY		
AMENDMENT B		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)
	Total (37 CFR 1.16(i))	*	Minus	**	=	x	=	OR	x	=
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x	=	OR	x	=
	Application Size Fee (37 CFR 1.16(s))							OR		
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3. ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20". *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3". The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.										



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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
14/809,142	07/24/2015	3765	730	BRGDP001C3	20	3

CONFIRMATION NO. 5385

FILING RECEIPT



0000000076803105

19694
Kwan & Olynick LLP
2000 Hearst Avenue, Suite 305
Berkeley, CA 94709

Date Mailed: 08/12/2015

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Inventor(s)

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Applicant(s)

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Assignment For Published Patent Application

Brainguard Technologies, Inc., El Cerrito, CA

Power of Attorney: The patent practitioners associated with Customer Number 19694

Domestic Priority data as claimed by applicant

This application is a CON of 14/714,093 05/15/2015
which is a CON of 14/485,993 09/15/2014 PAT 9060561
which is a CON of 13/554,471 07/20/2012 PAT 8863319
which claims benefit of 61/510,401 07/21/2011

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see <http://www.uspto.gov> for more information.) - None.

Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Projected Publication Date: To Be Determined - pending completion of Security Review

Non-Publication Request: No

Early Publication Request: No

**** SMALL ENTITY ****

Title

BIOMECHANICS AWARE HELMET

Preliminary Class

002

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No**PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES**

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/809,142	07/24/2015	Robert T. Knight	BRGDP001C3	5385
19694	7590	12/17/2015	EXAMINER	
Kwan & Olynick LLP			PATEL, TAJASH D	
2000 Hearst Avenue, Suite 305			ART UNIT	PAPER NUMBER
Berkeley, CA 94709			3765	
			NOTIFICATION DATE	DELIVERY MODE
			12/17/2015	ELECTRONIC

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The time period for reply, if any, is set in the attached communication.

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alundy@kwanip.com

Office Action Summary	Application No. 14/809,142	Applicant(s) KNIGHT, ROBERT T.	
	Examiner TEJASH PATEL	Art Unit 3765	AIA (First Inventor to File) Status No

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Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 7/24/15.
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.
- 4) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

- 5) ☒ Claim(s) 1-20 is/are pending in the application.
5a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 6) ☐ Claim(s) _____ is/are allowed.
- 7) ☒ Claim(s) 1-20 is/are rejected.
- 8) ☐ Claim(s) _____ is/are objected to.
- 9) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

- 10) ☐ The specification is objected to by the Examiner.
- 11) ☒ The drawing(s) filed on 7/24/15 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

- a) ☐ All b) ☐ Some** c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☒ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b)
Paper No(s)/Mail Date 7/24/15.
- 3) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 4) ☐ Other: _____.

The present application is being examined under the pre-AIA first to invent provisions.

DETAILED ACTION

Double Patenting

1. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory double patenting rejection is appropriate where the claims at issue are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the reference application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement. A terminal disclaimer must be signed in compliance with 37 CFR 1.321(b).

The USPTO internet Web site contains terminal disclaimer forms which may be used. Please visit <http://www.uspto.gov/forms/>. The filing date of the application will determine what form should be used. A web-based eTerminal Disclaimer may be filled out completely online using web-screens. An eTerminal Disclaimer that meets all requirements is auto-processed and approved immediately upon submission. For more information about eTerminal Disclaimers, refer to <http://www.uspto.gov/patents/process/file/efs/guidance/eTD-info-I.jsp>.

For case filed on/after 9/16/12, 37 CFR 1.321 specifies that the applicant can disclaim and the terminal disclaimer must specify the extent of the applicant's ownership. This can be done with a request under 37 CFR 1.46 (c) to change the applicant needs to be filed, which is (1) a request, signed by a 1.33 (b) party, (2) a corrected ADS (37CFR 1.76 (c)) that identifies the "new" applicant in the applicant information, and is underlined since it is new, and (3) a 3.73 (c) statement showing change of title to the new applicant. Along with 1.46 (c) request include a POA that gives power to the attorney who is signing the TD, along with another copy of the TD (No new fee required), unless the TD is signed by the applicant.

2. Claims 1-20 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1-20 of U.S. Patent No. 9,060,561. Although the claims at issue are not identical, they are not patentably distinct from each other because the helmet of pending application '142 claims an outer shell layer connected to an inner shell layer through a shear mechanism that allows the outer shell layer to slide with respect to the inner shell layer which is substantially similar in scope to U.S. Patent '561 which claims

a helmet with a first outer shell layer connected to a second shell layer through a first energy transformer layer that allows the first and second shell layers to slide relative to one another.

3. Claims 1-20 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1-20 of U.S. Patent No. 8,863,319. Although the claims at issue are not identical, they are not patentably distinct from each other because the protective gear of pending application '142 claims an outer shell layer connected to an inner shell layer through a shear mechanism that allows the outer shell layer to slide with respect to the inner shell layer which is substantially similar in scope to U.S. Patent '319 which claims a helmet with an outer shell layer connected to a middle shell layer through an outer energy and impact transformer layer that allows the outer and middle shell layers to slide relative to one another.

Allowable Subject Matter

4. Claims 1-20 would be allowable if rewritten or amended to overcome the nonstatutory double patenting rejection(s) set forth in this office action. Claims 1, 9 and 17 with its respective dependents are allowable because the prior art does not teach or suggest the recitation therein including a helmet with an inner shell layer connected to an outer shell layer through a shear mechanism with a first energy transformer in combination with a chin strap that maintains the position of the inner shell during rotational force impact while the outer shell is allowed to slide with respect thereto.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to Applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tejash Patel whose telephone number is (571) 272-4993. The examiner can normally be reached on Mon. –Thur. from 8am – 6pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Clinton Ostrup can be reached on (571) 272-5559. The fax phone number for this group is (571) 273-8300.

December 11, 2015

/Tejash Patel/
Primary Examiner

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	Not Yet Assigned
	Filing Date	Herewith
	First Named Inventor	Robert T Knight
	Art Unit	Not Yet Assigned
	Examiner Name	Not Yet Assigned
	Attorney Docket Number	BRGDP001C3

U.S.PATENTS						
Examiner Initial*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
/T.P./		3946441		1976-03-30	Johnson, John R.	
/T.P./		4352484		1982-10-05	Gertz, David C., et al.	
/T.P./		5713082		1998-02-03	Bassette, Aldean B., et al.	
/T.P./		5815846		1998-10-06	Calonge, Rafael	
/T.P./		5956777		1999-09-28	Popovich, Darko D.	
/T.P./		6103641		2000-08-15	Gehring Jr., George G.	
/T.P./		6145348		2000-11-14	Hardegree, Mike et al.	
/T.P./		6378140		2002-04-30	Abraham, Carl J., et al.	
/T.P./		6434755		2002-08-20	Halstead, David P., et al.	
/T.P./		20030088906	A1	2003- 05-15	Baker, Gregg S.	
/T.P./		6658671		2003-12-09	Von Holst, Hans et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	Not Yet Assigned
	Filing Date	Herewith
	First Named Inventor	Robert T Knight
	Art Unit	Not Yet Assigned
	Examiner Name	Not Yet Assigned
	Attorney Docket Number	BRGDP001C3

/T.P./		6728969		2004- 05-04	Zeiler, Bernard	
/T.P./		20040126565	A1	2004-07-01	Naganathan, Ganapathy et al.	
/T.P./		6996856		2006-02-14	Puchalski, lone G.	
/T.P./		20060059605	A1	2006-03-23	Ferrara, Vincent R.	
/T.P./		7076811		2006-07-18	Puchalski, lone G.	
/T.P./		7254843		2007-08-14	Talluri, Srikrishna	
/T.P./		20080066217	A1	2008-03-20	Depreitere, Bart et al.	
/T.P./		20110004980	A1	2011-01-13	Leatt, Christopher J., et al.	
/T.P./		8176574		2012- 05-15	Bryant, Mark et al.	
/T.P./		20130019384	A1	2013-01-24	Knight, Robert T.	
/T.P./		8533869		2013-09-17	Capuano, Sonya A.	
/T.P./		8863319		2014-10-21	Knight, Robert T.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	Not Yet Assigned
	Filing Date	Herewith
	First Named Inventor	Robert T Knight
	Art Unit	Not Yet Assigned
	Examiner Name	Not Yet Assigned
	Attorney Docket Number	BRGDP001C3

/T.P./		20150000014	A1	2015-01-01	Knight, Robert T.	
/T.P./		9060561		2015-06-23	Knight, Robert T.	

U.S. PATENT APPLICATION PUBLICATIONS

Examiner Initial*	Cite No	Publication Number	Kind Code ¹	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
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FOREIGN PATENT DOCUMENTS

Examiner Initial*	Cite No	Foreign Document Number ³	Country Code ²	Kind Code ⁴	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T ⁵
/T.P./								
/T.P./		0145526	WO	A1	2001-06-28	Von Holst, Hans et al.		
/T.P./		2004032659	WO	A1	2004-04-22	Madey, Steven M., et al.		
/T.P./		1050905	SE	A1	2011-07-14	Halldin, Peter et al.		
/T.P./		2011087435	WO	A1	2011-07-21	Halldin, Peter et al.		
/T.P./		2012109381	WO	A1	2012-08-16	Weber, Robert et al.		
/T.P./		2013013180	WO	A1	2013-01-24	Knight, Robert		
/T.P./		2734071	EP		2014- 05-28	Knight, Robert T.		

NON-PATENT LITERATURE DOCUMENTS

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	Not Yet Assigned
	Filing Date	Herewith
	First Named Inventor	Robert T Knight
	Art Unit	Not Yet Assigned
	Examiner Name	Not Yet Assigned
	Attorney Docket Number	BRGDP001C3

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ⁵
/T.P./		"Application Serial No. 13/554,471, Non Final Office Action mailed 05-22-14", 5 pgs.	
/T.P./		"Application Serial No. 13/554,471, Notice of Allowance mailed 07-15-14", 5 pgs.	
/T.P./		"Application Serial No. 14/485,993, Non Final Office Action mailed 10-28-14", 6 pgs.	
/T.P./		"Application Serial No. 14/485,993, Notice of Allowance mailed 03-19-15", 5 pgs.	
/T.P./		"European Application Serial No. 12814787.3, Search Report and Opinion mailed 03-30-15", 6 pgs.	
/T.P./		"Helmet with Fluid Layer that Protects Against a Common Cause of Head Injury", Office of Technology Licensing, University of Florida, [Online]. Retrieved from the Internet: < http://apps.research.ufl.edu/otl/pdf/marketing/13586.pdf > Accessed on 7/12/12, 2 pgs.	
/T.P./		"International Application Serial No. PCT/US2012/047662, Written Opinion mailed 10-05-12", 8 pgs.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	Not Yet Assigned
	Filing Date	Herewith
	First Named Inventor	Robert T Knight
	Art Unit	Not Yet Assigned
	Examiner Name	Not Yet Assigned
	Attorney Docket Number	BRGDP001C3

/T.P./		"International Application Serial No. PCTUS2012/047662, Search Report and Written Opinion mailed 10-05-12", 7 pgs.	
/T.P./		"Int'l Application Serial No. PCT/US2012/047662, Preliminary Report on Patentability mailed 01-30-14", 7 pgs.	
/T.P./		"Lazer Helmets", [Online]. Retrieved from the Internet: < http://www.lazerhelmets.com/wp-content/uploads/2011/04/Catalogue-Motorcycling-2010-UK.pdf >, 14 pgs.	
/T.P./		"Proposal for a Novel Helmet Design", Brainguard Technologies, 14 pgs.	
/T.P./		BOSCH, HENRICUS V. , "Crash Helmet Testing and Design Specifications", University Press Facilities, Eindhoven, The Netherlands, 2006, 179 pgs.	
/T.P./		COLLINS, MICKY , "Examining Concussion Rates and Return to Play in High School Football Players Wearing Newer Helmet Technology: A Three-Year Prospective Cohort Study", Neurosurgery, Vol. 58, No. 2, February 2006, 12 pgs.	
/T.P./		GOEL, R , "Design of an Advanced Helmet Liner User Simulations", [Online]. Retrieved from the Internet: < http://mvl.mit.edu/MVLpubs/MVL_10.07_Goel.pdf > Accessed on 3/13/12, 8 pgs.	
/T.P./		MAY, PHILIP R. , "Woodpecker Drilling Behavior: An Endorsement of the Rotational Theory of Impact Brain Injury", Arch Neural, Vol. 36,, June 1979, pgs. 370-373	

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	Filing Date	Herewith
	First Named Inventor	Robert T Knight
	Art Unit	Not Yet Assigned
	Examiner Name	Not Yet Assigned
	Attorney Docket Number	BRGDP001C3

/T.P./		VIANO, DAVID C. , "Concussion in Professional Football: Brain Responses by Finite Element Analysis: Part 9", Neurosurgery, Vol. 57, No. 5, November 2005, pgs. 891-916	
/T.P./		WANG, LIZHEN , "Why do Woodpeckers Resist Head Impact Injury: A Biomechanical Investigation", PLoS One, Vol. 6, No. 10, October 2011, 8 pgs.	
EXAMINER SIGNATURE			
Examiner Signature	/Tajash Patel/	Date Considered	12/14/2015
*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.			
¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.			

Search Notes 	Application/Control No. 14809142	Applicant(s)/Patent Under Reexamination KNIGHT, ROBERT T.
	Examiner TEJASH PATEL	Art Unit 3765

CPC- SEARCHED		
Symbol	Date	Examiner
A42B 3/12, A42B 3/064, A42B 3/04, A42B 3/121	12/11/15	TP

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
2	410-414, 416, 421, 425, 6.1, 6.2, 7	12/11/15	TP

SEARCH NOTES		
Search Notes	Date	Examiner
PALM Searched	12/11/15	TP

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner

	/TEJASH PATEL/ Primary Examiner.Art Unit 3765
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UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
14/809,142	07/24/2015	Robert T. Knight	BRGDP001C3

CONFIRMATION NO. 5385

NEW OR REVISED PPD NOTICE

19694
Kwan & Olynick LLP
2000 Hearst Avenue, Suite 305
Berkeley, CA 94709



NOTICE OF NEW OR REVISED PROJECTED PUBLICATION DATE

The above-identified application has a new or revised projected publication date. The current projected publication date for this application is 03/24/2016. If this is a new projected publication date (there was no previous projected publication date), the application has been cleared by Licensing & Review or a secrecy order has been rescinded and the application is now in the publication queue.

If this is a revised projected publication date (one that is different from a previously communicated projected publication date), the publication date has been revised due to processing delays in the USPTO or the abandonment and subsequent revival of an application. The application is anticipated to be published on a date that is more than six weeks different from the originally-projected publication date.

More detailed publication information is available through the private side of Patent Application Information Retrieval (PAIR) System. The direct link to access PAIR is currently <http://pair.uspto.gov>. Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

Questions relating to this Notice should be directed to the Office of Data Management, Application Assistance Unit at (571) 272-4000, or (571) 272-4200, or 1-888-786-0101.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Robert T. Knight

Atty Dkt No.: BRGDP001C3

Application No.: 14/809,142

Examiner: Tajash D. Patel

Filed: July 24, 2015

Art Unit: 3765

Title: BIOMECHANICS AWARE HELMET

Confirmation: 5385

CERTIFICATE OF EFS-WEB TRANSMISSION

I hereby certify that this correspondence is being transmitted electronically through EFS-WEB to Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450 Alexandria, VA 22313-1450 on December 30, 2015.

Signed: /Amber Lundy/
Amber Lundy

OFFICE ACTION RESPONSE

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

In response to the Non Final Office Action dated December 17, 2015, Applicant submits terminal disclaimers to obviate double patenting rejections over prior patents 8,863,319 and 9,060,561.

It is believed that all claims are allowable over the rejections provided. Should the Examiner believe that a telephone conference would expedite the prosecution of this application, the undersigned can be reached using the contact information provided below.

Please charge any additional fees or credit any overpayment to Deposit Account 50-6367 (BRGDP001C3).

Respectfully submitted,

/Audrey Kwan/

Avery Audrey Kwan
Reg. No. 46,850

Kwan & Olynick LLP
2000 Hearst Ave, Ste 305
Berkeley, CA 94709
510-900-9501 x705
akwan@kwanip.com

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		14/809,142
	Filing Date		Jul 24, 2015
	First Named Inventor	Robert T Knight	
	Art Unit	3765	
	Examiner Name	Patel, Tajash D.	
	Attorney Docket Number	BRGDP001C3	

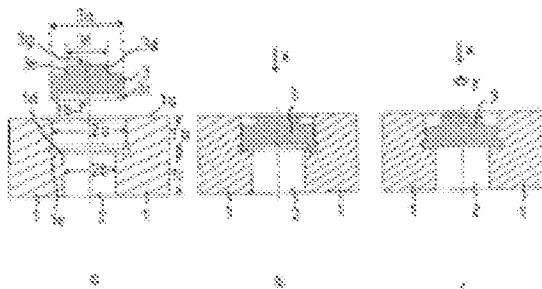
U.S.PATENTS								
Examiner Initial*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear		
		8104593		2012-01-31	Lin, Keng-Hsien			
		20130239397	A1	2013-09-19	Hotte, Denis			
		20150245681	A1	2015-09-03	Knight, Robert T.			
U.S.PATENT APPLICATION PUBLICATIONS								
Examiner Initial*	Cite No	Publication Number	Kind Code ¹	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear		
FOREIGN PATENT DOCUMENTS								
Examiner Initial*	Cite No	Foreign Document Number ³	Country Code ²	Kind Code ⁴	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T ⁵
		102011086791	DE	A1	2013- 05-23	Dilalan, Umit		
NON-PATENT LITERATURE DOCUMENTS								
Examiner Initials*	Cite No	include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.						T ⁵

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		14/809,142
	Filing Date		Jul 24, 2015
	First Named Inventor	Robert T Knight	
	Art Unit	3765	
	Examiner Name	Patel, Tajash D.	
	Attorney Docket Number	BRGDP001C3	

EXAMINER SIGNATURE			
Examiner Signature		Date Considered	
*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.			
¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.			

2 of 3 DOCUMENTS

DE102011086791A1 2013-05-23 Closing method for closing bore of workpiece using bore closing device, involves placing bore in workpiece, where bore in area of workpiece near to surface has bigger diameter than in area of workpiece away from surface (en)



Inventors: Ümit Dilalan, 68309, Mannheim, Federal Republic of Germany

Applicants/Assignees: Continental Automotive GmbH, 30165, Hannover, Federal Republic of Germany

Classifications: CPC: B23K20/12 (2013-01-01; I 2013-06-14; B, H, EP)

CPC: B23K20/10 (2013-01-01; I 2013-06-14; B, H, EP)

CPC: B23K20/129 (2013-01-01; I 2013-12-09; B, H, EP)

CPC: B23K2201/006 (2013-01-01; A 2013-12-09; B, H, EP)

CPC: B23K2203/10 (2013-01-01; A 2013-12-09; B, H, EP)

CPC: B23K2203/12 (2013-01-01; A 2013-12-09; B, H, EP)

CPC: B29C65/0672 (2013-01-01; A 2013-12-09; B, H, EP)

CPC: B29C65/08 (2013-01-01; A 2013-12-09; B, H, EP)

CPC: B29C65/568 (2013-01-01; A 2013-12-09; B, H, EP)

CPC: B29C66/1222 (2013-01-01; A 2013-12-09; B, H, EP)

CPC: B29C66/1224 (2013-01-01; A 2013-12-09; B, H, EP)

CPC: B29C66/128 (2013-01-01; A 2013-12-09; B, H, EP)

CPC: B29C66/322 (2013-01-01; A 2013-12-09; B, H, EP)

CPC: B29C66/7392 (2013-01-01; A 2013-12-09; B, H, EP)

CPC: B29C66/8322 (2013-01-01; A 2013-12-09; B, H, EP)

CPC: B29L2031/737 (2013-01-01; A 2013-12-09; B, H, EP)

IPC[8]: B23P23/04 (2006-01-01; A, F, I, 2013-05-23; B, H, DE)

Priority Number and Date: DE102011086791 2011-11-22

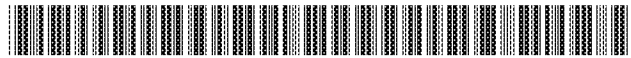
English Abstract:

The invention concerns a procedure for locking a drilling of a workpiece as well as a drilling catch device. With this procedure a drilling is brought into the workpiece, which exhibits a larger diameter within a range near the surface of the workpiece than within a surface-far range of the workpiece, whereby between the range near the surface and the surface-far range a stage is formed. Then takes place would bring in a cap, whose diameter corresponds to the inside diameter of the drilling within the range near the surface of the workpiece, into the drilling. Afterwards an attachment of the cap takes place in the drilling by means of a ultrasonic sealing procedure or a rotation friction welding procedure.

(19)



Deutsches
Patent- und Markenamt



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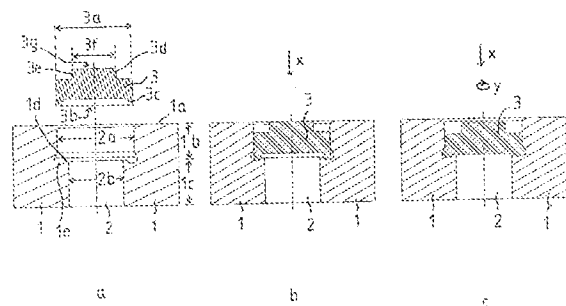
Dilalan, Ümit, 68309, Mannheim, DE

Prüfungsantrag gemäß § 44 PatG ist gestellt.

Die folgenden Angaben sind den vom Anmelder eingereichten Unterlagen entnommen

(54) Bezeichnung: **Verfahren zum Verschließen einer Bohrung eines Werkstückes und
Bohrungsverschlussvorrichtung**

(57) Zusammenfassung: Die Erfindung betrifft ein Verfahren zum Verschließen einer Bohrung eines Werkstückes sowie eine Bohrungsverschlussvorrichtung. Bei diesem Verfahren wird eine Bohrung in das Werkstück eingebracht, welche in einem oberflächennahen Bereich des Werkstückes einen größeren Durchmesser aufweist als in einem oberflächenfernen Bereich des Werkstückes, wobei zwischen dem oberflächennahen Bereich und dem oberflächenfernen Bereich eine Stufe gebildet wird. Dann erfolgt ein Einführen eines Verschlussdeckels, dessen Durchmesser dem Innendurchmesser der Bohrung im oberflächennahen Bereich des Werkstückes entspricht, in die Bohrung. Danach erfolgt eine Befestigung des Verschlussdeckels in der Bohrung mittels eines Ultraschallschweißvorganges oder eines Rotationsreißschweißvorganges.



Beschreibung

[0001] Die Erfindung betrifft ein Verfahren zum Verschließen einer Bohrung eines Werkstückes sowie eine Bohrungsverschlussvorrichtung.

[0002] Im Rahmen eines Fertigungsprozesses ist es oftmals notwendig, in ein Werkstück Bohrungen einzubringen. Zumindest ein Teil dieser Bohrungen muss in vielen Fällen am Ende des Fertigungsprozesses wieder verschlossen werden.

[0003] Ein Beispiel für ein derartiges Werkstück ist das Lagergehäuse eines Abgasturboladers, welches in seinem Inneren mit einem Wasserkern versehen ist. In derartige Lagergehäuse werden beispielsweise vier Bohrungen eingebracht, von denen am Ende des Fertigungsprozesses zwei wieder verschlossen werden müssen. Dieser Verschluss soll wasserdicht sein und über die Lebensdauer des Abgasturboladers die Dichtheit sicherstellen.

[0004] Es ist bereits bekannt, als Verschluss für derartige Bohrungen jeweils einen Verschlussdeckel zu verwenden, wie er in der DIN 443 spezifiziert ist. Ein derartiger Verschlussdeckel, der meist aus Stahl besteht, wird zum Verschluss der jeweiligen Bohrung in die Bohrung eingedrückt. Vor diesem Eindringen des Verschlussdeckels in die Bohrung besteht oftmals die Notwendigkeit, die Bohrung mit einer zusätzlichen Dichtmasse zu versehen, um nach dem nachfolgenden Eindringen des Verschlussdeckels in die Bohrung die gewünschte Dichtheit gewährleisten zu können.

[0005] Ausgehend von diesem Stand der Technik liegt der Erfindung die Aufgabe zugrunde, ein Verfahren anzugeben, mittels dessen ein verbesserter Verschluss einer Bohrung erreicht werden kann. Diese Aufgabe wird durch ein Verfahren mit den im Anspruch 1 angegebenen Merkmalen gelöst. Vorteilhafte Ausgestaltungen und Weiterbildungen des im Anspruch 1 angegebenen Verfahrens sind in den abhängigen Ansprüchen 2–4 angegeben. Der Anspruch 5 hat eine Bohrungsverschlussvorrichtung zum Gegenstand. Vorteilhafte Ausgestaltungen und Weiterbildungen der im Anspruch 5 angegebenen Bohrungsverschlussvorrichtung sind in den abhängigen Ansprüchen 6 und 7 angegeben.

[0006] Die Vorteile der Erfindung bestehen insbesondere darin, dass es auch bei einem Vorliegen von kleinen Oberflächenfehlern in der Bohrung des Werkstückes, wie beispielsweise Bearbeitungsriefen in einem Lagergehäuse, keines Einbringens einer zusätzlichen Dichtmasse in die Bohrung bedarf, um die gewünschte Dichtheit sicherstellen zu können. Denn durch die Anwendung eines Ultraschallschweißvorganges oder eines Rotationsreibschweißvorganges wird erreicht, dass in den Kontaktbereichen des Ver-

schlussdeckels mit der Bohrung aufgrund der eintretenden Materialplastifizierung und der anschließenden Erkaltung des Materials eventuelle Oberflächenfehler in der Bohrung des Werkstücks und auch am Verschlussdeckel ausgeglichen werden, da diese Oberflächenfehler, bei denen es sich beispielsweise um Bearbeitungsriefen handelt, mit plastifiziertem Material des Verschlussdeckels gefüllt werden. Des Weiteren wird durch den Ultraschallschweißvorgang bzw. den Rotationsreibschweißvorgang die gewünschte Dichtheit der verschlossenen Bohrung sichergestellt. Dies gilt auch dann, wenn im späteren Betrieb im Inneren des Werkstücks, beispielsweise in einem Wasserkern des Lagergehäuses eines Abgasturboladers, ein erhöhter Druck auftritt, der eine nach außen wirkende Kraft auf den Verschlussdeckel ausübt.

[0007] Vorzugsweise wird vor dem Einfügen des Verschlussdeckels in die Bohrung ein Freistich in die Bohrung eingebracht. Aufgrund dieses Freistiches weist die Bohrung in ihrem nach außen gerichteten Teil einen größeren Querschnitt auf als in ihrem inneren Teil, wobei zwischen dem äußeren Teil und dem inneren Teil der Bohrung eine umlaufende Stufe gebildet ist. Diese Stufe weist in vorteilhafter Weise in ihrem radial äußeren Bereich eine umlaufende Vertiefung auf, in welche bei der Verbindung des Verschlussdeckels mit dem Material des Werkstücks das plastifizierte Material des Verschlussdeckels einfließen kann.

[0008] Um die Verbindung des Verschlussdeckels mit dem Werkstück weiter zu verbessern, weist die Unterseite des Verschlussdeckels in ihrem radial äußeren Bereich vorzugsweise einen umlaufenden Vorsprung auf, der beim Einführen des Verschlussdeckels in die Bohrung zuerst mit der umlaufenden Vertiefung der Stufe in Kontakt kommt. Die aufgrund des Ultraschallschweißvorganges bzw. des Rotationsreibschweißvorganges auftretende Plastifizierung des Materials des umlaufenden Vorsprungs füllt die genannte umlaufende Vertiefung mit plastifiziertem Verschlussdeckelmaterial.

[0009] Weitere vorteilhafte Eigenschaften der Erfindung ergeben sich aus deren nachfolgender beispielhafter Erläuterung anhand der Figuren. Es zeigt

[0010] Fig. 1 Querschnittsdarstellungen zur Erläuterung eines Verfahrens zum Verschließen einer Bohrung mit einem Verschlussdeckel gemäß einem ersten Ausführungsbeispiel für die Erfindung,

[0011] Fig. 2 eine Querschnittsdarstellung zur Veranschaulichung eines zweiten Ausführungsbeispiels für die Form eines in die Bohrung eingebrachten Verschlussdeckels und

[0012] Fig. 3 eine Querschnittsdarstellung zur Veranschaulichung eines dritten Ausführungsbeispiels für die Form eines in die Bohrung eingebrachten Verschlussdeckels.

[0013] Die Fig. 1 zeigt Querschnittsdarstellungen zur Erläuterung eines Verfahrens zum Verschließen einer Bohrung eines Werkstücks. Bei diesem Werkstück 1, von dem nur ein Teil dargestellt ist, handelt es sich beispielsweise um das Lagergehäuse eines Abgasturboladers, welches in seinem inneren Bereich mit einem Wasserkern ausgestattet ist.

[0014] Das in der Fig. 1a dargestellte Werkstück 1 weist eine Oberfläche 1a, einen oberflächennahen Bereich 1b, einen oberflächenfernen Bereich 1c, eine Stufe 1d und eine im radial äußeren Endbereich der Stufe vorgesehene umlaufende Vertiefung 1e auf.

[0015] In dieses Werkstück 1 ist eine Bohrung 2 eingebracht, die im oberflächennahen Bereich 1b des Werkstücks 1 einen Innendurchmesser 2a und im oberflächenfernen Bereich 1c des Werkstücks 1 einen Innendurchmesser 2b aufweist.

[0016] Des Weiteren ist in der Fig. 1a ein Verschlussdeckel 3 gemäß einem ersten Ausführungsbeispiel gezeigt, der zum Verschließen der Bohrung 2 vorgesehen ist. Der Verschlussdeckel 3 hat einen Durchmesser 3a, eine Unterseite 3b und eine Oberseite 3g. Auf seiner Unterseite 3b weist der Verschlussdeckel 3 in seinem radial äußeren Bereich einen umlaufenden Vorsprung 3c auf. Im Bereich seiner Oberseite 3g bzw. in seinem oberflächennahen Endbereich 3d weist der Verschlussdeckel einen Außendurchmesser 3f auf, welcher kleiner ist als der Durchmesser 3a des Verschlussdeckels. Dieser verschmälerte Bereich des Verschlussdeckels 3 dient als Werkzeugeingriffsbereich 3e, an welchem bei einem Verfahren gemäß der Erfindung ein Werkzeug eingreift, um den Verschlussdeckel 3 in die Bohrung 2 einzuführen und durch einen Ultraschallschweißvorgang oder einen Rotationsreibschweißvorgang in der Bohrung 2 zu fixieren, um das gewünschte Verschließen der Bohrung herbeizuführen. Der Werkzeugeingriffsbereich 3e kann auch anders geformt sein als beim gezeigten Ausführungsbeispiel, beispielsweise sechskantförmig.

[0017] Das Verfahren zum Verschließen der Bohrung hat folgende Schritte:

In einem Schritt S1 erfolgt ein Einbringen der Bohrung 2 in das Werkstück 1, wobei diese Bohrung – wie es in der Fig. 1 gezeigt ist – im oberflächennahen Bereich 1b des Werkstücks 1 einen Durchmesser 2a und im oberflächenfernen Bereich 1c einen Durchmesser 2b aufweist. Dabei gilt die folgende Beziehung:

$2a > 2b$.

[0018] Zwischen dem oberflächennahen Bereich 1b und dem oberflächenfernen Bereich 1c wird eine Stufe 1d gebildet, die in ihrem radial außenliegenden Bereich mit einer umlaufenden Vertiefung 1e versehen ist.

[0019] Danach erfolgt in einem Schritt S2 – wie es in der Fig. 1b angedeutet ist – ein Einführen des Verschlussdeckels 3 in die Bohrung 2 in Richtung des Pfeiles x solange, bis der umlaufende Vorsprung 3c auf der Unterseite des Verschlussdeckels 3 mit dem Werkstück 1 innerhalb von dessen Vertiefung 1e in Berührung kommt.

[0020] Danach erfolgt in einem Schritt S3 – wie es in der Fig. 1c veranschaulicht ist – eine Befestigung des Verschlussdeckels 3 in der Bohrung 2 mittels eines Rotationsreibschweißvorganges. Bei diesem Rotationsreibschweißvorgang wird der in die Bohrung 2 eingeführte Verschlussdeckel 3 unter Verwendung eines im Werkzeugeingriffsbereich 3e eingesetzten Werkzeugs unter Ausübung von weiterem Druck in Richtung des Pfeiles x in Rotation in Richtung des Pfeiles y versetzt. Dies hat zur Folge, dass zunächst das Material des umlaufenden Vorsprungs 3c des Verschlussdeckels 3 plastifiziert bzw. verflüssigt wird und die umlaufende Vertiefung der Stufe 1d des Werkstücks 1 mit plastifiziertem Verschlussdeckelmateriale füllt. Dieser Rotationsreibschweißvorgang, bei welchem die zum Plastifizieren des Materials benötigte Wärme durch Grenzflächenreibung zwischen den zu verbindenden Teilen erzeugt wird, wird solange fortgesetzt, bis die Vertiefung 1e vollständig mit plastifiziertem Verschlussdeckelmateriale gefüllt ist und auch im weiteren Bereich der Stufe 1d und an dem Außenmantel des Verschlussdeckels durch eine Plastifizierung des Verschlussdeckelmateriale eine Verbindung des Verschlussdeckels mit dem Werkstückmaterial erreicht ist. Diese Verbindung wird durch eine nach Beendigung des Rotationsreibschweißvorganges auftretende Abkühlung der Kontaktflächen gefestigt, so dass der gewünschte wasserdichte, über die Lebensdauer des Abgasturboladers anhaltende Verschluss der Bohrung sichergestellt wird.

[0021] Durch das vorstehend beschriebene Verfahren wird in vorteilhafter Weise erreicht, dass bei der Herstellung der Bohrung und auch des Verschlussdeckels auftretende Toleranzen, beispielsweise Bearbeitungsriefen in der Bohrung und/oder am Verschlussdeckel, durch das Material des Verschlussdeckels gefüllt und dadurch abgedichtet werden.

[0022] Dies ermöglicht auch eine Vereinfachung der Fertigung des Verschlussdeckels und auch des Einbringens der Bohrung in das Werkstück, da die Genauigkeitsanforderungen im Vergleich zum Stand der Technik reduziert sind.

[0023] Des Weiteren entfällt auch die beim Stand der Technik ggf. notwendige, vor dem Eindringen eines Verschlussdeckels durchzuführende gesonderte Einbringung von Dichtmasse in die Bohrung.

[0024] Durch die Verwendung einer Bohrung, die im Übergangsbereich zwischen dem oberflächennahen Bereich des Werkstücks und dem oberflächenfernen Bereich des Werkstücks eine Stufe aufweist, wird die Belastbarkeit der Bohrungsverschlussvorrichtung erhöht, da die Befestigungsfläche, an welcher direkter Kontakt des Verschlussdeckels mit dem Werkstück besteht, im Vergleich zum Stand der Technik vergrößert ist.

[0025] Das Einbringen einer Bohrung, wie sie in den Fig. 1a, Fig. 1b und Fig. 1c gezeigt ist, in das Werkstück 1 kann dadurch erfolgen, dass zunächst eine Bohrung in das Werkstück eingebracht wird, die in ihrem gesamten Bereich den Innendurchmesser 2b aufweist, und dass im Rahmen eines danach vorgenommenen Freistiches im oberflächennahen Bereich 1b des Werkstücks eine Verbreiterung der Bohrung durchgeführt wird. Die Form dieses Freistiches kann an jeweils gegebene Erfordernisse angepasst werden.

[0026] Das Material, aus welchem der Verschlussdeckel besteht, kann in Abhängigkeit vom jeweiligen Anwendungsfall gewählt werden. Handelt es sich bei der zu verschließenden Bohrung um eine Wasserkern-Bohrung des Lagergehäuses eines Abgasturboladers, dann kann als Verschlussdeckel ein thermoplastisches Kunststoffteil oder ein Spritzgusskunststoffteil oder auch ein Aluminiumteil oder ein aus einer Kupferlegierung bestehendes Teil verwendet werden.

[0027] Alternativ zu dem oben beschriebenen Ausführungsbeispiel kann die Befestigung des Verschlussdeckels in der Bohrung auch mittels eines Ultraschallschweißvorganges vorgenommen werden. Dabei wird die zum Plastifizieren des Verschlussdeckelmaterials benötigte Wärme durch die Umwandlung von Ultraschallschwingungen in mechanische Schwingungen erzeugt. Die gebildete Wärme wird dem Verschlussdeckel über eine Sonotrode mit einem definierten Anpressdruck zugeleitet. An den Fügeflächen des Verschlussdeckels mit dem Werkstück entsteht durch die Schwingungen Reibungswärme, die das Material zum Schmelzen bringt und den Verschlussdeckel mit dem Werkstück verbindet. Nach dieser Schalleinleitung wird das plastifizierte Material für die Dauer einer kurzen Abkühlphase unter Beibehaltung des Fügedrucks homogen verfestigt. Dadurch entsteht der gewünschte Verschluss der Bohrung.

[0028] Die Fig. 2 zeigt eine Querschnittsdarstellung zur Veranschaulichung eines zweiten Ausführungs-

beispiels für die Form eines in die Bohrung eingebrachten Verschlussdeckels. Bei diesem Verschlussdeckel ist die genannte Unterseite eben ausgebildet. Entsprechend ist auch die Stufe 1d über ihre gesamte Breite eben ausgebildet.

[0029] Die Fig. 3 zeigt eine Querschnittsdarstellung zur Veranschaulichung eines dritten Ausführungsbeispiels für die Form eines in die Bohrung eingebrachten Verschlussdeckels. Dieser Verschlussdeckel weist auf seiner Unterseite einen Fortsatz auf, dessen Außendurchmesser dem Innendurchmesser 2b des oberflächenfernen Bereichs entspricht. Dieser Fortsatz ragt in den oberflächenfernen Bereich der Bohrung 2 hinein.

ZITATE ENTHALTEN IN DER BESCHREIBUNG

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Zitierte Nicht-Patentliteratur

- DIN 443 [0004]

Patentansprüche

1. Verfahren zum Verschließen einer Bohrung eines Werkstückes mit folgenden Schritten:

S1: Einbringen einer Bohrung (2) in das Werkstück (1), welche in einem oberflächennahen Bereich (1b) des Werkstücks einen größeren Durchmesser (2a) aufweist als in einem oberflächenfernen Bereich (1c) des Werkstücks, wobei zwischen dem oberflächennahen Bereich (1b) und dem oberflächenfernen Bereich (1c) eine Stufe (1d) gebildet wird,

S2: Einführen eines Verschlussdeckels (3), dessen Durchmesser (3a) dem Innendurchmesser (2a) der Bohrung im oberflächennahen Bereich (1b) des Werkstückes entspricht, in die Bohrung (2),

S3: Befestigung des Verschlussdeckels (3) in der Bohrung (2) mittels eines Ultraschallschweißvorganges oder eines Rotationsreißschweißvorganges.

2. Verfahren nach Anspruch 1, dadurch gekennzeichnet, dass im Schritt S1 eine Bohrung (2) in das Werkstück (1) eingebracht wird, die im Bereich der Stufe (1d) in ihrem radial außenliegenden Bereich mit einer umlaufenden Vertiefung (1e) versehen ist.

3. Verfahren nach Anspruch 1 oder 2, dadurch gekennzeichnet, dass im Schritt S2 ein Verschlussdeckel (3) in die Bohrung (2) eingeführt wird, auf dessen Unterseite (3b) im radial außenliegenden Bereich ein umlaufender Vorsprung (3c) vorgesehen ist.

4. Verfahren nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, dass im Schritt S3 bei der Befestigung des Verschlussdeckels (3) in der Bohrung (2) zunächst der umlaufende Vorsprung (3c) auf der Unterseite des Verschlussdeckels plastifiziert wird und das plastifizierte Material die umlaufende Vertiefung (1e) auffüllt.

5. Bohrungsverschlussvorrichtung eines Werkstückes, aufweisend

– eine Bohrung (2) im Werkstück (1), welche in einem oberflächennahen Bereich (1b) des Werkstücks einen größeren Innendurchmesser (2a) aufweist als in einem oberflächenfernen Bereich (1c) des Werkstücks, wobei zwischen dem oberflächennahen Bereich (1b) und dem oberflächenfernen Bereich (1c) eine Stufe (1d) gebildet ist,

– einen in die Bohrung (2) eingesetzten und im Bereich der Stufe (1d) mit dem Werkstück (2) mittels eines Ultraschallschweißvorganges oder eines Rotationsreißschweißvorganges verbundenen Verschlussdeckel (3).

6. Bohrungsverschlussvorrichtung nach Anspruch 5, dadurch gekennzeichnet, dass die in das Werkstück (1) eingebrachte Bohrung (2) im Bereich der Stufe (1d) in ihrem radial außenliegenden Bereich mit einer umlaufenden Vertiefung (1e) versehen ist, welche mit Verschlussdeckelmaterial gefüllt ist.

7. Bohrungsverschlussvorrichtung nach Anspruch 5 oder 6, dadurch gekennzeichnet, dass der Verschlussdeckel (3) in seinem oberflächennahen Endbereich (3d) mit einem Werkzeugeingriffsbereich (3e) versehen ist, dessen Außendurchmesser (3f) kleiner ist als der Innendurchmesser (2a) der Bohrung im oberflächennahen Bereich des Werkstücks.

Es folgen 2 Blatt Zeichnungen

Anhängende Zeichnungen

FIG.1

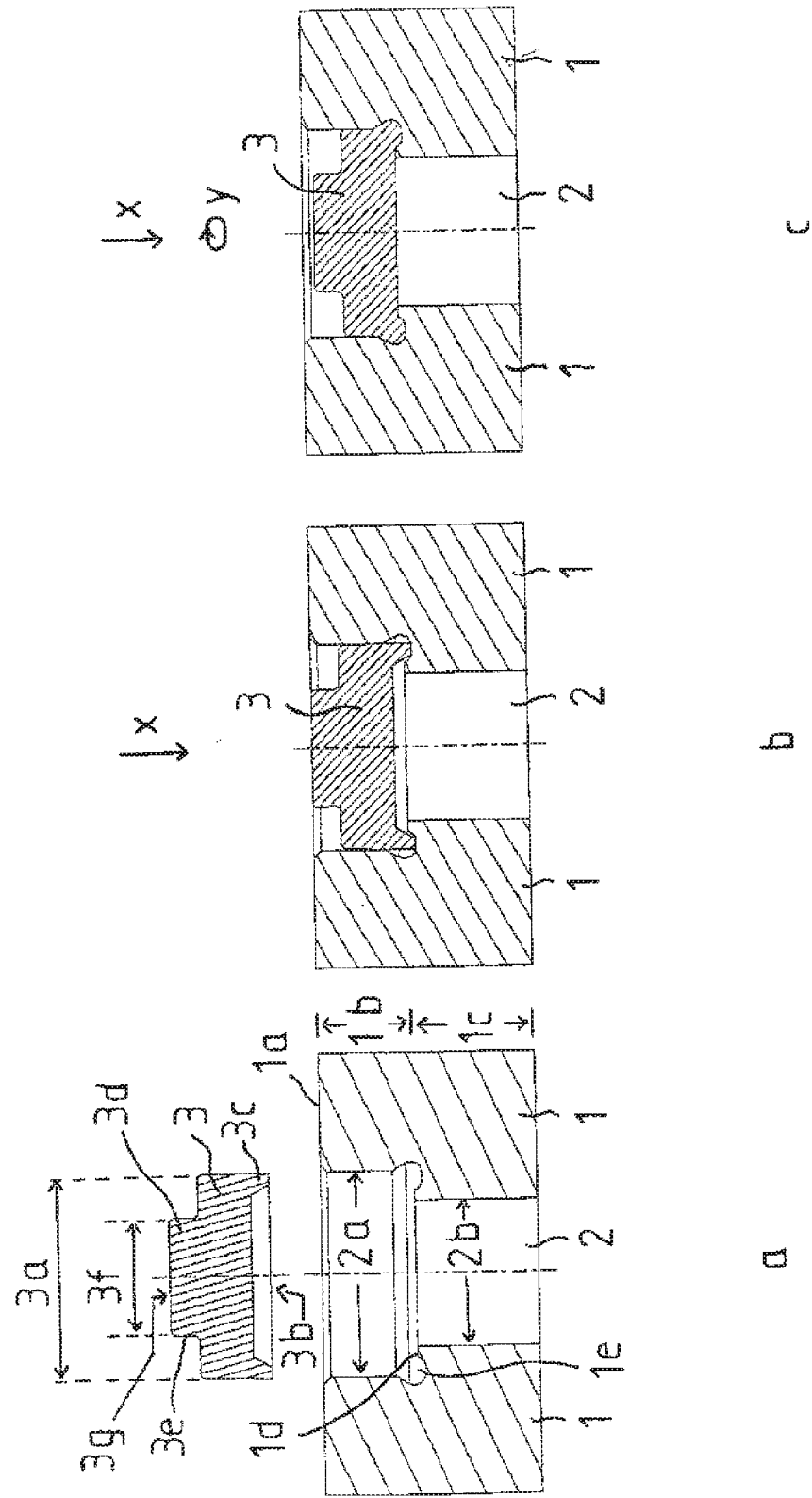


FIG. 3

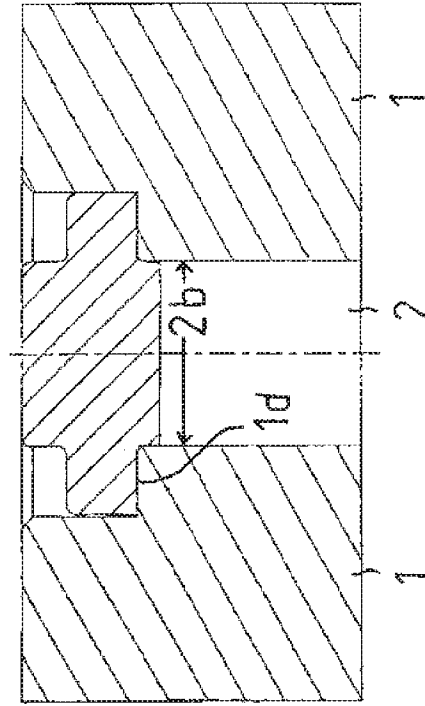
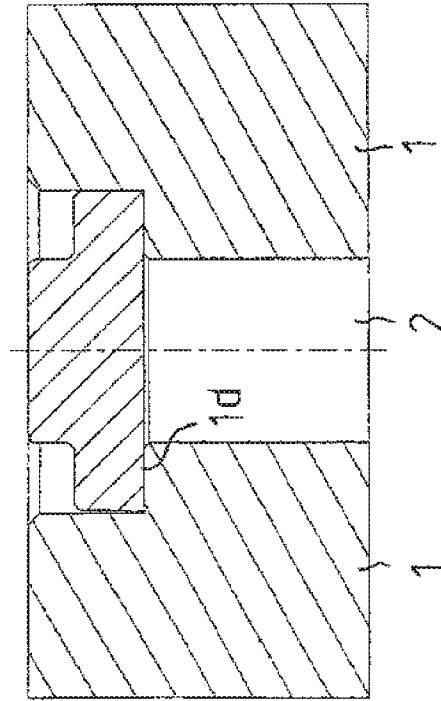


FIG. 2



Electronic Patent Application Fee Transmittal

Application Number:	14809142			
Filing Date:	24-Jul-2015			
Title of Invention:	BIOMECHANICS AWARE HELMET			
First Named Inventor/Applicant Name:	Robert T. Knight			
Filer:	Avery Audrey Kwan/Amber Lundy			
Attorney Docket Number:	BRGDP001C3			
Filed as Small Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
Submission- Information Disclosure Stmt	2806	1	90	90
Statutory or Terminal Disclaimer	2814	2	160	320
Total in USD (\$)				410

Electronic Acknowledgement Receipt

EFS ID:	24486946
Application Number:	14809142
International Application Number:	
Confirmation Number:	5385
Title of Invention:	BIOMECHANICS AWARE HELMET
First Named Inventor/Applicant Name:	Robert T. Knight
Customer Number:	19694
Filer:	Avery Audrey Kwan/Amber Lundy
Filer Authorized By:	Avery Audrey Kwan
Attorney Docket Number:	BRGDP001C3
Receipt Date:	30-DEC-2015
Filing Date:	24-JUL-2015
Time Stamp:	11:04:05
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$410
RAM confirmation Number	12689
Deposit Account	
Authorized User	

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1	Amendment/Req. Reconsideration-After Non-Final Reject	BRGDP001C3_Response_filed_12-30-15.pdf	84905	no	1
			6eb82828fc08bc596a336ddccc17236aae644b3a		
Warnings:					
Information:					
2	Terminal Disclaimer Filed	BRGDP001C3_Terminal_Disclaimer_filed_12-30-15.pdf	137504	no	2
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Information:					
3	Terminal Disclaimer Filed	BRGDP001C3_Terminal_Disclaimer2_filed_12-30-15.pdf	137501	no	2
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	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Transmittal Letter		1	2	
	Information Disclosure Statement (IDS) Form (SB08)		3	4	
Warnings:					
Information:					
5	Foreign Reference	DE102011086791A1_.pdf	291665	no	9
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6	Fee Worksheet (SB06)	fee-info.pdf	32299	no	2
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National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

**TERMINAL DISCLAIMER TO OBVIATE A DOUBLE PATENTING
REJECTION OVER A "PRIOR" PATENT**

Docket Number (Optional)

BRGDP001C3

In re Application of: Robert T. Knight

Application No.: 14/809,142

Filed: July 24, 2015

For:

BIOMECHANICS AWARE HELMET

The applicant, Brainguard Technologies, Inc., owner of 100 percent interest in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of **prior patent** No. 9,060,561 as the term of said **prior patent** is presently shortened by any terminal disclaimer. The applicant hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the **prior patent** are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

In making the above disclaimer, the applicant does not disclaim the terminal part of the term of any patent granted on the instant application that would extend to the expiration date of the full statutory term of the **prior patent**, "as the term of said **prior patent** is presently shortened by any terminal disclaimer," in the event that said **prior patent** later:

expires for failure to pay a maintenance fee;

is held unenforceable;

is found invalid by a court of competent jurisdiction;

is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321;

has all claims canceled by a reexamination certificate;

is reissued; or

is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer.

Check either box 1 or 2 below, if appropriate.

1. ☐ The undersigned is the applicant. If the applicant is an assignee, the undersigned is authorized to act on behalf of the assignee.

I hereby acknowledge that any willful false statements made are punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

2. ☒ The undersigned is an attorney or agent of record. Reg. No. 46850

/Avery Audrey Kwan/

Signature

2015-12-30

Date

Avery Audrey Kwan

Typed or printed name

Attorney of Record

Title

510-900-9501

Telephone Number

- ☒ Terminal disclaimer fee under 37 CFR 1.20(d) included.

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

This collection of information is required by 37 CFR 1.321. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

**TERMINAL DISCLAIMER TO OBVIATE A DOUBLE PATENTING
REJECTION OVER A "PRIOR" PATENT**

Docket Number (Optional)

BRGDP001C3

In re Application of: Robert T. Knight

Application No.: 14/809,142

Filed: July 24, 2015

For:

BIOMECHANICS AWARE HELMET

The applicant, Brainguard Technologies, Inc., owner of 100 percent interest in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of **prior patent** No. 8,863,319 as the term of said **prior patent** is presently shortened by any terminal disclaimer. The applicant hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the **prior patent** are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

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expires for failure to pay a maintenance fee;

is held unenforceable;

is found invalid by a court of competent jurisdiction;

is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321;

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is reissued; or

is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer.

Check either box 1 or 2 below, if appropriate.

1. ☐ The undersigned is the applicant. If the applicant is an assignee, the undersigned is authorized to act on behalf of the assignee.

I hereby acknowledge that any willful false statements made are punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

2. ☒ The undersigned is an attorney or agent of record. Reg. No. 46850

/Avery Audrey Kwan/

Signature

2015-12-30

Date

Avery Audrey Kwan

Typed or printed name

Attorney of Record

Title

510-900-9501

Telephone Number

- ☒ Terminal disclaimer fee under 37 CFR 1.20(d) included.

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2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
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9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Robert T. Knight

Attorney Docket No.: BRGDP001C3

Application No.: 14/809,142

Examiner: Tajash D. Patel

Filed: July 24, 2015

Group: 3765

Title: BIOMECHANICS AWARE HELMET

Confirmation No.: 5385

CERTIFICATE OF EFS-WEB TRANSMISSION

I hereby certify that this correspondence is being transmitted electronically through EFS-WEB to the Commissioner for Patents, P.O. Box 1450 Alexandria, VA 22313-1450 on December 30, 2015.

Signed: /Amber Lundy/
Amber Lundy

INFORMATION DISCLOSURE STATEMENT
37 CFR §§1.56 AND 1.97(b)

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

The references listed in the attached PTO Form 1449 may be material to examination of the above-identified patent application. The Examiner is requested to make the identified references of official record in this application. The above-identified application is a continuation of prior application U.S. Patent Application No. 14/714,093, which is a continuation of prior applications U.S. Patent Application No. 14/485,993. Because some of the listed references were either cited by the USPTO, or submitted to the USPTO in the prior applications, under 37 CFR § 1.98(d), Applicants submit that copies of these references need not be provided. Copies of non-U.S. references that were not cited in the priority applications are attached.

This Information Disclosure Statement is not to be construed as a representation that a search has been made, that additional information material to the examination of this application does not exist, or that the reference(s) indeed constitutes prior art.

This Information Disclosure Statement is being filed after the mailing date of the first Office Action on the merits, or after three months from the filing date of this application, whichever event occurred last, but it is believed before the mailing date of either: (i) a final action under §1.113 or (ii) a notice of allowance under §1.311, whichever occurs first.

Accompanying this Information Disclosure Statement is the fee set forth in 37 CFR 1.17(p). However, if it is determined that additional fees are due, the Commissioner is hereby authorized to charge such fees to Deposit Account 50-6367 (Order No. BRGDP001C3).

Respectfully submitted,
Kwan & Olynick LLP

/ Audrey Kwan /

Avery Audrey Kwan
Registration No. 46,850

2000 Hearst Avenue, Ste 305
Berkley, CA 94709
510-900-9501 x705

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 14/809,142	Filing Date 07/24/2015	☐ To be Mailed
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ENTITY: ☐ LARGE ☒ SMALL ☐ MICRO**APPLICATION AS FILED – PART I**

(Column 1)

(Column 2)

FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X \$ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X \$ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	

APPLICATION AS AMENDED – PART II

(Column 1)

(Column 2)

(Column 3)

AMENDMENT	12/30/2015	CLAIMS REMAINING AFTER AMENDMENT	MINUS	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)
	Total (37 CFR 1.16(i))	* 20	Minus	** 20	= 0	X \$40 =	0
	Independent (37 CFR 1.16(h))	* 3	Minus	***3	= 0	X \$210 =	0
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	0

(Column 1)

(Column 2)

(Column 3)

AMENDMENT	CLAIMS REMAINING AFTER AMENDMENT	MINUS	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)
	Total (37 CFR 1.16(i))	*	Minus	**	X \$ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	X \$ =	
	☐ Application Size Fee (37 CFR 1.16(s))					
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					
						TOTAL ADD'L FEE

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
/LINDA HUMES/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Application Number 	Application/Control No. 14/809,142	Applicant(s)/Patent under Reexamination KNIGHT, ROBERT T.	
Document Code - DISQ		Internal Document – DO NOT MAIL	

TERMINAL DISCLAIMER	☒ APPROVED	☐ DISAPPROVED
Date Filed : 12/30/15	This patent is subject to a Terminal Disclaimer	

Approved/Disapproved by:

2 td's
Jean Proctor



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

19694 7590 02/17/2016
Kwan & Olynick LLP
2000 Hearst Avenue, Suite 305
Berkeley, CA 94709

EXAMINER

PATEL, TAJASH D

ART UNIT

PAPER NUMBER

3765

DATE MAILED: 02/17/2016

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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14/809,142

07/24/2015

Robert T. Knight

BRGDP001C3

5385

TITLE OF INVENTION: BIOMECHANICS AWARE HELMET

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	\$480	\$0	\$0	\$480	05/17/2016

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B - FEE(S) TRANSMITTAL

**Complete and send this form, together with applicable fee(s), to: Mail Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885**

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

19694 7590 02/17/2016
Kwan & Olynick LLP
2000 Hearst Avenue, Suite 305
Berkeley, CA 94709

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/809,142	07/24/2015	Robert T. Knight	BRGDP001C3	5385

TITLE OF INVENTION: BIOMECHANICS AWARE HELMET

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	\$480	\$0	\$0	\$480	05/17/2016

EXAMINER	ART UNIT	CLASS-SUBCLASS
PATEL, TAJASH D	3765	002-411000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363). ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached. ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. Use of a Customer Number is required.	2. For printing on the patent front page, list (1) The names of up to 3 registered patent attorneys or agents OR, alternatively, 1 _____ (2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2 _____ 3 _____
---	---

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☐ Issue Fee
☐ Publication Fee (No small entity discount permitted)
☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.
☐ Payment by credit card. Form PTO-2038 is attached.
☐ The director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

- ☐ Applicant certifying micro entity status. See 37 CFR 1.29
☐ Applicant asserting small entity status. See 37 CFR 1.27
☐ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____ Date _____
 Typed or printed name _____ Registration No. _____



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/809,142	07/24/2015	Robert T. Knight	BRGDP001C3	5385
19694 7590 02/17/2016 Kwan & Olynick LLP 2000 Hearst Avenue, Suite 305 Berkeley, CA 94709			EXAMINER PATEL, TAJASH D	
			ART UNIT	PAPER NUMBER
			3765	
DATE MAILED: 02/17/2016				

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Notice of Allowability	Application No. 14/809,142	Applicant(s) KNIGHT, ROBERT T.	
	Examiner TEJASH PATEL	Art Unit 3765	AIA (First Inventor to File) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to Terminal Disclaimer filed on 12/30/15.
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.
2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.
3. ☒ The allowed claim(s) is/are 1-20. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

- a) ☐ All b) ☐ Some *c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|--|---|
| 1. ☐ Notice of References Cited (PTO-892) | 5. ☐ Examiner's Amendment/Comment |
| 2. ☒ Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date <u>12/30/15</u> | 6. ☐ Examiner's Statement of Reasons for Allowance |
| 3. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 7. ☐ Other _____. |
| 4. ☐ Interview Summary (PTO-413),
Paper No./Mail Date _____. | |

/Tejash Patel/
Primary Examiner



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
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 Alexandria, Virginia 22313-1450
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BIB DATA SHEET

CONFIRMATION NO. 3113

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.		
14/927,093	10/29/2015	002	3765	BRGDP001C4		
RULE						
APPLICANTS Brainguard Technologies, Inc., El Cerrito, CA;						
INVENTORS Robert T. Knight, Berkeley, CA;						
** CONTINUING DATA ***** This application is a CON of 14/809,142 07/24/2015 which is a CON of 14/714,093 05/15/2015 which is a CON of 14/485,993 09/15/2014 PAT 9060561 which is a CON of 13/554,471 07/20/2012 PAT 8863319 which claims benefit of 61/510,401 07/21/2011						
** FOREIGN APPLICATIONS *****						
** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** ** SMALL ENTITY ** 11/10/2015						
Foreign Priority claimed ☐ Yes ☒ No 35 USC 119(a-d) conditions met ☐ Yes ☒ No Verified and Acknowledged <u>/TEJASH D PATEL/</u> Examiner's Signature		☐ Met after Allowance Initials	STATE OR COUNTRY CA	SHEETS DRAWINGS 6	TOTAL CLAIMS 20	INDEPENDENT CLAIMS 2
ADDRESS Kwan & Olynick LLP 2000 Hearst Avenue, Suite 305 Berkeley, CA 94709 UNITED STATES						
TITLE BIOMECHANICS AWARE HELMET						
FILING FEE RECEIVED 730	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:			☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit		

Search Notes 	Application/Control No. 14809142	Applicant(s)/Patent Under Reexamination KNIGHT, ROBERT T.
	Examiner TEJASH PATEL	Art Unit 3765

CPC- SEARCHED		
Symbol	Date	Examiner
A42B 3/12, A42B 3/064, A42B 3/04, A42B 3/121	12/11/15	TP
Updated above search from 12/11/15	2/3/16	TP

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
2	410-414, 416, 421, 425, 6.1, 6.2, 7	12/11/15	TP
Updated	Above search from 12/11/15	2/3/16	TP

SEARCH NOTES		
Search Notes	Date	Examiner
PALM Searched	12/11/15	TP

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner
A42B	3/064	2/3/16	TP

	/TEJASH PATEL/ Primary Examiner.Art Unit 3765
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Issue Classification 	Application/Control No. 14809142	Applicant(s)/Patent Under Reexamination KNIGHT, ROBERT T.	
	Examiner TEJASH PATEL	Art Unit 3765	

CPC						
Symbol					Type	Version
A42B		3	/	064	F	2013-01-01
A42B		3	/	121	I	2013-01-01
A42B		3	/	08	I	2013-01-01
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CPC Combination Sets				
Symbol	Type	Set	Ranking	Version

NONE (Assistant Examiner) _____ (Date) _____		Total Claims Allowed: 20	
/TEJASH PATEL/ Primary Examiner.Art Unit 3765 (Primary Examiner) _____ (Date) _____		O.G. Print Claim(s) 1	O.G. Print Figure 5

Issue Classification 	Application/Control No. 14809142	Applicant(s)/Patent Under Reexamination KNIGHT, ROBERT T.
	Examiner TEJASH PATEL	Art Unit 3765

☐ Claims renumbered in the same order as presented by applicant															
☐ CPA															
☐ T.D.															
☐ R.1.47															
Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1	17	17												
2	2	18	18												
3	3	19	19												
4	4	20	20												
5	5														
6	6														
7	7														
8	8														
9	9														
10	10														
11	11														
12	12														
13	13														
14	14														
15	15														
16	16														

NONE	Total Claims Allowed: 20	
(Assistant Examiner)	(Date)	
/TEJASH PATEL/ Primary Examiner.Art Unit 3765	02/03/2016	O.G. Print Claim(s) 1
(Primary Examiner)	(Date)	O.G. Print Figure 5

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		14/809,142
	Filing Date		Jul 24, 2015
	First Named Inventor	Robert T Knight	
	Art Unit	3765	
	Examiner Name	Patel, Tajash D.	
	Attorney Docket Number	BRGDP001C3	

U.S.PATENTS						
Examiner Initial*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
/T.P./		8104593		2012-01-31	Lin, Keng-Hsien	
/T.P./		20130239397	A1	2013-09-19	Hotte, Denis	
/T.P./		20150245681	A1	2015-09-03	Knight, Robert T.	

U.S.PATENT APPLICATION PUBLICATIONS						
Examiner Initial*	Cite No	Publication Number	Kind Code ¹	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

FOREIGN PATENT DOCUMENTS								
Examiner Initial*	Cite No	Foreign Document Number ³	Country Code ²	Kind Code ⁴	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T ⁵
/T.P./		102011086791	DE	A1	2013- 05-23	Dilalan, Umit		

NON-PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ⁵

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	14/809,142
	Filing Date	Jul 24, 2015
	First Named Inventor	Robert T Knight
	Art Unit	3765
	Examiner Name	Patel, Tajash D.
	Attorney Docket Number	BRGDP001C3

EXAMINER SIGNATURE			
Examiner Signature	/Tajash Patel/	Date Considered	02/04/2016
*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.			
¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.			

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax **(571)-273-2885**

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

19694 7590 02/17/2016
Kwan & Olynick LLP
2000 Hearst Avenue, Suite 305
Berkeley, CA 94709

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

Sally Austin	(Depositor's name)
/Sally Austin/	(Signature)
2016-02-22	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/809,142	07/24/2015	Robert T. Knight	BRGDP001C3	5385

TITLE OF INVENTION: BIOMECHANICS AWARE HELMET

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	\$480	\$0	\$0	\$480	05/17/2016

EXAMINER	ART UNIT	CLASS-SUBCLASS
PATEL, TAJASH D	3765	002-411000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.563).
☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
 (1) The names of up to 3 registered patent attorneys or agents OR, alternatively, Kwan & Olynick LLP
 (2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2
3

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE Brainguard Technologies, Inc. (B) RESIDENCE: (CITY and STATE OR COUNTRY) El Cerrito, CA

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

☒ Issue Fee
☐ Publication Fee (No small entity discount permitted)
☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)

☐ A check is enclosed.
☒ Payment by credit card. Form PTO-2038 is attached.
☐ The director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

☐ Applicant certifying micro entity status. See 37 CFR 1.29
☐ Applicant asserting small entity status. See 37 CFR 1.27
☐ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature /Audrey Kwan/ Date 2016-02-22
 Typed or printed name Avery Audrey Kwan Registration No. 46850

Electronic Patent Application Fee Transmittal				
Application Number:		14809142		
Filing Date:		24-Jul-2015		
Title of Invention:		BIOMECHANICS AWARE HELMET		
First Named Inventor/Applicant Name:		Robert T. Knight		
Filer:		Avery Audrey Kwan/Sally Austin		
Attorney Docket Number:		BRGDP001C3		
Filed as Small Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Utility Appl Issue Fee	2501	1	480	480

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				480

Electronic Acknowledgement Receipt

EFS ID:	24987756
Application Number:	14809142
International Application Number:	
Confirmation Number:	5385
Title of Invention:	BIOMECHANICS AWARE HELMET
First Named Inventor/Applicant Name:	Robert T. Knight
Customer Number:	19694
Filer:	Avery Audrey Kwan/Sally Austin
Filer Authorized By:	Avery Audrey Kwan
Attorney Docket Number:	BRGDP001C3
Receipt Date:	22-FEB-2016
Filing Date:	24-JUL-2015
Time Stamp:	20:28:13
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$ 480
RAM confirmation Number	7585
Deposit Account	506367
Authorized User	KWAN, AVERY AUDREY

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Charge any Additional Fees required under 37 CFR 1.16 (National application filing, search, and examination fees)

Charge any Additional Fees required under 37 CFR 1.17 (Patent application and reexamination processing fees)

Charge any Additional Fees required under 37 CFR 1.19 (Document supply fees)

Charge any Additional Fees required under 37 CFR 1.20 (Post Issuance fees)

Charge any Additional Fees required under 37 CFR 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	BRGDP001C3_IFEE_filed_022216.pdf	1588835 c591cb4da7127dbf8b363ddfb83d18af84b25c03	no	1

Warnings:

Information:

2	Fee Worksheet (SB06)	fee-info.pdf	30865 13fff813ab4dac473ba4f6a2dd9b58bc635be979	no	2
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Warnings:

Information:

Total Files Size (in bytes):	1619700
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This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.



UNITED STATES PATENT AND TRADEMARK OFFICE

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/809,142	07/24/2015	Robert T. Knight	BRGDP001C3	5385
19694	7590	02/26/2016	EXAMINER	
Kwan & Olynick LLP 2000 Hearst Avenue, Suite 305 Berkeley, CA 94709			PATEL, TAJASH D	
			ART UNIT	PAPER NUMBER
			3765	
			NOTIFICATION DATE	DELIVERY MODE
			02/26/2016	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

docket@kwanip.com
alundy@kwanip.com



UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

Application No. : 14809142
Applicant : Knight
Filing Date : 07/24/2015
Date Mailed : 02/26/2016

NOTICE TO FILE CORRECTED APPLICATION PAPERS

Notice of Allowance Mailed

This application has been accorded an Allowance Date and is being prepared for issuance. The application, however, is incomplete for the reasons below.

Applicant is given two (2) months from the mail date of this Notice within which to respond. This time period for reply is extendable under 37 CFR 1.136(a) for only TWO additional MONTHS.

The application is not in compliance with 37 CFR 1.78, as indicated in the attachment. The consequences of failure to respond within the above-identified time period are set forth in the attachment.

Even if the Office has recognized a benefit claim and has entered it into the Office's database and included it on applicant's filing receipt, the benefit claim is not a proper benefit claim unless the reference in compliance with 37 CFR 1.78 is included, depending upon the application's filing date and as indicated in the attachment, in an application data sheet or in the first sentence(s) of the specification and all other requirements are met.

See attachment.

*A copy of this notice **MUST** be returned with the reply. Please address response to
"Mail Stop Issue Fee, Commissioner for Patents,
P.O. Box 1450, Alexandria, VA 22313-1450".*

/Anita Grimmage/
Publication Branch
Office of Data Management
(571) 272-4200

**APPLICATION FILED ON OR AFTER MARCH 16, 2013,
NOT IN COMPLIANCE WITH 37 CFR 1.78**

- ☐ The 37 CFR 1.78(c)(2) reference on the application data sheet does not indicate the relationship (continuation, division, continuation-in-part) to the prior U.S. nonprovisional application or international application designating the U.S. See document coded dated , listing application number(s) .
- ☒ The 37 CFR 1.78(c)(2) reference on the application data sheet does not provide the U.S. nonprovisional application number (series code and serial number) or, with respect to an international PCT application designating the U.S., it provides the international application number or international filing date but not both. See document coded ADS dated 07/24/2015, in which the following is missing: 14/809,142.
- ☐ The 37 CFR 1.78(c)(2) reference on the application data sheet shows an incorrect, incomplete, or illegible U.S. nonprovisional application number, international PCT application number, or international PCT filing date. See document coded dated , in which the following error was made: .
- ☐ The 37 CFR 1.78(c)(2) reference to the prior U.S. nonprovisional application or international application designating the U.S. is not present on an application data sheet, thus removing the validating link under 35 U.S.C. 119(a)-(d) to a prior foreign application or under 35 U.S.C. 119(e) to a prior U.S. provisional application.
- ☒ The 37 CFR 1.78(c)(2) reference to the prior U.S. nonprovisional application or international application designating the U.S. is not present on an application data sheet.
- ☐ The 37 CFR 1.78(a)(3) reference to the prior U.S. provisional application is not present on an application data sheet.
- ☐ The 37 CFR 1.78(a)(3) reference to the prior U.S. provisional application on an application data sheet does not provide the provisional application number (series code and serial number). See document coded dated , in which the following is missing: .
- ☐ The 37 CFR 1.78(a)(3) reference to the prior U.S. provisional application on an application data sheet shows an incorrect, incomplete, or illegible U.S. provisional application number. See document coded dated , in which the following error was made: .
- ☐ Other: .

HOW TO RESPOND

A proper response to this notice would include: (1) a corrected Application Data Sheet (ADS) pursuant to 37 CFR 1.76(c) which provides the benefit information from the attached filing receipt which would make the benefit information comply with 37 CFR 1.78(c)(2) or 37 CFR 1.78(a)(3) or (2) a petition filed pursuant to the provisions of 37 CFR 1.78(b) or 37 CFR 1.78(d) if the benefit information from the attached filing receipt does not accurately reflect the benefits under 35 U.S.C. 119(e), 120, 121 or 365(c) as claimed by applicant (a grantable petition would include a corrected ADS as required by 37 CFR 1.78(b)(1) or 37 CFR 1.78(d)(1)).

WARNING: If Applicant fails to timely submit a proper response, the benefit information will be deleted and the patent will be printed without the benefit information present.



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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
14/809,142	07/24/2015	Robert T. Knight	BRGDP001C3

CONFIRMATION NO. 5385

PUBLICATION NOTICE



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19694
Kwan & Olynick LLP
2000 Hearst Avenue, Suite 305
Berkeley, CA 94709

Title:BIOMECHANICS AWARE HELMET

Publication No.US-2016-0081416-A1

Publication Date:03/24/2016

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently <http://www.uspto.gov/patft/>.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Office of Public Records. The Office of Public Records can be reached by telephone at (703) 308-9726 or (800) 972-6382, by facsimile at (703) 305-8759, by mail addressed to the United States Patent and Trademark Office, Office of Public Records, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently <http://pair.uspto.gov/>. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

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Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101



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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/809,142	08/16/2016	9414635	BRGDP001C3	5385

19694 7590 07/27/2016
Kwan & Olynick LLP
2000 Hearst Avenue, Suite 305
Berkeley, CA 94709

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment is 55 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site <http://pair.uspto.gov> for additional applicants):

Robert T. Knight, Berkeley, CA;
Brainguard Technologies, Inc., El Cerrito, CA;

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