EXHIBIT 1002

8561710

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

January 15, 2025

THIS IS TO CERTIFY THAT ANNEXED IS A TRUE COPY FROM THE RECORDS OF THIS OFFICE OF THE FILE WRAPPER AND CONTENTS OF:

APPLICATION NUMBER: ***18/211,036***
FILING DATE: ***June 16, 2023***
PATENT NUMBER: ***12110089***
ISSUE DATE: ***October 08, 2024***

Certified by

Acting Under Secretary of Commerce
for Intellectual Property
and Acting Director of the United States
Patent and Trademark Office

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Application Number: 18211036 Document Date: 06/16/2023

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Form Revision Date: March 1, 2019

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of: Stephen James COLLIE	Customer No.: 193853
Application No.: TBA	Confirmation No.: TBA
Filed: June 16, 2023	Art Unit: TBA
For: SAIL STRUCTURE	Examiner: TBA

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

PRELIMINARY AMENDMENT

Dear Sir:

Prior to examination on the merits, please amend the above-identified U.S. patent application as follows.

Amendments to the Specification begin on page **2** of this paper.

Amendments to the Claims begin on page **3** of this paper.

Remarks begin on page 7 of this paper.

AMENDMENTS TO THE SPECIFICATION

On page 1, after the title, please add the following paragraph:

--CROSS REFERENCE TO RELATED APPLICATIONS

This application is by-pass continuation filing under 35 U.S.C. 111 of International Application No. PCT/IB2021/061985, filed on December 17, 2021, which claims the benefit of and priority to U.S. Provisional Application No. 63/127,127, filed on December 17, 2020, the contents of which are all hereby incorporated by reference herein in their entirety.--

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims

1. (Original) A sail comprising

a head, a tack, and a luff extending between the head and the tack;

a luff region extending along the luff;

wherein the luff region has a higher degree of elasticity compared to a remainder of the sail.

2. (Original) The sail of claim 1 comprising at least two different materials being a first material in the luff region of the sail and a second material that defines the remainder of the sail, wherein the average stiffness of the second material (i.e stiffer material) is in the range of 2 to 25 times higher than the average stiffness of the first material.

3. (Currently Amended) The sail of ~~any one of claims~~ claim 1 ~~and 2~~ wherein the sail is a mainsail.

4. (Currently Amended) The sail of ~~any one of claims~~ claim 1 ~~and 2~~ wherein the sail is a headsail.

5. (Original) The sail of claim 2 wherein the first material has a failure strain of at least about 2.5% to about 30%.

6. (Original) The sail of claim 2 wherein the first material has a failure strain of at least about 2 to about 10 times the failure strain of the second material.

7. (Original) The sail of claim 2 wherein the first material has an average Young's Modulus of about 1 to about 60 GPa.

8. (Currently Amended) The sail of ~~any one of claims~~ claim 2 ~~to 6~~ wherein the first material has an average elasticity that is at least about 100% to about 2400% higher than an average elasticity of the second material.

9. (Currently Amended) The sail of ~~any one of claims~~ claim 1 ~~to 7~~ wherein there is an absence of sail fibres, or sailcloth fibres, that extend in a direction parallel, or at least substantially parallel, to the luff in the luff region of the sail.

10. (Currently Amended) The sail of ~~any one of claims~~ claim 7 ~~and 8~~ wherein there are sail fibres, or sailcloth fibres, in the luff region of the sail, the sail fibres, or sailcloth fibres, extending in a line that leaves an angle of greater or equal than about 15 degrees free from fibres relative to a direction parallel to the luff of the sail.

11. (Currently Amended) The sail of ~~any one of claims~~ claim 2 ~~to 6~~ wherein the first material extends at least 50% to about 95% of the distance between the head and tack of the sail.

12. (Currently Amended) The sail of ~~any one of claims~~ claim 2 ~~to 10~~ wherein the first material extends up to about 10 to about 50% of the width of the sail towards the leech of the sail.

13. (Currently Amended) The sail of ~~any one of claims~~ claim 10 ~~and 11~~ wherein the first material extends towards the leech of the sail to a greater extent in the middle of the sail (relative to the height of the sail) compared to the luff regions towards the head and tack of the sail.

14. (Currently Amended) The sail of ~~any one of claims~~ claim 1 ~~to 13~~ wherein the sail includes a third region having an elasticity less than other regions of the sail (i.e. the luff region and the remainder of the sail), this third region extending along at least a portion of the margin of the luff region between the luff region and the remainder of the sail.

15. (Original) The sail of claim 14 wherein the third region extends from the head to the tack of the sail.

16. (Currently Amended) The sail of ~~any one of claims~~ claim 14 ~~or 15~~ wherein the third material comprises carbon.

17. (Currently Amended) The sail of ~~any one of claims~~ claim 2 ~~to 16~~ wherein the first material comprises a gradient of reducing elasticity in the direction from luff to leech, as defined by its:

(i) failure strain, or

(ii) average Youngs Modulus, or

(iii) both (i) and (ii).

18. (Original) The sail of claim 17, wherein the first material comprises polyester.

19. (Original) The sail of claim 17, wherein the first material comprises polyester in combination with one or more of aramid and UHMWPE.

20. (Currently Amended) The sail of ~~any one of claims~~ claim 1 ~~to 19~~, wherein the difference in elasticity is achieved by a lesser material thickness in the luff region compared with the remainder of the sail.

21. (Currently Amended) The sail of ~~any one of claims 1 to 20~~ wherein in a luff direction, a ratio of a stiffness of the region outside the luff region and the stiffness of the luff region is in the range of 2-25 times greater, preferably in the range of 10-20 time greater, and more preferably is equal to about 15 times greater.

22. (Currently Amended) The sail of ~~any one of claims~~ claim 1 ~~to 21~~ wherein an orientation of a material in the luff region is different from an orientation of a material in the remainder of the sail, such that the luff region has a higher degree of elasticity compared to the remainder of the sail.

23. (Currently Amended) The sail of ~~any one of claims~~ claim 1 ~~to 22~~ wherein the luff region does not comprise any carbon fibres oriented within 15degs of parallel to the luff, and wherein the remainder of the sail does comprise carbon fibers oriented within 15degs of parallel to the luff.

24. (Currently Amended) The sail ~~according to any previous of~~ claim 1 wherein the sail is a twin skin mainsail having two skins defining the sail, wherein each skin has a luff

region extending along the luff and wherein each luff region has a higher degree of elasticity compared to a remainder of the respective skin.

25. (Original) A sail comprising:

a head and a tack;

a luff edge extending between the head and the tack;

a luff region comprising the luff edge and at least a portion of the sail adjacent the luff edge;

wherein the degree of elasticity of the luff region and the degree of elasticity of a region of the sail adjacent the luff region are configured such that, when the sail is mounted to a sailing boat, tensioning the luff region assists to flatten the sail to a greater extent than would be achievable if the luff was of equivalent stiffness to a remainder of the sail.

26. (Original) A method of making a sail comprising the steps of:

- laying out material to form the sail;

- arranging material in a luff region of the sail and in the remainder of the sail such that in the direction of the luff, the luff region has a higher degree of elasticity compared to the remainder of the sail;

- curing or sewing the sail to form a cohesive structure.

27. (Original) The method according to claim 26, wherein the step of laying out material comprises laying out tapes of resin infused fibrous material.

28. (Original) The method according to claim 26, wherein the step of laying out material comprises laying out fibres glued between sheets of plastic laminate.

29. (Original) The method according to claim 26, wherein the step of laying out material comprises sewing together component pieces of fabric or laminate.

30. (Original) A method of making a sail having a luff region, wherein in the direction along a luff of the sail, the luff region has a higher degree of elasticity than the remainder of the sail.

REMARKS

By this Preliminary Amendment, the specification has been amended to add priority information. No new matter has been added.

In addition, claims 3-4, 8-14, 16-17 and 20-24 have been amended in order to remove multiple claim dependency.

If these papers are not considered timely filed by the Patent and Trademark Office, then a petition is hereby made under 37 C.F.R. § 1.136, and any additional fees required under 37 C.F.R. § 1.136 for any necessary extension of time, or any other fees required to complete the filing of this response, may be charged to Deposit Account No. 50-0911. Please credit any overpayment to Deposit Account No. 50-0911.

Dated: June 16, 2023

Respectfully submitted,

By: */Mark R. Kresloff/*
Mark R. Kresloff
Registration No.: 42,766
Bryan Cave Leighton Paisner LLP
1155 F Street NW
Washington, DC 20004-1357
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Attorneys for Applicants

Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	SAIL STRUCTURE
First Named Inventor/Applicant Name:	Stephen James COLLIE
Filer:	Abigail M. Cotton/Susan Murphy
Attorney Docket Number:	tba

Filed as Large Entity

Filing Fees for Track I Prioritized Examination - Nonprovisional Application under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
UTILITY APPLICATION FILING	1011	1	320	320
UTILITY SEARCH FEE	1111	1	700	700
UTILITY EXAMINATION FEE	1311	1	800	800
REQUEST FOR PRIORITIZED EXAMINATION	1817	1	4200	4200
Pages:				
Claims:				
CLAIMS IN EXCESS OF 20	1202	10	100	1000
INDEPENDENT CLAIMS IN EXCESS OF 3	1201	1	480	480

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous-Filing:				
PUBL. FEE- EARLY, VOLUNTARY, OR NORMAL	1504	1	0	0
PROCESSING FEE, EXCEPT PROV. APPLS.	1830	1	140	140
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**7640**

Electronic Acknowledgement Receipt

EFS ID:	48168418
Application Number:	18211036
International Application Number:	
Confirmation Number:	2954
Title of Invention:	SAIL STRUCTURE
First Named Inventor/Applicant Name:	Stephen James COLLIE
Customer Number:	193853
Filer:	Abigail M. Cotton/Susan Murphy
Filer Authorized By:	Abigail M. Cotton
Attorney Docket Number:	tba
Receipt Date:	16-JUN-2023
Filing Date:	
Time Stamp:	16:40:45
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$7640
RAM confirmation Number	E20236FG41295418
Deposit Account	024467
Authorized User	Susan Murphy

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

37 CFR 1.16 (National application filing, search, and examination fees)

37 CFR 1.17 (Patent application and reexamination processing fees)

37 CFR 1.19 (Document supply fees)

37 CFR 1.20 (Post Issuance fees)

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	Track One Request	Track1_Request.pdf	111793 12ff49486138e801b2be2baf6e1ac25aff462ac5	no	2
Warnings:					
Information:					
2	Application Data Sheet	Track1_ADS.pdf	2449362 010449b228ed5b29f20badccd7f055c1afdb43e4	no	8
Warnings:					
Information:					
3		Track1_Application.pdf	222563 db8e3dbc854e8d63f2a17a5b46f9cc3bc2c87a28	yes	18

Multipart Description/PDF files in .zip description

Document Description	Start	End
Specification	1	13
Claims	14	17
Abstract	18	18

Warnings:					
Information:					
4	Drawings-other than black and white line drawings	Track1_Figures.pdf	636588 910ba7a96a5d70590bcdc36893f21b337baa5fa0	no	10
Warnings:					
Information:					
5	Transmittal Letter	Track1_IDS_TL.pdf	158102 ac075e8af653ec9de3e6d8bb903d3c68bcf1de09	no	2

Warnings:					
Information:					
6	Information Disclosure Statement (IDS) Form (SB08)	IDS_SB08.pdf	1505671 082e61a4beda9e5d6c838a81bfcf54458149d007	no	4
Warnings:					
Information:					
7	Foreign Reference	DE3320321A1.PDF	266371 d344ba5837afca67bdba7cac3935749bfcea4fbb	no	7
Warnings:					
Information:					
8	Foreign Reference	EP0375111A1.PDF	560987 25453d71cdedb0fc19cccb3ba888ab944520e886	no	10
Warnings:					
Information:					
9	Foreign Reference	ES1073250U.PDF	290860 f84441f69052f3d7abb2873bd8557f9d6f3f1170	no	6
Warnings:					
Information:					
10	Foreign Reference	FR2585324A1.PDF	460521 7bc2f71f001e91bda76bd1e48cc74895e4bb66d5	no	16
Warnings:					
Information:					
11	Foreign Reference	NPL_ISR.PDF	390940 6ccfc8013482bf591b3653032c8323e491969a0c	no	6
Warnings:					
Information:					
12	Foreign Reference	NPL_WO.PDF	357519 b8085b8952c162952ec01ba572e780f280449770	no	4
Warnings:					
Information:					

13	Foreign Reference	NPL_WOResponse.pdf	212273 1186ae700ea4bc48c62eab1e55ecd9695ed30a3e	no	5
Warnings:					
Information:					
14	Foreign Reference	NPL_IPRP.pdf	207372 6f0161cc0775a0954dd7bcd50f277a2708904569	no	5
Warnings:					
Information:					
15		Track1_PA.pdf	158178 d98b932f2bf5f2f66f9041eec5282b33813f4059	yes	7

Multipart Description/PDF files in .zip description

Document Description	Start	End
Preliminary Amendment	1	1
Specification	2	2
Claims	3	6
Applicant Arguments/Remarks Made in an Amendment	7	7

Warnings:					
Information:					
16	Fee Worksheet (SB06)	fee-info.pdf	55167 cb6797cd23fa791eb86227d99f7d94493a998dff	no	2
Warnings:					
Information:					
			Total Files Size (in bytes):	8044267	

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.

Doc Code: TRACK1.REQ
Document Description: TrackOne Request

PTO/AIA/424 (04-14)

CERTIFICATION AND REQUEST FOR PRIORITIZED EXAMINATION UNDER 37 CFR 1.102(e) (Page 1 of 1)

First Named Inventor:	Stephen James COLLIE	Nonprovisional Application Number (if known):	
Title of Invention:	SAIL STRUCTURE		

APPLICANT HEREBY CERTIFIES THE FOLLOWING AND REQUESTS PRIORITIZED EXAMINATION FOR THE ABOVE-IDENTIFIED APPLICATION.

1. The processing fee set forth in 37 CFR 1.17(i)(1) and the prioritized examination fee set forth in 37 CFR 1.17(c) have been filed with the request. The publication fee requirement is met because that fee, set forth in 37 CFR 1.18(d), is currently $0. The basic filing fee, search fee, and examination fee are filed with the request or have been already been paid. I understand that any required excess claims fees or application size fee must be paid for the application.

2. I understand that the application may not contain, or be amended to contain, more than four independent claims, more than thirty total claims, or any multiple dependent claims, and that any request for an extension of time will cause an outstanding Track I request to be dismissed.

3. The applicable box is checked below:

I. ☑ Original Application (Track One) - Prioritized Examination under § 1.102(e)(1)

i. (a) The application is an original nonprovisional utility application filed under 35 U.S.C. 111(a). This certification and request is being filed with the utility application via EFS-Web.

---OR---

(b) The application is an original nonprovisional plant application filed under 35 U.S.C. 111(a). This certification and request is being filed with the plant application in paper.

ii. An executed inventor's oath or declaration under 37 CFR 1.63 or 37 CFR 1.64 for each inventor, **or** the application data sheet meeting the conditions specified in 37 CFR 1.53(f)(3)(i) is filed with the application.

II. ☐ Request for Continued Examination - Prioritized Examination under § 1.102(e)(2)

i. A request for continued examination has been filed with, or prior to, this form.
ii. If the application is a utility application, this certification and request is being filed via EFS-Web.
iii. The application is an original nonprovisional utility application filed under 35 U.S.C. 111(a), or is a national stage entry under 35 U.S.C. 371.
iv. This certification and request is being filed prior to the mailing of a first Office action responsive to the request for continued examination.
v. No prior request for continued examination has been granted prioritized examination status under 37 CFR 1.102(e)(2).

Signature /Mark R. Kresloff/	Date 2023-06-16
Name (Print/Typed) Mark R. Kresloff	Practitioner Registration Number 42766

Note: *This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. Submit multiple forms if more than one signature is required.**

☑ *Total of 1 forms are submitted.

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.

PTO/AIA/14 (01-22)
Approved for use through 05/31/2024. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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	to be advised
	Application Number	
Title of Invention	SAIL STRUCTURE	

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
	Stephen	James	COLLIE	

Residence Information (Select One) US Residency ● Non US Residency Active US Military Service

City	Auckland	Country of Residence [i]	NZ

Mailing Address of Inventor:

Address 1	161 Halsey st		
Address 2			
City	Auckland	**State/Province**	
Postal Code	1021	**Country** [i]	NZ

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

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	193853		
Email Address	dcipdocketing@bclplaw.com	Add Email	Remove Email

Application Information:

Title of the Invention	SAIL STRUCTURE		
Attorney Docket Number	to be advised	**Small Entity Status Claimed**	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	10	**Suggested Figure for Publication (if any)**	

PTO/AIA/14 (01-22)
Approved for use through 05/31/2024. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	to be advised
	Application Number	
Title of Invention	SAIL STRUCTURE	

Filing By Reference:

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	193853		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim 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" field blank.

Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
	Continuation of	PCT/IB2021/061985	2021-12-17

PTO/AIA/14 (01-22)
Approved for use through 05/31/2024. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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	to be advised
	Application Number	
Title of Invention	SAIL STRUCTURE	

Prior Application Status	Expired		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
PCT/IB2021/061985	Claims benefit of provisional	63127127	2020-12-17
Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button.			Add

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. 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(i)(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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Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)
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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.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	to be advised
	Application Number	
Title of Invention	SAIL STRUCTURE	

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Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	to be advised
	Application Number	
Title of Invention	SAIL STRUCTURE	

Applicant Information:

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Applicant 1 — Remove

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

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● Assignee	Legal Representative under 35 U.S.C. 117	Joint Inventor
Person to whom the inventor is obligated to assign.	Person who shows sufficient proprietary interest	

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor:

If the Applicant is an Organization check here. ☒

Organization Name	Team New Zealand Limited		
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Phone Number		Fax Number	
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	to be advised
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Assignee 1

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Signature:

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See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/Mark. R. Kresloff/			Date (YYYY-MM-DD)	2023-06-16
First Name	Mark R.	Last Name	Kresloff	Registration Number	42766

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	to be advised
	Application Number	
Title of Invention	SAIL STRUCTURE	

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.**

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SAIL STRUCTURE

FIELD OF THE INVENTION

[0001] The present invention is directed to a sail structure for a yacht which provides a modification of conventional sail design in order to retain the conventional mast and rigging design, while increasing the ability to modify the shape of the sail to react to different conditions. More particularly, the present invention provides a sail having a region of lower elastic modulus and higher failure strain at the luff region.

BACKGROUND

[0002] On sailing yachts it is desirable to make adjustments that change sail shapes to suit different conditions or points of sail (heading relative to the wind). A significant part of this is adjusting the depth or camber of a sail. A deeper sail can provide more thrust but also more drag and side force. In situations where there is more wind pressure available than is required to provide sufficient force it is desirable to flatten the sails to reduce aerodynamic drag.

[0003] It is desired to address or ameliorate one or more disadvantages or limitations associated with the prior art, provide a sail, or to at least provide the public with a useful alternative.

SUMMARY OF THE INVENTION

[0004] In a first aspect there is described a sail that comprises a region of elastic material in the luff region of the sail.

[0005] In a further aspect there is described a sail wherein the composite sail material in the luff region of the sail has a lower stiffness and higher failure strain in the direction parallel to the luff relative to material further aft in the sail.

[0006] In a further aspect there is described a sail comprising a head, a tack, and a luff extending between the head and the tack; a luff region extending along the luff; wherein the luff region has a higher degree of elasticity compared to a remainder of the sail.

[0007] A sail comprising: a head and a tack; a luff edge extending between the head and the tack; a luff region comprising the luff edge and at least a portion of the sail adjacent the luff edge; wherein the degree of elasticity of the luff region and the degree of elasticity of a region of the sail adjacent the luff region are configured such that, when the sail is mounted to a sailing boat, tensioning the luff region assists to flatten the sail to a greater extent than would be achievable if the luff was of equivalent stiffness to a remainder of the sail.

[0008] In a further aspect there is described a sail wherein the material in the luff region of the sail has a higher failure strain in the direction parallel to the luff relative to material further aft in the sail.

[0009] In a further aspect there is described a sail that comprises a region of elastic material in the luff region of the sail, such that tensioning of the luff directs load into the body of the sail and pulls the maximum draft of the sail to windward.

[0010] In a further aspect there is described a sail that comprises a region of elastic material in the luff region of the sail, the sail being adapted such that when in use tensioning the luff region assists to flatten the sail to a greater degree than a conventional sail with a stiff luff.

[0011] In a further aspect there is described a sail that comprises at least two different materials (preferably, composite materials) wherein the material in the luff region of the sail has a higher average elasticity in the direction of the luff than that of the remainder of the sail.

[0012] In a further aspect there is described a sail that comprises a material in the luff region of the sail, where the elastic properties of material in a direction within 15° of being parallel to the luff have:

(i) a failure strain of at least 2.5%, or

(ii) an average Youngs Modulus of less than 50GPa, or

(iii) both (i) and (ii).

[0013] In a further aspect there is described a sail that comprises a material in the luff region of the sail, where the elastic properties of the load bearing material in a direction within 15° of being parallel to the luff have:

(i) a failure strain of at least 2.5%, or

(ii) an average Youngs Modulus of less than 50GPa, or

(iii) both (i) and (ii),

the elastic material extending along at least 50% of the distance between the head and tack of the sail, and at least a portion of the elastic material extending on average up to 50% of the width of the sail towards the leech of the sail.

[0014] In a further aspect there is described a sail that comprises at least two different materials (or composite materials) being a first material (or composite sail material) in the luff region of the sail and a second material (or composite sail material) that defines the remainder of the sail, wherein the average stiffness of the first material (i.e. elastic material) is less than about 5, 10, 15, 20, 25, 30, 35, 40, 45, to about 50% of the average stiffness of the second material, the first material extending along at least 50% of the distance between the head and tack of the sail, and at least a portion of the first material extending up to 50% of the width of the sail towards the leech of the sail.

[0015] In a further aspect there is described a sail that comprises at least two different materials (or composite sail materials) being a first material (or composite sail material) in the luff region of the sail and a second material (or composite material) that defines the remainder of the sail, wherein the Youngs modulus of the first material (i.e. elastic material) is less than about 5, 10, 15, 20, 25, 30, 35, 40, 45, to about 50% of the average Youngs modulus of the second material, the first material extending along at least 50% of the distance between the head and tack of the sail, and at least a portion of the first material extending up to 50% of the width of the sail towards the leech of the sail.

[0016] In a further aspect there is a method of manufacturing a sail as described above.

[0017] In a further aspect the composite sail materials described above are constructed as sections of woven or knitted fabrics that are glued or stitched together.

[0018] In a further aspect the composite sail materials described above are constructed as using load bearing yarns, fibers or filaments laminated between sheets of fabric or plastic or both.

[0019] In a further aspect the composite sail materials described above are constructed by curing layers of reimpregnated tapes that comprise of a mixture of fibrous reinforcement and polymeric matrix.

[0020] In a further aspect there is described a method of using a sail that comprises a luff region with a higher degree of elasticity compared to the average elasticity of the remainder of the sail.

[0021] The following embodiments may relate to any of the above aspects.

[0022] In one configuration the second material may have an increased amount of material along the fringe of the two materials in order to attract more load to this region of the sail and to reduce stretch in this region of the sail.

[0023] In one configuration the sail is a mainsail.

[0024] In one configuration the sail is a headsail.

[0025] In one configuration the elastic material (or first material) has a failure strain in the direction parallel to the luff of at least 2.5, 3.0, 3.5, 4.0, 4.5, 5.0, 5.5, 6.0, 6.5, 7.0, 7.5, 8.0, 8.5, 9, 9.5 or 10%, and suitable ranges may be selected from between any of these values.

[0026] In one configuration the elastic material (or first material) has an average stiffness in the direction parallel to the luff that is about 4% to about 50% of the average stiffness of the material in the remainder of the sail, and suitable ranges may be selected from between any of these values.

[0027] In one configuration there is an absence of sail fibres, or sailcloth fibres that extend in a direction parallel, or at least substantially parallel, to the luff in the luff region.

[0028] In one configuration the sail fibres, or sailcloth fibres, in the luff region of the sail extend in a line that is an angle of greater than about 15, 20, 25, 30 or 35° relative to a direction that is parallel to the luff of the sail, and suitable ranges may be selected from between any of these values.

[0029] In one configuration the elastic material (or first material) extends at least 50, 55, 60, 65, 70, 75, 80, 85, 90 or 95% of the distance between the head and tack of the sail, and suitable ranges may be selected from between any of these values.

[0030] In one configuration a portion of the elastic material (or first material) extends up to about 10, 20, 30, 40, or 50% of the width of the sail towards the leech of the sail, and suitable ranges may be selected from between any of these values. Typically, the further aft the elastic portion extends the larger the effect on the ability to flatten the sail, but this can come with an adverse effect on the fairness of the section shapes.

[0031] In one configuration, the elastic material (or first material) extends towards the leech of the sail to a greater extent in the middle of the sail (relative to the height of the sail) compared to the luff regions towards the head and tack of the sail.

[0032] In one configuration the sail includes a band of material ("the third material") between the first material and the second material having stiffness which is higher than both the first material and the material in the remainder of the sail.

[0033] In one configuration the third material extends from the head to the tack of the sail.

[0034] In one configuration the elastic material (or first material) comprises a gradient of elasticity over the width (chordwise) of the elastic material, as defined by its

(i) failure strain, and

(ii) average stiffness

over the chordwise width of the elastic material within the luff region.

[0035] In one configuration the elastic material (or first material) comprises polyester.

[0036] In one configuration the elastic material (or first material) comprises polyester in combination with one or more of aramid and/ or ultra-high molecular weight-polyethylene (UHMWPE).

[0037] In one configuration the second material comprises carbon.

[0038] In one configuration the elasticity of the elastic material (or first material) decreases from the elastic material adjacent the luff to the elastic material aft of the luff.

[0039] In a further aspect there is disclosed a sail comprising

a head, a tack, and a luff extending between the head and the tack;

a luff region extending along the luff;

wherein the luff region is less stiff compared to a remainder of the sail and consequently has a higher degree of elasticity compared to the remainder of the sail.

[0040] In a further aspect there is disclosed a method of making a sail comprising the steps of:

- laying out material to form the sail;

- arranging material in a luff region of the sail and in the remainder of the sail such that in the direction of the luff, the luff region has a higher degree of elasticity compared to the remainder of the sail;

- curing or sewing the sail to form a cohesive structure.

[0041] A method of making a sail having a luff region, wherein in the direction along a luff of the sail, the luff region has a higher degree of elasticity than the remainder of the sail.

[0042] The term "comprising" as used in this specification means "consisting at least in part of". When interpreting statements in this specification which include that term, the features, prefaced by that term in each statement, all need to be present but other features can also be present. Related terms such as "comprise" and "comprised" are to be interpreted in the same manner.

[0043] It is intended that reference to a range of numbers disclosed herein (for example, 1 to 10) also incorporates reference to all rational numbers within that range (for example, 1, 1.1, 2, 3, 3.9, 4, 5, 6, 6.5, 7, 8, 9 and 10) and also any range of rational numbers within that range (for example, 2 to 8, 1.5 to 5.5 and 3.1 to 4.7).

[0044] This invention may also be said broadly to consist in the parts, elements and features referred to or indicated in the specification of the application, individually or collectively, and any or all combinations of any two or more of said parts, elements or features, and where specific integers are mentioned herein which have known equivalents in the art to which this invention relates, such known equivalents are deemed to be incorporated herein as if individually set forth.)

[0045] To those skilled in the art to which the invention relates, many changes in construction and widely differing embodiments and applications of the invention will suggest themselves without departing from the scope of the invention as defined in the appended claims. The disclosures and the descriptions herein are purely illustrative and are not intended to be in any sense limiting.

[0046] The term “elastic” as used in this specification in relation to regions of a sail, or materials used therein, means “being more deformable than a material not indicated as being elastic”. Herein, the term “deformable” can refer to the elastic region or material undergoing more deformation at a given load than a region or material which is not indicated as being elastic and can also refer to the elastic region or material being able to undergo comparatively high amounts of reversible (as compared to irreversible or “plastic”) deformation without failure.

[0047] As the skilled person will appreciate, in some fields of technology, when a first region or material undergoes a higher amount of deformation at a given load than another region or material, that first region or material would be described as having a lower stiffness or being less stiff than the other region or material. It is to be understood that the term “elastic” as used in this specification encompasses this meaning.

[0048] Similarly, the skilled person will appreciate that the property of a material of tolerating high amounts of reversible deformation is sometimes referred to as the material being “ideal elastic” and/or as the material having a high yield strain or failure strain. It is to be understood that the term “elastic” as used in this specification encompasses this meaning as well.

BRIEF DESCRIPTION OF THE FIGURES

[0049] The invention will now be described by way of example only and with reference to the drawings in which:

[0050] Figure 1 is a stylised side view of a Bermuda rigged sailboat, having a main sail and headsail.

[0051] Figure 2 is a side view of sail.

[0052] Figure 3 is a cross section through a sail.

[0053] Figure 4 is a cross section through a sail showing a sail (D) with tension released on the luff of the sail to produce a sail with increased camber and a sail (E) with tension applied to the luff of the sail to produce a sail with the camber moved towards the bow and having a flatter profile.

[0054] Figure 5 is a top stylised view of a batten as it may attach to, or bear upon a forestay.

[0055] Figure 6 is a top view of a twin skin mainsail.

[0056] Figures 7-9 depict a side view of the sail in different configurations when in use.

[0057] Figures 10A-10C are cross sectional views through a sail when in use.

[0058] Figure 11 is a side view of a sail with square or quadrilateral shape.

[0059] Figures 12A-12B show results of numerical analysis in relation to a behaviour or a performance of sails.

DETAILED DESCRIPTION OF THE INVENTION

[0060] Described is a sail having material with a lower elastic modulus and higher failure strain in the luff region compared to the body of the sail. This provides for a sail that is effective to power up or power down the sail in response to the wind speed or the heading of the yacht relative to the wind direction.

[0061] Sail power is controlled by three main power sources being angle of attack, camber (or depth) and twist.

[0062] Camber is the amount of curvature (otherwise known as depth) in a sail. It is measured as a proportion of the distance from luff to leech. A mainsail with a maximum camber of 5% is a flat sail, while a camber of 15% would mean a deep or full main.

[0063] A deep (or fuller) sail provides more force while a flatter sail creates less drag for a given amount of total force. A flatter shape is better in heavy air when a boat is overpowered. A deep sail is better in lighter air when a boat is underpowered.

[0064] A sail can be controlled by the amount of depth as well as its position. The usual goal is to put the deepest draft position about 40-50% of the way aft from luff to leech in a mainsail and 30-40% aft for the jib.

[0065] Draft position (along with camber) is adjusted using the halyard and/or cunningham. Ideally the draft is set and is kept at about 30% to about 50% away from the luff. However, as the wind strength increases, wind pressure will move the draft position aft and the halyard and/or cunningham will require tensioning to move the draft forward once again.

[0066] Old sails, which have been permanently deformed, show their age because more and more halyard and/or cunningham tension is required to keep the sails flat and to maintain the draft correctly positioned.

[0067] In light winds it is often advantageous to move the draft aft by slackening the halyard or cunningham.

[0068] Tightening the headsail halyard, or cunningham, will typically move the draft forward and make it flatter. Easing the genoa halyard, or cunningham, will typically move it aft and make the sail fuller.

[0069] The general arrangement of the most basic elements of a yacht 1 is shown in Figure 1, which depicts a Bermuda rigged yacht. While a Bermuda rigged yacht is shown it should be appreciated that the elastic luff can be utilised on other rig styles. A yacht 1 typically comprises a mainsail 3 and a head sail 4 (which includes genoas, jibs and staysails). The mainsail 3 body comprises a head 9, being the top, a tack 10, being the leading edge bottom corner, and a clew, being the trailing edge bottom corner. The mainsail 20 further has a luff 8, being the leading edge, a leech 6, being the trailing edge, and a foot 7, being the bottom.

[0070] The mainsail is typically attached to the mast, the mast generally including a track through which a portion of the edge of the sail luff 8, or clips that attach to the sail luff, travel to retain the sail to the mast 2. A main halyard attaches to the head 9 of the sail and is used to host the sail up the mast 2. A boom 12 extends from the mast and attaches to the foot 7 of the sail. The boom 12 typically includes a tract that through which a portion of the edge of the sail foot 7, or clips that attach to the sail foot 7, travels to retain the sail to the boom 12. On larger yachts, the boom 12 may include a self-furling system such as an in-boom furling system. Some yachts may not have a boom and instead are sheeted directly to the yacht.

[0071] The sail typically includes 1 or more battens 11 that assist sail shape and performance. The battens can be more or less evenly-spaced along the leech of the sail. These battens tension the sail, provide rigidity and help maintain a smooth aero dynamic shape. The battens 11 typically are inserted into a slot or sleeve in the sail that extends from the leech 6 of the sail 3 towards the luff 8 of the sail 3. Given sails are formed by a flexible sheet material, typically made largely of non-rigid materials and rigid materials , the battens help the sails to resist compression, which would lead to wrinkling of the sail. Battens are formed of rigid materials such as fibre reinforced plastics of fibreglass, carbon fibre, or a combination thereof. Once inserted into the sleeve in the sail 3, the battens are typically placed under longitudinal compressive load. For example, through the use of an elastic portion within the sleeve.

[0072] The headsail 4, if present, sits forward of the mainsail 3 and typically attaches to the forestay 5, using attachment devices such as by clips or pockets on the luff 7 of the headsail 4. The headsail 4 can be hoisted up the forestay 5 via a headsail halyard that extends from the mast 2. There are a range of different types of headsails 4 with the Genoa and Jib being the most commonly used. Both these types have different subtypes depending on their intended use. Headsails 4 are usually classified according to the relative weight of the sailcloth used and the size or total area of the sail. The headsail 4 may include battens 11 that assist in maintaining an optimal shape for the sail.

[0073] As described, the luff region of the headsail or mainsail can be formed from material that has a degree of elasticity. Suitable materials may comprise, for example, yarns, filaments, fibres, fabric or film. This elastic material provides for greater stretch, for example, in a direction parallel to the luff or mast, as tension is applied in this direction. It is to be understood that the luff region includes the luff but can include regions of the sail that extend some way aft from the luff as well, as indicated in, for example, Figure 7.

[0074] In general terms, techniques of manufacturing the sail comprise composite tapes where the load bearing fibers are impregnated with resin (no external films, 3Di), laminated string sails where the load bearing fibers (yarns) are sandwiched between plastic films, and panel sails where rectangular or triangular panels of fabric are stitched or glues together. It is to be understood that any of the above techniques may be used to manufacture both the luff region of the sail and the remainder of the sail, and that the orientation of the load bearing fibers or yarns may be varied in the luff region and the remainder of the sail to achieve a higher degree of elasticity in the luff region. As explained above, the term "higher degree of elasticity" includes the meaning of "lower stiffness" and/or the meaning of "higher failure strain", and/or generally "higher deformability".

[0075] In one embodiment, the sails of a yacht (i.e., mainsail and the headsail) comprise an elastic material in the luff region and a stiff material running from the tack to head through the body of the sail. Due to this arrangement of the materials, in the present invention, when pulled down on the tack with the head fixed (or vice versa), the primary structural band (the second, or stiffer, material) of the sail straightens and thus flattens the sail.

[0076] In this embodiment, the elastic material may extend along at least 50% of the distance between the head and tack of the sail, and at least a portion of the elastic material extending on average up to 50% of the width of the sail towards the leech of the sail. By allowing the luff region to stretch the tack can be pulled down further which straightens the primary structural band through the body of the sail. This flattens the sail to a much greater degree than would be achievable if the luff region was stiff.

[0077] In one embodiment the elastic region comprises a fibrous material with a linear density of about 200, 600, 1000, 1400, 1800, 2200, 2600, 3000, 3400, 3800or 4200 dtex, and suitable ranges may be selected from between any of these values. In one embodiment the fiber material that forms the elastic region has an elongation at break of about 10, 11, 12, 13, 14, 15, 16, 17, 18, 19 or 20%, and up to 30%, and suitable ranges may be selected from between any of these values. In one embodiment the material that forms the elastic region comprises, or is formed from, polyester.

[0078] In some embodiments the elastic region comprises a fibrous material with a linear density of about 200, 600, 800, 1000, 1400, 1800, 2200, 2600, 3000, 3400, 3800 or 4200 dtex, and suitable ranges may be selected from between any of these values. In some embodiments the elastic region comprises a material with an elongation at break of about 2, 2.5, 3, 3.5 or 4%, and suitable ranges may be selected from between any of these values. In some embodiments the elastic region comprises of aramid fibres.

[0079] While polyester and aramid have been given as examples for materials suitable for use in the elastic (or first) region, other materials may be used as well, including such with elongation at break

between the values given in the above for polyester and aramid. Materials may also be used that have larger values of elongation at break than those indicated for polyester, for example, nylon.

[0080] In one embodiment the elastic region comprises a material with a linear density of about 200, 6000, 1000, 1400, 1800, 2200, 2600, 3000, 3400, 3800, 4200 dtex, and suitable ranges may be selected from between any of these values. In one embodiment the material is a ultra-high molecular weight polyethylene.

[0081] In some embodiments, the luff region or elastic region does not include fibres oriented in a direction parallel to the luff. Instead, the sail in the luff region may be constructed from a material like carbon tapes or yarns that are oriented so that they do not have any fibers supporting load in the luff direction. In these embodiments, when the remainder of the sail does include fibers oriented in the direction parallel to the luff, a relative decrease in stiffness of the luff region parallel to the luff is achieved which leads to the favourable effects in relation to flattening the sail set out in this disclosure.

[0082] The elastic region may be formed from a combination of materials to form a composite, laminate, or fabric. The three types of materials defined above may be combined in ratios to provide the desired degree of elasticity, in combination with or without resin (matrix) material or a plastic film in the case of laminate sails.

[0083] The stiffer material may be selected from carbon, or may be formed from a combination of materials to form a composite, laminate or fabric. Examples of suitable materials include combinations of carbon and ultra-high molecular weight polyethylene (UHMWPE), aramid, and aramid/polyester. The stiffer material may have an elongation at break of about 0.5%, 1.0%, 1.5% or 2.0% and suitable ranges may be selected from between any of these values. The carbon may have a modulus of about 200, 250, 300, 350, 400, 450 to 500 Gpa, and suitable ranges may be selected from between any of these values.

[0084] The carbon may also be used in the material in the elastic region to give an element of stiffness but with the fibre orientation at a greater angle to the luff. A preferable range for this angle comprises angles greater or equal than 20 degrees.

[0085] The materials used in the luff region include, but may not be limited to 100% polyester (closest to the luff), polyester/aramid mixture and carbon or a carbon/UHMWPE mixture. The stiffness and strength of the elastic elements used in the luff region are be summarised below:

Polyester
Youngs Modulus = 1-20GPa
Failure strain 6-10%

Aramid
Youngs Modulus = 80-120GPa
Failure strain 2-3%

UHMWPE
Youngs Modulus = 80-120GPa
Failure strain 3.0-4.0%

Carbon
Youngs Modulus = 200-500GPa
Failure strain 0.5-2.0%

[0086] According to an embodiment of the invention, as depicted in Figure 2, when the tack 10 is pulled down through a luff tensioner 17 in the downward direction, then the load predominantly travels from tack through the front of the stiff region of the sail. If the sail had constant stiffness then the load would predominantly travel though the most direct path which is directly up the luff of the sail. As tension is increased in the luff region, the area of greater stiffness 16 moves in the direction of the force F and straightens which results in a reduction of sail camber. The force F may produce compressive forces in the sail that are typically carried through to the forestay through the battens. This force can project the luff (and forestay) forward. In some embodiments, the sail could be designed without any battens but with bending stiffness so as to take compression in the direction of the force F, but this region would also need to have high elasticity in the direction parallel to the luff.

[0087] As mentioned, the sails may include battens that can bear and push the forestay forward and this effect is enhanced with the use of the elastic material on the luff.

[0088] As a mainsail is pulled down on the tack, the battens could push against the mast and may help it bend. Also, the aft angles of the primary load paths out of the tack and head of the sail, which is generated due to the shape of the front of the second (stiffer) region, induces increased bending of the mast.

[0089] In the present invention, the mainsail and/or the headsail comprises of stiff and elastic regions in which the elastic regions have high failure strain and low Young's modulus compared to the stiffer materials which have low failure strain and high Youngs modulus.

[0090] Furthermore, at the margin between the elastic region and the rest of the sail, there is a zone of material with higher stiffness.

[0091] The camber and draft position can be adjusted with forestay tension. This is easy to adjust on a masthead rigged boat if there is an adjustable backstay.

[0092] Referring to Figure 6 embodiment, there is shown a mast 2 with respect to the leech 6 and luff 8 of the sailboat 1. In this embodiment two mainsails are attached with one each side of the aft face of the mast in order to make a smooth aerodynamic section. A skilled addressee will appreciate that even for these configurations with more than one sail, elastic material with high failure strain in the luff region in combination with relatively stiffer material aft in the sail can be used to enable more effective shape control and depowering through application of luff tension via the cunningham or halyard. The embodiments of the invention described previously for conventional mainsails apply equally to this twin mainsail configuration. In one embodiment, what is disclosed is a sail comprising a load bearing material in the luff region of the sail, wherein under highest stress, the elastic properties of the load bearing material in a direction within 15deg of being parallel to the luff may have: (i) a failure strain of at least 2.5%, or(ii) an average Youngs Modulus of less than 60GPa, or (iii) both (i) and (ii), the elastic material extending along at least 50% of the distance between the head and tack of the sail, and at least a portion of the elastic material extending on average up to 50% of the width of the sail towards the leech of the sail. The sail could be a mainsail or a headsail.

[0093] The sail may comprise two different materials being a first material in the luff region of the sail and a second material that defines the remainder of the sail, wherein the average elasticity of the first material (i.e. elastic material) is at least about 2, 4, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26 times higher than the average elasticity of the second material, and suitable ranges may be selected from between any of these values. The materials are preferably composite materials, or a mixture of two or more different types of materials.

[0094] The elastic or first material may have a failure strain of at least about 2.5, 3, 3.5, 4, 4.5, 5, 5.5, 6, 6.5, 7, 7.5, 8, 8.5, 9, 9.5% to about 10%, and suitable ranges may be selected from between any of these values. The elastic material (or first material) may have an average Youngs Modulus of about 1 to about 60 GPa.

[0095] It will be appreciated that the material of the sail is a composite of multiple materials. Some of those materials will have a Youngs Modulus of less than 50GPa (e.g. glue, mylar, plastics etc).

However, when referring to a failure strain, what is being referred to is the main load bearing material in a region of the sail, such as the luff region. While incidental material may include a failure strain less than 2.5%, given that material does not form a significant portion of the sail material, it is not to be considered when assessing failure strain.

[0096] The direction of the elasticity being considered may be limited to being along or within about 15° relative to the luff.

[0097] There may be an absence of sail fibres, or sailcloth fibres that extend in a direction parallel, or at least substantially parallel, to the luff in the luff region of the sail. The sailcloth fibres in the luff region of the sail extend in a line that is an angle of greater than about 15, 20, 25, 30, 35, 40 to about 45° relative to a direction that is parallel to the luff of the sail, and suitable ranges may be selected from between any of these values. As the skilled person will appreciate, such orientation of the fibres in the luff region leads to a limitation of the load that the material in the luff region can take in the luff direction. In other words, such wider angles contribute to the luff region having a lower stiffness in the luff direction.

[0098] The elastic material (or first material) may extend at least 50, 55, 60, 65, 70, 75, 80, 85, 90 to about 95% of the distance between the head and tack of the sail, and suitable ranges may be selected from between any of these values. The elastic material (or first material) extends up to about 20, 30, 40 to about 50% of the width of the sail towards the leech of the sail, and suitable ranges may be selected from between any of these values.

[0099] The elastic material (or first material) may extend towards the leech of the sail to a greater extent in the middle of the sail (relative to the height of the sail) compared to the luff regions towards the head and tack of the sail.

[0100] The elastic material (or first material) may comprise polyester, or polyester in combination with one or more of aramid and UHMWPE. The second and third materials may comprise carbon, aramid or a combination of carbon, aramid and UHMWPE. The composition or % of aramid and

UHMWPE in the central region of the luff region of the sail may be lower than in the upper and lower regions of the sail.

[0101] The elastic material (or first material) may comprise a gradient of elasticity, as defined by its: (i) failure strain, or (ii) average Youngs Modulus, or both (i) and (ii), over the width of the elastic material within the luff region. The elasticity of the elastic material (or first material) may decrease from the elastic material adjacent the luff to the elastic material aft of the luff. This gradient of elasticity can be achieved either by varying stiffness or through the use of different materials, or concentrations of different materials.

[0102] The structure and position of the stiffer material can be used to move the draft position forward or aft depending on where the structure lies relative to the natural draft position of the sail

[0103] As shown in Figure 7, the shape and positioning of the elastic region 18 relative to the stiffer sail material 19 can be modified to effect different parts of the sail. For example, as shown in Figure 7, a lower biased structure will have more influence on the lower part of the sail. In comparison, as shown in Figure 8, an upper biased structure will have more influence on the upper part of the sail. This will also affect the section shapes due to the tendency of the position of the edge of the stiffer region 16 to move the position of maximum draft. As shown in Figure 9, the positioning of the boundary or fringe between the two materials can be modified to influence the sectional shape of the sail. For example, as shown in Figure 10A, forward positioning of the fringe pushes the position of maximum draft aft. In comparison, as shown in Figure 10B, aft positioning of the fringe pushes the position of maximum draft forward.

[0104] Figure 12 shows results of a Finite-Element-Analysis (FEA) comparing a prior art sail and a sail according to the present disclosure. In Figure 12(a), the solid line represents a common sail with a luff region that has approximately the same stiffness and failure strain as the remainder of the sail, while the dashed line represents a sail in accordance with the present disclosure. The skilled person will appreciate that in the prior art sail, at 100% cunningham load (horizontal axis) a percentage increase in luff length, shown on the vertical axis, is about 0.38%. Contrary thereto, the sail according to the invention exhibits an increase in luff length of about 0.19% at 100% cunningham load. In other words, as is apparent from the figure, at a given elongation of the luff the load generated in the cunningham as a percentage of maximum load is much lower in the sail according to the present disclosure, because of its lower stiffness in the luff region. As a side note in Figure 12(a), a negative increase in luff length in the range of between 0% and approximately 25% cunningham load should be interpreted as wrinkles in the luff region.

[0105] The graph shown in Figure 12(b) has the same horizontal axis as the one of Figure 12(a) but shows sail mid camber in percent in the vertical axis. As will be apparent to the skilled person, the mid camber in the sail as disclosed herein, at 100% cunningham load, is at about 6.2% while the corresponding value in the prior art sail is at about 8.3%. In other words, the sail disclosed herein exhibits a lower mid-camber at a high cunningham load and a higher camber at a low cunningham load.

[0106] The above concepts can be applied to a range of sail shapes. For example, as shown in Figure 11, they can be applied to a sail with more of a rectangular or quadrilateral shape comprising a mast 2, elastic region 18 and stiffer material 19. The above concepts could also be applied to twin skin

sails as shown in Figure 6. It will be understood by the skilled person that in case of a twin skin sail, the sail has two luff regions, one in each of the two skins defining the twin sail. In this embodiment, each of the two luff regions has elastic properties in relation to the respective remainder of the sail that make the luff region less stiff in the luff direction than the remainder of the sail

[0107] Among other things, the above novel configurations provide an advantage in that the sail according to the present disclosure may be able to change its shape and to adjust to changes in the wind pressure or heading of the yacht relative to the wind direction.

[0108] Further, it has been found that some embodiments of the sail disclosed herein are typically lighter than a comparable prior art sail. The reason for this may be that the reduction in stiffness in the luff region may be achieved by a thinner material in this region, or by the absence of certain load bearing fibres in the direction parallel to the luff, as explained above. The saved material typically results in a lighter sail.

[0109] Moreover, in some situations, for example in yacht racing, a fixed weight of a sail is prescribed. In this case, the sail disclosed herein is advantageous over prior art sails in that the weight savings in the luff region allow for the allocation of more weight (and hence more material and stiffness) to areas of the sail where a higher stiffness is desirable to reduce stretch. These areas are typically in the body or centre of the sail where the bulk of the wind load is transferred to the head, clew and tack

[0110] Although embodiments have been described with reference to a number of illustrative embodiments thereof, it will be understood by those skilled in the art that various changes in form and details may be made therein without departing from the spirit and scope of the invention as defined by the appended claims. Therefore, the preferred embodiments should be considered in a descriptive sense only and not for purposes of limitation, and also the technical scope of the invention is not limited to the embodiments. Furthermore, the present invention is defined not by the detailed description of the invention but by the appended claims, and all differences within the scope will be construed as being comprised in the present disclosure.

[0111] Many modifications will be apparent to those skilled in the art without departing from the scope of the present invention as herein described with reference to the accompanying drawings.

CLAIMS

1. A sail comprising

a head, a tack, and a luff extending between the head and the tack;

a luff region extending along the luff;

wherein the luff region has a higher degree of elasticity compared to a remainder of the sail.

2. The sail of claim 1 comprising at least two different materials being a first material in the luff region of the sail and a second material that defines the remainder of the sail, wherein the average stiffness of the second material (i.e stiffer material) is in the range of 2 to 25 times higher than the average stiffness of the first material.

3. The sail of any one of claims 1 and 2 wherein the sail is a mainsail.

4. The sail of any one of claims 1 and 2 wherein the sail is a headsail.

5. The sail of claim 2 wherein the first material has a failure strain of at least about 2.5% to about 30%.

6. The sail of claim 2 wherein the first material has a failure strain of at least about 2 to about 10 times the failure strain of the second material.

7. The sail of 2 wherein the first material has an average Young's Modulus of about 1 to about 60 GPa.

8. The sail of any one of claims 2 to 6 wherein the first material has an average elasticity that is at least about 100% to about 2400% higher than an average elasticity of the second material.

9. The sail of any one of claims 1 to 7 wherein there is an absence of sail fibres, or sailcloth fibres, that extend in a direction parallel, or at least substantially parallel, to the luff in the luff region of the sail.

10. The sail of any one of claims 7 and 8 wherein there are sail fibres, or sailcloth fibres, in the luff region of the sail, the sail fibres, or sailcloth fibres, extending in a line that leaves an angle of

greater or equal than about 15 degrees free from fibres relative to a direction parallel to the luff of the sail.

11. The sail of any one of claims 2 to 6 wherein the first material extends at least 50% to about 95% of the distance between the head and tack of the sail.

12. The sail of any one of claims 2 to 10 wherein the first material extends up to about 10 to about 50% of the width of the sail towards the leech of the sail.

13. The sail of any one of claims 10 and 11 wherein the first material extends towards the leech of the sail to a greater extent in the middle of the sail (relative to the height of the sail) compared to the luff regions towards the head and tack of the sail.

14. The sail of any one of claims 1 to 12 wherein the sail includes a third region having an elasticity less than other regions of the sail (i.e. the luff region and the remainder of the sail), this third region extending along at least a portion of the margin of the luff region between the luff region and the remainder of the sail.

15. The sail of claim 14 wherein the third region extends from the head to the tack of the sail.

16. The sail of any one of claims 14 or 15 wherein the third material comprises carbon.

17. The sail of any one of claims 2 to 16 wherein the first material comprises a gradient of reducing elasticity in the direction from luff to leech, as defined by its:

(i) failure strain, or

(ii) average Youngs Modulus, or

(iii) both (i) and (ii).

18. The sail of claim 17, wherein the first material comprises polyester.

19. The sail of claim 17, wherein the first material comprises polyester in combination with one or more of aramid and UHMWPE.

20. The sail of any one of claims 1 to 19, wherein the difference in elasticity is achieved by a lesser material thickness in the luff region compared with the remainder of the sail.

21. The sail of any one of claims 1 to 20 wherein in a luff direction, a ratio of a stiffness of the region outside the luff region and the stiffness of the luff region is in the range of 2-25 times greater, preferably in the range of 10-20 time greater, and more preferably is equal to about 15 times greater.

22. The sail of any one of claims 1 to 21 wherein an orientation of a material in the luff region is different from an orientation of a material in the remainder of the sail, such that the luff region has a higher degree of elasticity compared to the remainder of the sail.

23. The sail of any one of claims 1 to 22 wherein the luff region does not comprise any carbon fibres oriented within 15degs of parallel to the luff, and wherein the remainder of the sail does comprise carbon fibers oriented within 15degs of parallel to the luff.

24. The sail according to any previous claim wherein the sail is a twin skin mainsail having two skins defining the sail, wherein each skin has a luff region extending along the luff and wherein each luff region has a higher degree of elasticity compared to a remainder of the respective skin.

25. A sail comprising:

a head and a tack;

a luff edge extending between the head and the tack;

a luff region comprising the luff edge and at least a portion of the sail adjacent the luff edge;

wherein the degree of elasticity of the luff region and the degree of elasticity of a region of the sail adjacent the luff region are configured such that, when the sail is mounted to a sailing boat, tensioning the luff region assists to flatten the sail to a greater extent than would be achievable if the luff was of equivalent stiffness to a remainder of the sail.

26. A method of making a sail comprising the steps of:

- laying out material to form the sail;

- arranging material in a luff region of the sail and in the remainder of the sail such that in the direction of the luff, the luff region has a higher degree of elasticity compared to the remainder of the sail;

- curing or sewing the sail to form a cohesive structure.

27. The method according to claim 26, wherein the step of laying out material comprises laying out tapes of resin infused fibrous material.

28. The method according to claim 26, wherein the step of laying out material comprises laying out fibres glued between sheets of plastic laminate.

29. The method according to claim 26, wherein the step of laying out material comprises sewing together component pieces of fabric or laminate.

30. A method of making a sail having a luff region, wherein in the direction along a luff of the sail, the luff region has a higher degree of elasticity than the remainder of the sail.

ABSTRACT

Disclosed is a sail comprising a head, a tack, and a luff extending between the head and the tack; a luff region extending along the luff; wherein the luff region has a significantly higher degree of elasticity compared to the average elasticity of a remainder of the sail. Also disclosed is a method of making a sail comprising laying out material to form the sail; arranging material in a luff region of the sail and in the remainder of the sail such that in the direction of the luff, the luff region has a higher degree of elasticity compared to the remainder of the sail; curing or sewing the sail to form a cohesive structure.

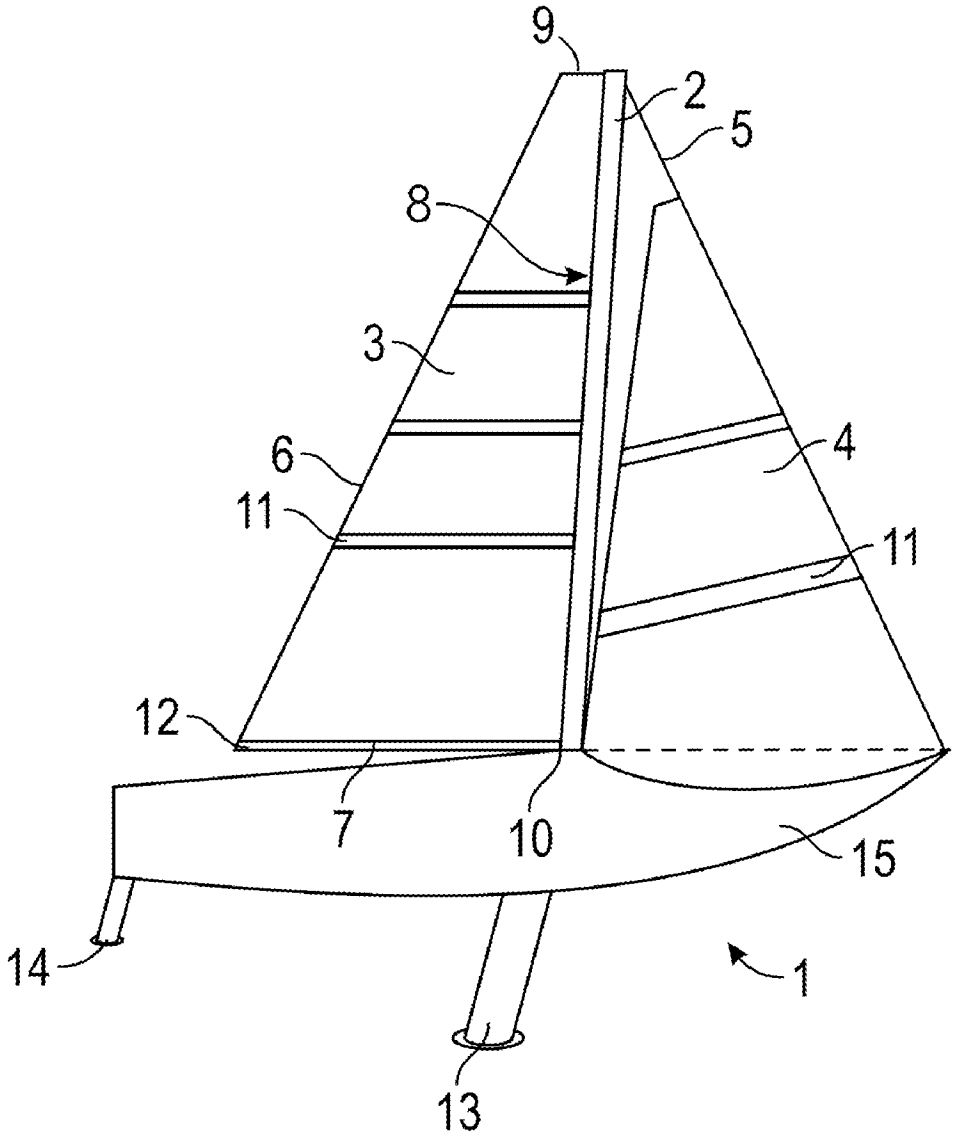

Figure 1

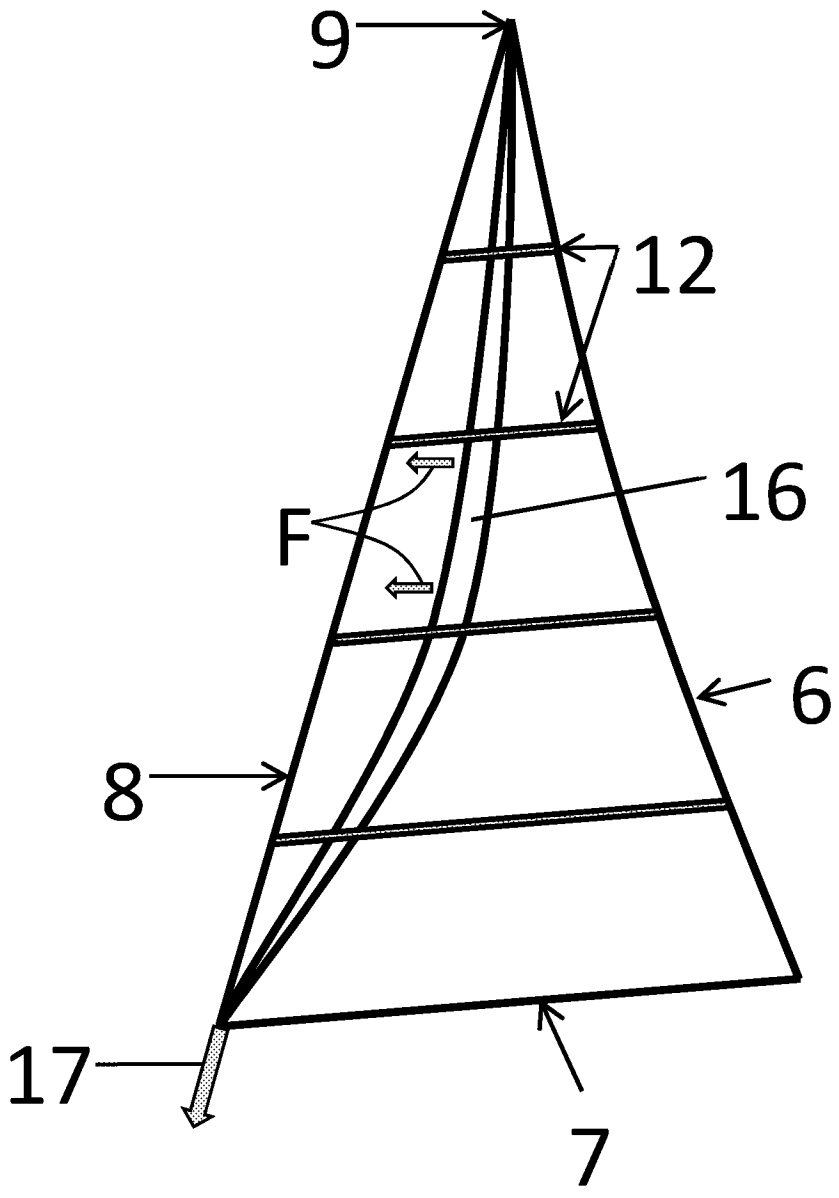

Figure 2

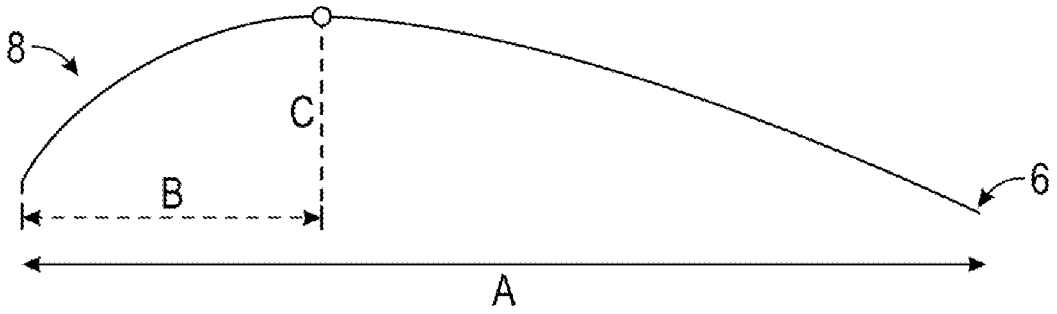

Figure 3

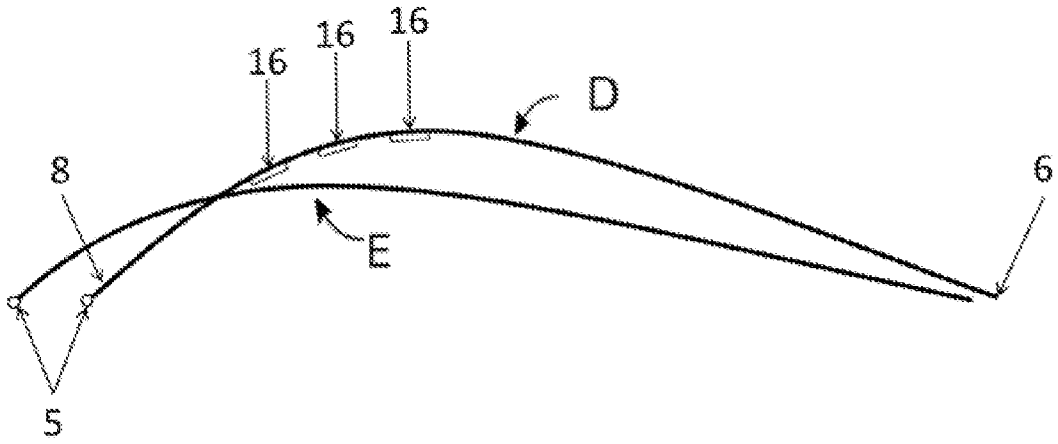

Figure 4

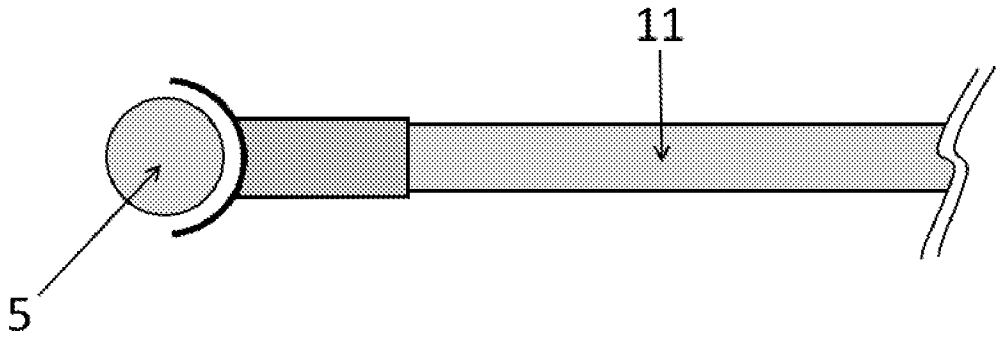

Figure 5

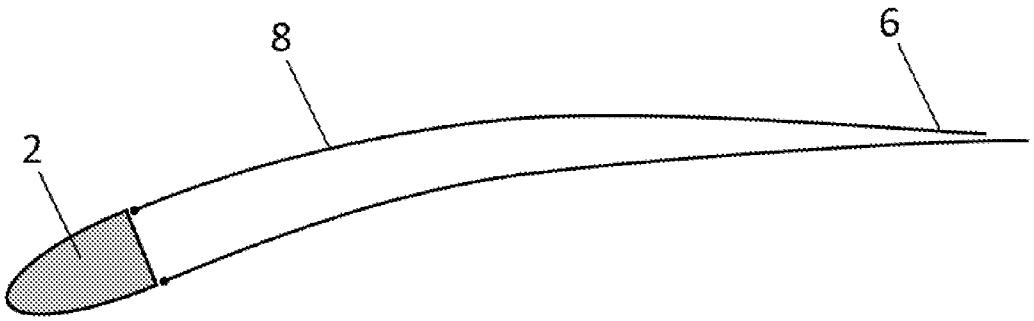

Figure 6

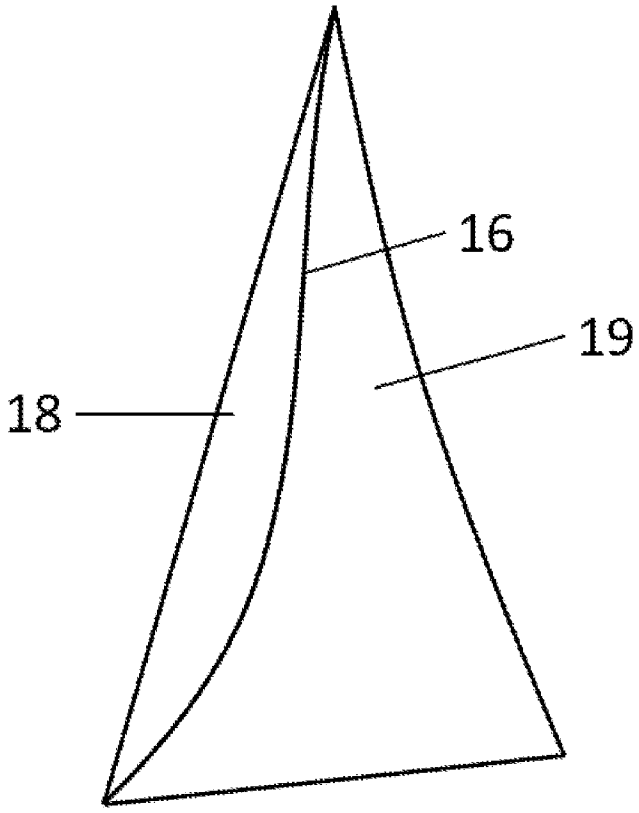

Figure 7

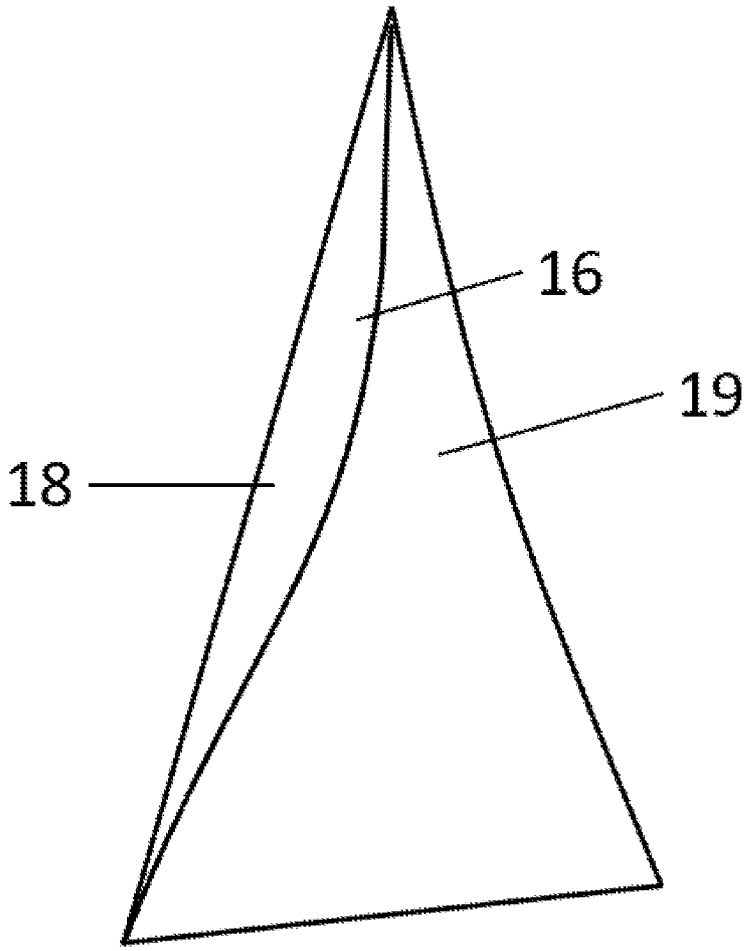

Figure 8

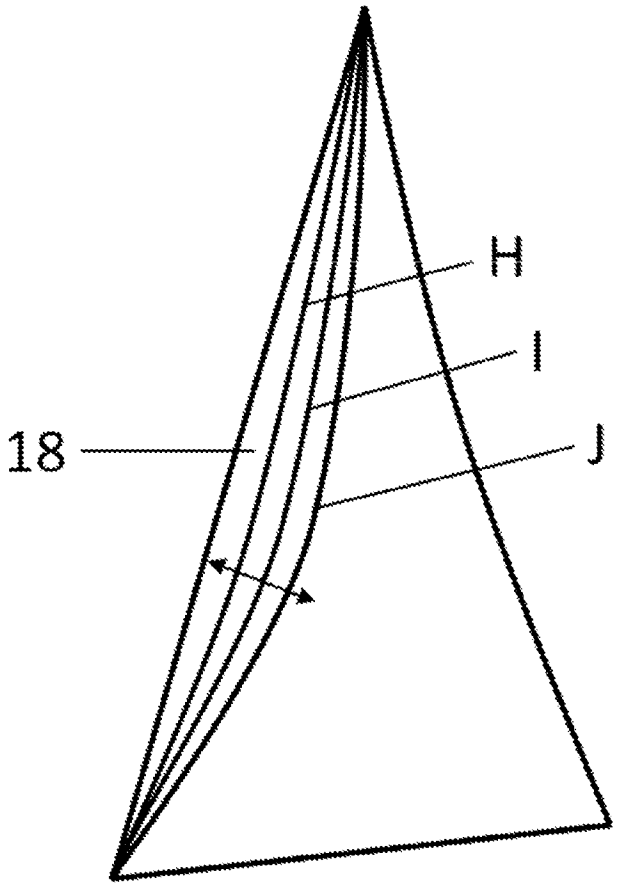

Figure 9

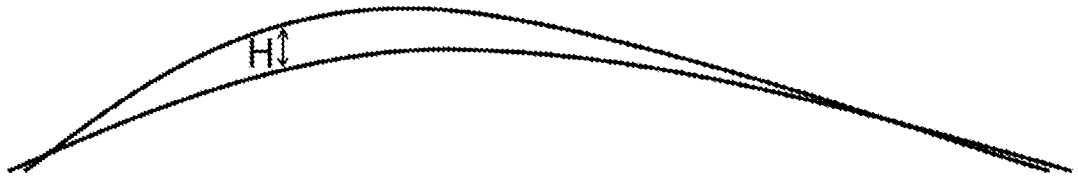

Figure 10A

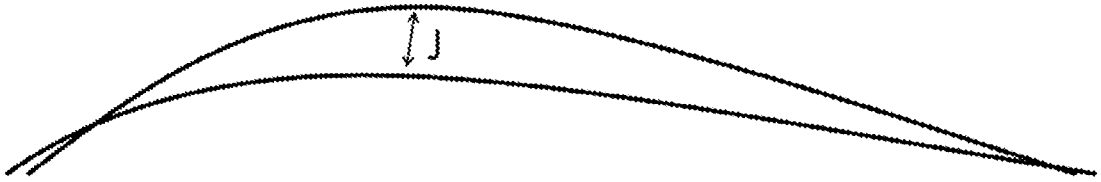

Figure 10B

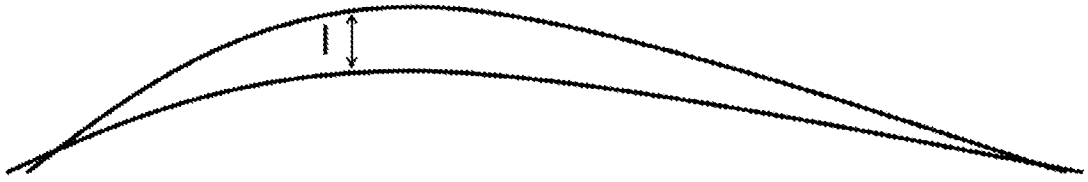

Figure 10C

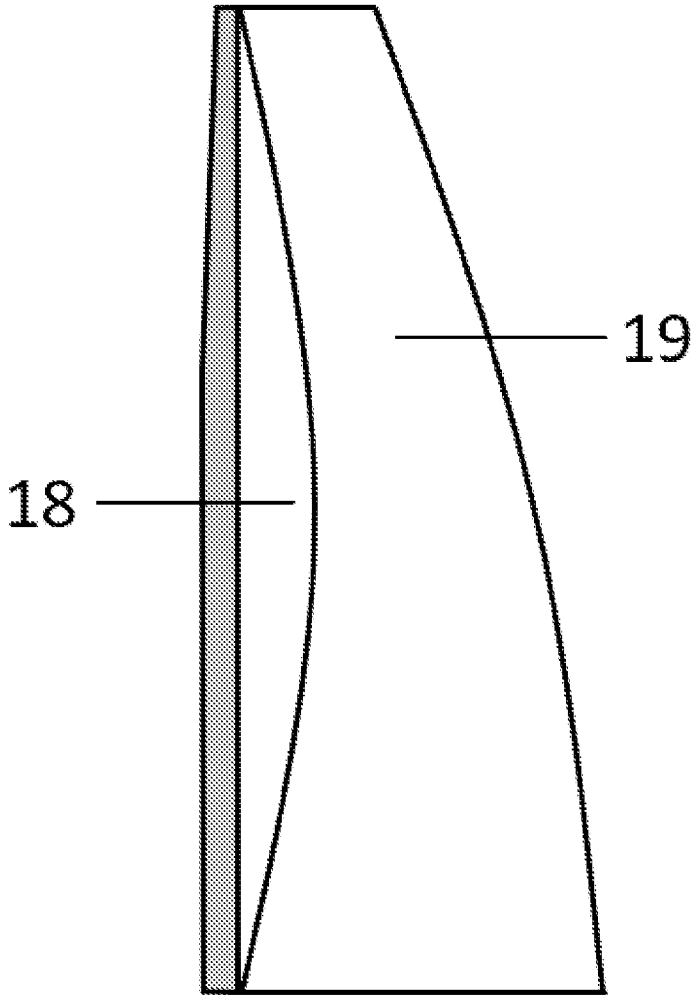

Figure 11

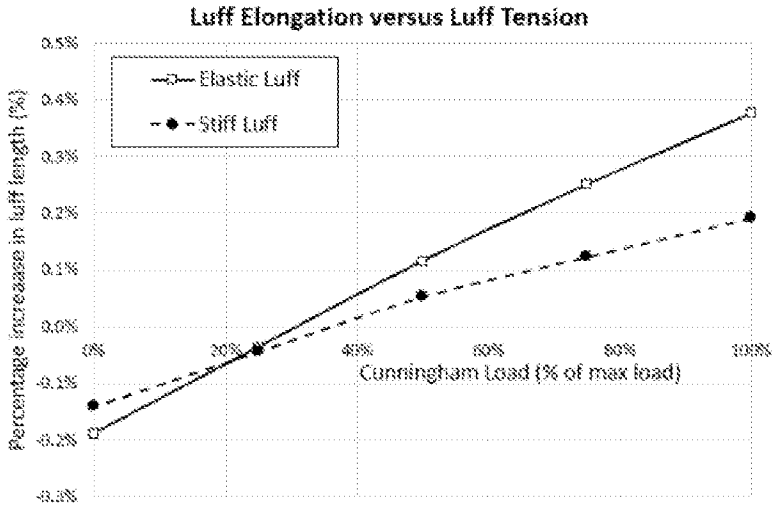

Figure 12a

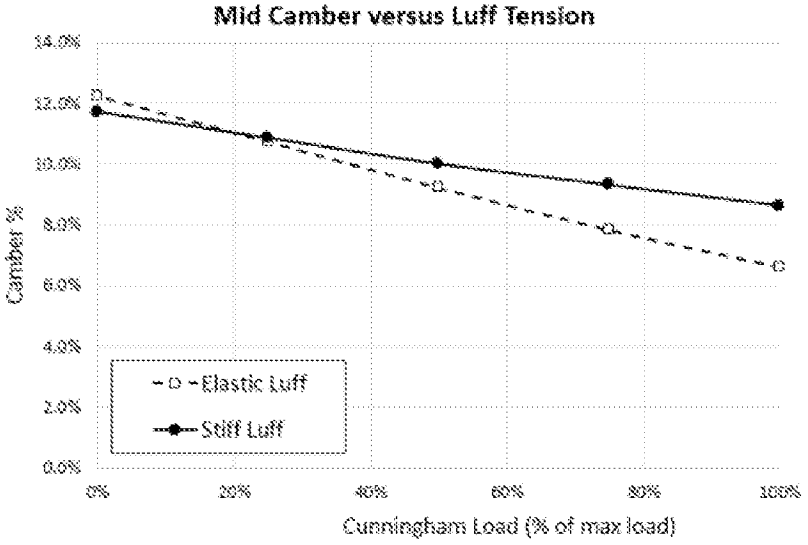

Figure 12b

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN RE APPLICATION OF: Stephen James COLLIE	CUSTOMER NUMBER: 193853
SERIAL NUMBER: TBA	CONFIRMATION NO.: TBA
FILED: June 22, 2023	ART UNIT: TBA
FOR: SAIL STRUCTURE	EXAMINER: TBA

INFORMATION DISCLOSURE STATEMENT UNDER 37 C.F.R. 1.97

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

Sir:

Applicant(s) wish to disclose the following information.

REFERENCES

■ The Applicant(s) wish to make of record the references listed on the attached PTO/SB/08. Copies of the listed references are attached, where required, as are either statements of relevancy or any readily available English translations of pertinent portions of any non-English language references.

RELATED DOCUMENTS

■ For the Examiner's convenience, Applicant(s) wish to make of record the following document(s):
  ■ International Search Report from PCT/IB2021/061985, dated March 14, 2022;
  ■ Written Opinion of the ISA from PCT/IB2021/061985, dated March 14, 2022;
  ■ Response to Written Opinion, dated July 27, 2022;
  ■ International Preliminary Report on Patentability from PCT/IB2021/061985, dated September 15, 2022;
  □ Search Report of _____ Patent Office in Appl'n No. _____, dated _____;
  □ Notice of Allowance of _____ Patent Office in Appl'n No. _____, _____;
  □ Office Action of the U.S. Patent Office in Appl'n No. _____, dated _____;
  □ _____.

  The above-cited document(s) are not prior art. The above-cited document(s) should not appear on the face of any patent that issues from the above-identified application. Accordingly, these document(s) are not listed on an PTO/SB/08.

RELATED CASES

□ A list of Applicant's pending applications or issued patents, which may be related to the present application, is shown below:

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_____

_____

DEPOSIT ACCOUNT

■ Please charge any required additional fees for the papers being filed herewith, including, if not filed herewith, the amount required under 37 CFR § 1.17(p) for taking action under 37 CFR § 1.97(c) or (d), or credit any overpayment to Deposit Account No. 02-4467.

□ This is a subsequent e-IDS submission being filed simultaneously with one or more other e-IDS submissions. The required fee under 37 CFR § 1.17(p) for taking action under 37 CFR § 1.97(c) was submitted with the other one or more simultaneously filed e-IDS submissions, and it is hereby requested that the required fee serve as payment for both the other one or more simultaneously filed e-IDS submissions and this subsequent e-IDS submission. Please charge any additional fees for the papers being filed herewith, including, if not filed herewith, the amount required under 37 CFR § 1.17(p) for taking action under 37 CFR § 1.97(c) or (d), or credit any overpayment to Deposit Account No. 02-4467.

Respectfully submitted,

Date: June 16, 2023

/Mark R. Kresloff/

Mark R. Kresloff
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Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-22)
Approved for use through 05/31/2024. OMB 0651-0031
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	
Filing Date	2023-06-22
First Named Inventor	Stephen James COLLIE
Art Unit	
Examiner Name	
Attorney Docket Number	

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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
	1	4672907	A	1987-06-16	SMALE	
	2	4854255	A	1989-08-08	KIEF	
	3	6843194	B1	2005-01-18	BAUDET	
	4	5315948	A	1994-05-31	BROWN	

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2023-06-22
	First Named Inventor	Stephen James COLLIE
	Art Unit	
	Examiner Name	
	Attorney Docket Number	

	1	0375111	EP	A1	1990-06-27	GAASTRA INTERNATIONAL LICENSING N.V.		
	2	1073250	ES	U	2010-11-25	BANARES VILELLA IGNACIO		
	3	3320321	DE	A1	1984-12-06	MENZ,WOLFGANG, DIPL.-ING		
	4	2585324	FR	A1	1987-01-30	ZODIAC		

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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.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2023-06-22
	First Named Inventor	Stephen James COLLIE
	Art Unit	
	Examiner Name	
	Attorney Docket Number	

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Mark R. Kresloff/	Date (YYYY-MM-DD)	2023-06-22
Name/Print	Mark R. Kresloff	Registration Number	42766

This collection of information is required by 37 CFR 1.97 and 1.98. 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 1 hour 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.**

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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.

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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.

Espacenet

Bibliographic data: DE3320321 (A1) — 1984-12-06

Diaphragm supporting framework of cloth or sheet or a combination of both which is used as a sail on ships

Inventor(s): MENZ WOLFGANG DIPL ING [DE] ± (MENZ,WOLFGANG,DIPL.-ING)

Applicant(s): MENZ WOLFGANG DIPL ING ± (MENZ,WOLFGANG,DIPL.-ING)

Classification: **- international:** ***B63H9/06;*** (IPC1-7): B63H9/06
- cooperative: **B63H9/067 (EP)**

Application number: DE19833320321 19830604

Priority number(s): DE19833320321 19830604

Abstract of DE3320321 (A1)

The hitherto known embodiments for diaphragm sail surfaces all suffered from aerodynamic disadvantages due to seam layers across the flow direction or a material thickness or rigidity not adapted to the lines of force in the diaphragm surface. In some cases, it was previously attempted to obtain the absence of rigidity by very expensive doubling-up in the leech area. These disadvantages are largely eliminated by the embodiment of the diaphragm surface now available. In the leading area of the sail, the seams lie virtually in the direction of the oncoming flow, while webs which are more rigid and which can be stressed to a greater degree run parallel to the leech in the leech area, which is stressed by forces to a greater degree.

(19) BUNDESREPUBLIK DEUTSCHLAND

(12) **Offenlegungsschrift**

(11) **DE 3320321 A1**

(51) Int. Cl. 3: **B63H 9/06**

DEUTSCHES PATENTAMT

(21) Aktenzeichen: P 33 20 321.0
(22) Anmeldetag: 4. 6. 83
(43) Offenlegungstag: 6. 12. 84

DE 3320321 A1

(71) Anmelder:
Menz, Wolfgang, Dipl.-Ing., 7000 Stuttgart, DE

(72) Erfinder:
gleich Anmelder

Bundesdruckerei

(54) Membrantragwerk aus Tuchen bzw. Folien oder einer Kombination von beiden, die als Segel auf Schiffen zur Anwendung kommt

Die bisher bekannten Ausführungen für Membransegelflächen litten sämtliche unter aerodynamischen Nachteilen durch Nahtlagen quer zur Strömungsrichtung oder einer dem Kraftfluß in der Membranfläche nicht angepaßten Materialstärke bzw. Steifigkeit. Teilweise wurde früher versucht, die fehlende Steifigkeit durch sehr aufwendige Aufdoppelungen im Achterlieksbereich zu erreichen.
Durch die jetzt vorliegende Ausführung der Membranfläche sind diese Nachteile weitgehend ausgeschlossen. Im vorderen Bereich des Segels liegen die Nähte nahezu in der Anströmrichtung, während im kräftemäßig stark beanspruchten Achterlieksbereich steifere und mehr beanspruchbare Bahnen parallel zum Achterliek verlaufen.

3320321

Patentanspruch bzw. Schutzanspruch

Oberbegriff:

Membran-Segelflächen aus Folien oder Tuchen bzw. Folientuche für Segelboote mit Materialstärken (Dehnung, Festigkeit) und Nahtverläufen entsprechend den statischen und aerodynamischen Erfordernissen.

Kennzeichnende Teile:

Diese Membransegelfläche ist dadurch gekennzeichnet, daß die Tuchbahnen im Bereich der Windanschnittskante Vorliek weitgehend parallel zur Strömungsrichtung verlaufen und hierdurch möglichst lange eine laminare Strömung aufrecht erhalten wird, während sie im hinteren Teil in Richtung der größten Beanspruchung (etwa parallel zum Achterliek) ausgerichtet sind. In diesem Bereich liegt weitgehend eine Strömung mit turbulenter Grenzschicht vor, so daß eine erhöhte Oberflächenrauhigkeit, bedingt durch die Nähte, nicht mehr stört. Dabei können diese hinteren Bahnen (kurz: Vertikalbahnen genannt) zur besseren Profilierung im Topbereich angespitzt zulaufen. Für die Vertikalbahnen wird stark anisotropes Material verwendet, das seine größte Steifigkeit und Festigkeit in Bahnenrichtung besitzt.

3320321

Beschreibung der Erfindung

Neue Konstruktionstype für Membransegelflächen:

Die Erfindung gehört in das Gebiet der Ingenieur-Membrantragewerke sowie der Aerodynamik.

Derzeitiger Stand der Technik:

Für den Antrieb von Wasser- und Landfahrzeugen werden schon seit langer Zeit Segel verwendet.

Die Ausführung oder das Zusammenfügen der Tuchbahnen oder Folien bzw. Tuchfolien richtet sich derzeit nach den Fertigungsmöglichkeiten oder den Materialeigenschaften.

Im wesentlichen sind derzeit zwei Konstruktionstypen bekannt:

1.) Die Bahnen laufen etwa senkrecht zum Achterliek.

2.) Die Bahnen laufen parallel zum Achterliek.

Einen Überblick über den technischen Stand von Membransegelflächen ist in (1,2) zu finden.

Durch die Entwicklung der Slooptakelage in der Vergangenheit wurden die Am-Windeigenschaften oder anders ausgedrückt die Aerodynamik stark verbessert. Galten früher bei den Rahsegeln für die optimale Höhe am scheinbaren Wind (Winkel zwischen Schiffsachse und scheinbarer Windrichtung) von 50° als erreichbar so sind mit der Slooptakelage und den neueren Rumpfformen der Bootskörper Werte um 30° erreichbar.

In diesen Bereichen sind von einer Segelfläche folgende Bedingungen zu erfüllen.

1.) Das Profil der Segelfläche muß richtig oder optimal sein und sollte sich unter wechselnden Windstärken nicht unkontrolliert verziehen.

2.) Das Gewicht der Segel sollte zur Vermeidung von zusätzlichen Krängungsmomenten so gering als möglich sein.

3.) Zur Erreichung eines möglichst großen Auftriebes der Segelfläche sollte die Oberfläche so glatt als möglich sein.

4.) Das auf die Fläche bezogene Gewicht des Segels sollte so gering als möglich sein um im Seegang durch die Schiffsbewegungen nicht zum Schlagen zu kommen bzw. die dem Segel gegebenen Profilierung zu halten. Leichtere Segel erfahren eine größere Dämpfung und kommen daher weniger zum Schlagen.

Durch die Erfindung sollen die aerodynamischen Eigenschaften der Segelfläche selbst sowie die Materialausnutzung im Hinblick auf eine Gewichtsoptimierung unter Beachtung einer

optimalen Profilierung und der Herstellungstechnologie verbessert werden.

Lösung der Aufgabe

Erreicht wird das im vorhergehenden Abschnitt angestrebte Ziel durch die im folgende beschriebene Erfindung, die gleichzeitig in einer Zeichnung mit den Begriffen dargestellt ist.

- Im Bereich der Windanschnittskante des Segels (Vorliekbereich) verlaufen die Nähte der Bahnen vorwiegend in der Strömungsrichtung der Luft. Hierdurch wird erreicht, daß zur Aufrechthaltung einer laminaren Grenzschicht keine störende Erhebung (bei Nähten in mm Größe) vorhanden sind, und deshalb in diesem Bereich lokal sehr hohe Auftriebsbeiwerte vorhanden sind.

- Im Bereich des Achterlieks (hinterer Bereich des Segels) treten, im Vergleich zum Mittel und Vorderteil des Segels, sehr viel höhere Beanspruchungen auf, so daß hier steifere und höher beanspruchbare Tuche zur Anwendung kommen. Gleichzeitig hat sich in diesem Bereich die laminare Grenzschicht abgelöst, so daß höchstens noch eine turbulente Grenzschicht vorhanden ist. Nähte, die hier quer zur Strömungsrichtung laufen, stören kaum.

- Im Gegensatz zum vorderen Teil des Segels mit in Strömungsrichtung liegenden Bahnen verlaufen hier Bahnen mit stark anisotropem Materialverhalten etwa parallel zum Achterliek.

  Die Hauptachsen der Anisotropie sind dabei parallel und senkrecht zur Bahnenachse. Die steifere und mit einer höheren Festigkeit versehene Achse geht hierbei in Bahnrichtung. Zur weiteren Gewichtsoptimierung sowie zur feineren Modellierung des angstrebten Profiles im Topbereich können die Breiten der Vertikalbahnen zum Top hin schmaler werden.

- Mögliche Aufdoppelungen im Achterlieksbereich für Horizontalbahnen bzw. an senkrecht zum Achterlieksbereich verlaufenden Bahnen werden hierdurch vermieden, wodurch herstellungstechnologische Vorteile sowie eine Gewichtsoptimierung durch weniger Nahtlängen erreicht wird.

- Die Definition der räumlich gekrümmten Schnittlinie zwischen den Vertikal-und Horizontalbahnen sowie ihrer Abwicklung in der Ebene für den Zuschnitt und das Zusammenfügen der Bahnen wurde vom Erfinder gelöst und soll als mathematische Methode nicht Gegenstand der Erfindung sein.

Literaturnachweis

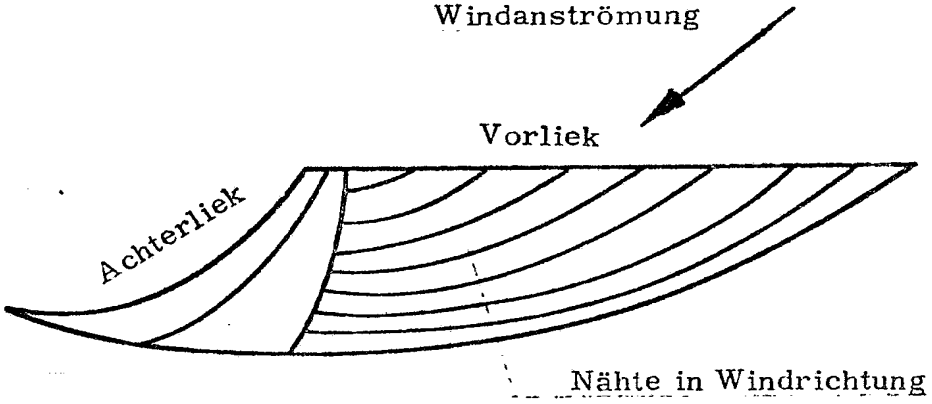
(1) C.A. Marchaj, Areo- Hydrodynamics of sailing
Verlag, Granada-Publishing-London

(2) J.H. Williams, Das Segel
Verlag, Delius-Klasing-Bielefeld-Berlin

– Leerseite –

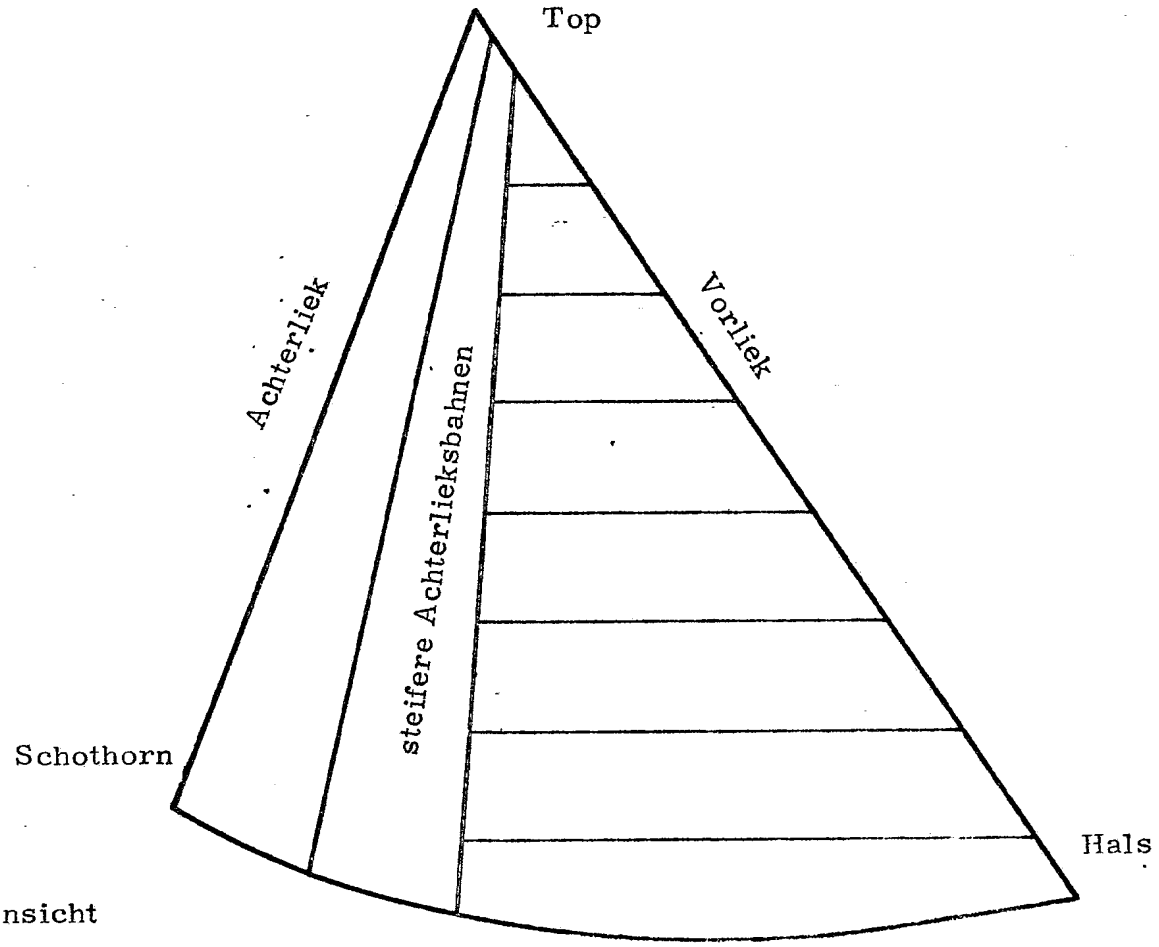
Nummer: 33 20 321
Int. Cl.³: B 63 H 9/06
Anmeldetag: 4. Juni 1983
Offenlegungstag: 6. Dezember 1984

W. Menz



Aufsicht

Nähte können von der horizontalen Richtung etwas abweichen



Ansicht

(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 375 111 A1**

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **89309131.4**

(51) Int. Cl.5: **B63H 9/06**

(22) Date of filing: **08.09.89**

(30) Priority: **22.12.88 GB 8829939**

(43) Date of publication of application:
27.06.90 Bulletin 90/26

(84) Designated Contracting States:
AT BE CH DE ES FR GB GR IT LI LU NL SE

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(54) Improvements in sails.

(57) A sail is provided which is made of a relatively stiff sheet material, as compared to conventional sail-making materials. The stiffness of the sheet material permits areas of roach in the sail to be supported without any battens or the like in view of the property of the material to resist simultaneous curvature of the material in a direction transverse to the curvature of the sail when the sail is being used.

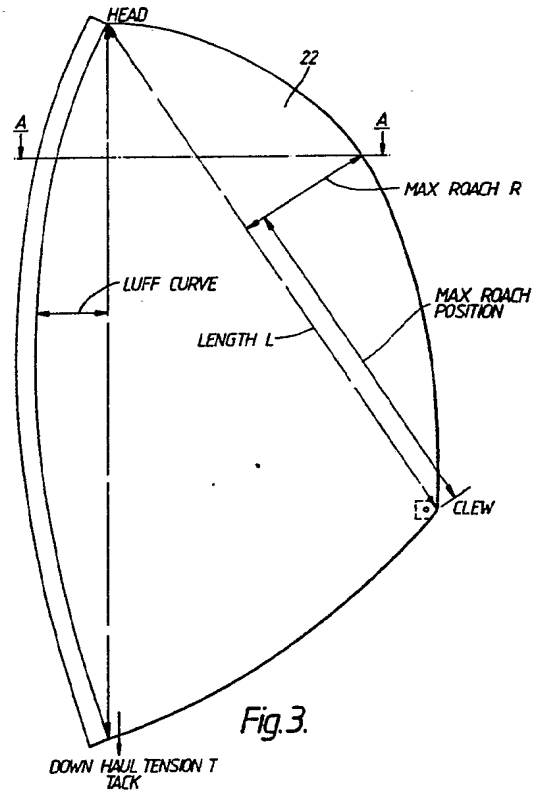

Fig.3.

EP 0 375 111 A1

IMPROVEMENTS IN SAILS

This invention relates to sails for wind-driven sailing craft such as those referred to as windsurfers.

Traditionally, sails have been made from woven material made up of a number of panels of such material to enable curvature or fullness to be built into such sails so that they can then adopt, in use, the required aerofoil shape. Many modern sail making materials include woven fabrics which are laminated to thin films of continuous synthetic plastics materials which function to seal the woven material to thereby make it impermeable to air and minimize stretch of the woven fabric.

An important consideration in the selection and design of sails and sail making materials has been the desirability to keep the weight as low as possible whilst improving the overall aerodynamic efficiency. This objective has tended to lead to extremely complex and elaborate designs of sails, many of which are characterized by being of a relatively light-weight material comprised of a large number of individual sail panels sewn together to form a composite having the required shape whilst generally improving the strength and flexibility of the sail.

An example of such a technically complex sail is shown in European patent application no. 0249427 which discloses a sail made with threads which run in the direction of principal stresses. The sail is comprised of a laminate made of the threads bonded to a film material, such as polyester film of the type sold under the Trade Mark Mylar.

Another example is shown in European patent application no. 0224729 in which a sail cloth is structured to resist stress developing in the corners of the sail at the foot and at the head thereof. The sail comprises an arrangement whereby the warp yarns radiate in directions coincident to the centre of stress in the sail.

It will be appreciated that such technologically complex sails can be difficult and expensive to manufacture and this may not always be economically justified in circumstances where the user of the sail is, for example, inexperienced or does not necessarily wish to engage in competitive racing activities.

Another way in which sails have improved in performance has been to increase the relative size of sails by building areas of roach (as hereafter defined) into the sail, such as in the leach in an area beyond the straight line between the head of the sail and the clew. Roach is the extra sail area which lies outside of the normal lines of tension in a sail. Areas of roach can be particularly significant in providing a longer curved aerofoil section to thereby give increased drive and also provide extra sail area to enable larger sails to be used without needing longer masts and booms and other rigging hardware. However, with conventional sail making materials, such areas of roach usually need to be supported, in use, otherwise they tend to hinge about the tension lines in the sail, such as the tension line between the head and the clew so that the roach area simply "flops" off to leeward of the sail, thereby losing the effectiveness of the extra area of the sail provided by the roach and increasing the drag of the sail.

To counter this problem sail makers have conventionally supported such areas of roach by, for example, inserting battens into the sail at spaced intervals in batten pockets sewn into the sail cloth, the battens being relatively stiff compared to the stiffness of the sail cloth to thereby prevent bending of the sail in the area of roach about the tension line of the sail. Battens have also been used to stretch out wrinkles in sail cloth.

Another way of supporting areas of roach in a sail is disclosed in German Offenlegungsschrift no. 3531121 wherein instead of using battens there is shown a system whereby rigid edge pieces are fixed to the sail and are used to support the areas of roach. This can have the advantage that larger areas of sail can be supported relatively simply.

A different type of sail construction is shown in European Patent Application No. 0056657 which discloses a sail which has a preformed three dimensional shape as a result of thermoforming a plastics sheet over a caul or mold. The plastics sheet may be laminated to a woven material to impart strength and flexibility to the sail. The teaching of No. 0056657 makes the important acknowledgement that there is only a limited class of commercial materials suitable for making sails, which must normally be flexible, stretch resistant and light-weight. In use, the sail assumes the required shape without the need to rely on tensioning of the luff, leech and foot of the sail in order to give it fullness, the necessary three-dimensional curved shape to give it thrust under sailing conditions. Battens may be bonded to the sail either during or after the thermoforming process in order to support the areas of roach.

Because the above described sails have necessarily tended to be constructed from very flexible, lightweight and "floppy" materials it has always been necessary to support areas of roach in some way or other either by battens, edge pieces or the like. The presence of such supports in the sail nevertheless increase the overall weight of the sail and the cost and complexity of its construction.

Furthermore, even though a sail may be designed to be aerodynamically very efficient, such as in E.P. 0056657, nevertheless the presence at regular intervals of discontinuities in the airfoil caused by the presence of the sail battens and batten pockets does tend to increase the drag of the sail and decrease the efficiency of air flow over the sail during use of it.

The present invention aims at a simplification and improvement in sails in these various respects and to that end is based upon the realization that it is possible to make sails having areas of roach which do not necessarily have to conform to the elaborate and technically complex designs as heretofore known. The invention discloses that similar objectives can be realized by an appropriate selection of those materials which would not otherwise be considered suitable for sailmaking and such materials can in fact be used to construct a sail which will perform adequately and cost substantially less than conventional sails.

According to the invention, there is provided a sail having one or more areas of roach, the sail being made wholly or primarily of sheet material, which material is adapted to assume in use a curved shape to provide draft or camber for the sail, but which material resists significant simultaneous generally transverse curvature of the sail such that the one or more areas of roach are supported wholly or primarily by the sheet material when it curves during use of the sail.

As will be appreciated, therefore, the invention uses the concept of the sheet material of the sail being of such a character in the sense that it is relatively stiff or rigid as compared to conventional sail making materials, that when the sail curves in use it will provide its own inherent support for the or each area of roach. Conveniently, the sheet material is a synthetic plastics film having the characteristic that it resists simultaneous bending about two planes which are each transverse to the other. Materials of this kind are generally quite rigid or stiff so that they would not normally be considered suitable for sail making.

Typically, therefore, the present invention provides a sail made from a sheet material having a tensile modulus of at least 100kg/mm^2 (as measured by ASTM D882) the material being of synthetic plastics. Tensile modulus (TM) may be defined as :

$$TM = \frac{\text{TENSILE STRESS (kg/mm2)}}{\text{STRAIN}}$$

More importantly, however, the sheet material must have the characteristic that it is less "floppy" than conventional sail making material and behaves like a sheet of paper when curved i.e. it tends to resist curvature in a direction transverse to the first direction of curvature.

The present invention has significant advantages over conventional sails in that it eliminates the need for individual battens and batten pockets to support areas of roach, thereby providing a substantial saving in the weight of the sail. Accordingly, even if the sheet material, such as synthetic plastics film material, used to make the sail according to the present invention is heavier and/or stiffer than conventional sail making material, nevertheless the net effect of eliminating the requirement for separate battens and batten pockets can even be a reduction in the overall weight of the sail. This can be particularly important with respect to sails for windsurfers where the user of the sail often has to some extent to support the weight of the sail and minimal weight is a primary performance objective. Additionally, the absence of discontinuities in the airfoil which would otherwise occur if battens and batten pockets were present improves the airflow over the sail of the invention and can thereby help improve efficiency. A further very significant advantage lies in the fact that a suitable material for the sail or at least the major portion of the sail may be entirely transparent such as a transparent polyester film and this further obviates the necessity otherwise to construct a window area in, for example, a windsurfer sail in order for the user of the sail to see where he is going.

In addition, because the relatively labour intensive steps of sewing or bonding batten pockets and the like to the sail is eliminated by the present invention, the overall cost of production of the sail can be significantly reduced. This is further enhanced by the fact that, in order to keep the weight of the sail to a minimum in a conventional sail having battens and batten pockets, relatively sophisticated manufacturing techniques are normally required which are much more expensive than would be the case if one used instead the cheapest and simplest way of producing a batten pocket.

A still further advantage of the present invention is that it eliminates the need for battens to be used to remove wrinkles in the sail, because such wrinkles are not normally present.

The sheet material, typically synthetic plastics film, used in the sail according to the invention is used in at least the areas of the sail which have roach and adjacent areas, such as in the leech. In addition, although it is not essential, the sheet material can be used to constitute the whole of the sail and in many instances it may not even be necessary to provide separate panels and the like which would otherwise have to be joined together by sewing or bonding, so that effectively the sail

can be made of one piece of material without having joints.

According to another embodiment of the invention, it is desirable to provide a luff sleeve for receiving a mast, the luff sleeve being made from conventional sailmaking material having a high degree of flexibility as compared to the sheet material used in the areas of roach, and the luff sleeve is joined to the sheet material either directly or via an intermediate edging strip.

The sheet material is preferably a synthetic plastics film material such as a polyester film having a thickness of at least 100 microns and, desirably, a thickness from between 100 and 300 microns. However, it will be appreciated that materials other than polyester can be used without departing from the spirit or scope of the invention.

The thickness of the material chosen is important since it is a necessary characteristic of the invention that the material should be of sufficient thickness that in the practical limits within which a sail is used, the material can be easily bent or curved to provide draft or camber but, at the same time, resists bending at right angles to the axis of curvature, at least to the extent necessary to support areas of roach. The optimum thickness is therefore dependent on the mechanical characteristics of the material chosen, particularly the tensile modulus when used as a measure of relative stiffness.

The invention is particularly applicable to sails which are used as main sails, i.e. are attached to a mast in sailing craft of all kinds. Additionally, in view of the mass market for windsurfer sails, the invention has special applicability in such sails where a significant saving in cost can be envisaged, since the usual requirement to provide battens and batten pockets collectively constitute a major component of the total cost of manufacturing such sails.

Another advantage of a sail according to the invention is that it is relatively easy to rig. Thus, if there is for example a luff sleeve at the luff of the sail, the luff can be substantially straight and so it is very simple to insert the mast into that luff. Additionally, a relatively small amount of downhaul tension is only then necessary to spread the sail and thus the rigging load such that the rigging load is not concentrated in particular localized regions as, for example, the line between the head and the clew.

The invention can also be applied to providing roach in the foot of the sail between the tack and the clew. However, generally speaking roach in this area is of less importance than roach provided on the leech of the sail and because of the relatively shorter distance between the tack and the clew than as between the head and the clew, the amount of roach which can be provided and supported in the manner according to the invention tends to be less than for roach provided between the head and the clew.

Because the sail of the present invention can generally be rigged with relatively low downhaul tension it is possible that there may be some twisting of the top of the sail in the area towards the head, particularly in heavy winds and when going windward. Even so, this may well be advantageous since in this way it may be possible to spill excess wind without an overwhelming heeling effect being apparent on the sail craft.

If a synthetic plastics film material is used as the sheet material this could conceivably have the weakness of tending to tear at it's edges in the event that there is a lack of continuity at any edge, by the presence of a small nick or cut. However, this should not normally occur since the leech of the sail according to the present invention is not subject to the same localized tension as would often be the case with a conventional sail. Even so, it may be desirable to strengthen the edges of the sail with the object of preventing or inhibiting tearing.

It will therefore be seen that the present invention constitutes a fundamental departure from the conventional sail making art in that instead of choosing the lightest and most flexible material available which is then subjected to elaborate and often technologically complex manufacturing processes, the present invention instead stems from the realization that by approaching the problem from a different angle, by positively utilizing the stiffness and rigidity associated with materials such as polyester films, it is still possible to achieve the same overall objectives but at much lower cost and greater simplicity.

The invention will now be described, by way of example only, with reference to the accompanying drawings, in which:-

Figure 1 is a side view of a sail according to the invention;

Figure 2 is a view from the rear of that sail as it would appear when in use and mounted on a mast;

Figure 3 is a diagram of a sail according to the invention showing the terminology employed herein;

Figure 4 is a sectional slice taken on the line A-A of Figure 1; and

Figure 5 is a view from the side and rear of a sail/mast assembly according to another embodiment of the invention.

The sail 10 shown in Figures 1 and 2 is composed of a front panel 12 and a rear one piece panel 14. The front panel is made of flexible polyester cloth with a polyethylene film laminated to it.

The panel 12 is in the form of a luff sleeve which includes a pocket 16 for a mast (not shown). The rear one piece panel is made of a polyester sheet having a thickness of from 100 to 300 microns and the two panels are joined to one another along a line 20.

It will be seen that there are no battens or even pockets for battens to support the roach area 22. This area is supported solely by virtue of the property of the polyester sheet material when it is curved as seen in Figure 2.

Referring to Figures 3 and 4, typical dimensions are:

L ..... 2.5 to 4 metres.
R ..... approximately 50 cm.
D ..... about 20 cm.

It will be understood that the drawings shown in Figures 1 to 4 are simplistic in nature and are intended only to illustrate the concepts used in the invention.

In Figure 5 is a more detailed drawing showing a sail/mast assembly for use in a wind-surfer. In the drawing, a sail shown generally at 30 is comprised of a main panel 31 of a relatively stiff clear ployester sheet material. A luff panel 32 is provided adjacent the main panel 31 and each panel 31, 32 is connected to the other by means of a stitched reinforcing strip 33 in conventional manner. The luff panel 32 is comprised of a laminate of a woven material and a plastics sheet material of conventional construction such that the luff panel 32 has all of the characteristics of conventional sail making material in that it is impervious to air, is very flexible, strong and relatively light-weight.

The luff panel 32 is attached to a luff sleeve 34 which is adapted to enclose a mast 35 in a conventional manner. A wishbone boom 36 is pivotally fixed to a mid-portion of the mast 35 and extends generally outwards and away therefrom. The wishbone boom is generally symmetrical and has a left-hand side boom handle 36a and a right-hand side boom handle 36b.

The main panel 31 of the sail 30 is provided with a reinforcing gusset 37 which carries a metal eye (not shown) by which the free-end of the main panel 31 may be attached by a rope (not shown) to an outhaul 38 on the free end of the boom 36 and by which the camber or draft of the sail 30 can be adjusted.

An edging strip 39 is sewn onto the free edges of the main panel 31 and functions to prevent or inhibit tearing of the sail from the edges.

In Figure 5 the direction of the wind is shown arrowed and as such the sail 30 adopts a full configuration so that it assumes a convex curved shape away from the right-hand side handle 36b of the wishbone boom 36 and towards the left-hand side handle 36a thereof. In this configuration, it will be seen that the left-hand side handle 36a of the wishbone boom 36 is still visible behind the main panel 31, which is transparent, but it is not visible behind the luff panel 32, which is opaque.

Because of the curved configuration of the sail 30 and in particular the part-cylindrical curvature of the main panel 31 the area of roach extending beyond the straight line from the head to the clew is supported as a consequence solely of the relatively stiff characteristics of the material of the main panel 31. It will be appreciated that if a relatively floppy material were chosen for the main panel 31 then the area of roach would not be supported and would tend to flop-off to leeward of the sail 30.

In Figure 5 there is also shown an area of roach which extends beyond a straight line between the clew and the tack and which is also, in part, supported by the characteristics of the sheet material chosen for the main panel 31. However, in this particular instance since the area of roach is small compared to the area of roach beyond the straight line between the head and the clew it will be understood that the beneficial effects of using a relatively stiff or rigid material for the main panel 31 are less significant.

The invention thus provides a relatively simple but elegant solution to the problem of constructing a sail in which areas of roach are necessary or desirable.

Claims

1. A sail having one or more areas of roach, the sail being made wholly or primarily of sheet material, which material is adapted to assume in use a curved shape to provide draft or camber for the sail, characterized in that the material resists significant simultaneous generally transverse curvature of the sail such that the one or more areas of roach are supported wholly or primarily by the sheet material when it curves during use of the sail.

2. A sail according to Claim 1 further characterized in that the sheet material has a tensile modulus of at least 100 kg/mm^2, as measured by ASTM D882.

3. A sail as claimed in claim 1 further characterized in that the sheet material has a tensile modulus of from 350 to 500 kg/mm^2 as measured by ASTM D882.

4. A sail as claimed in any preceding claim further characterized in that it comprises a luff sleeve for receiving a mast, the luff sleeve being made from material having a high degree of flexibility, the luff sleeve being joined to the synthetic plastics film material constituting the remainder of the sail.

5. A sail as claimed in Claim 4 further char-

acterized in that the material of the luff sleeve is woven polyester with a polyethylene film laminated to it.

6. A sail as claimed in any preceding claim further characterized in that the sheet material is a polyester film having a thickness of at least 100 microns.

7. A sail as claimed in any one of claims 1 to 5 further characterized in that the sheet material has a thickness of from 100 to 300 microns.

8. A sail as claimed in any preceding claim further characterized in that the area of the sail made of the sheet material is made in a one piece panel.

9. A sail made from sheet material, the sail having roach extending beyond a straight line joining the head to the clew of the sail, characterized in that the roach has substantially no localized stiffening to support it, and the sheet material has a tensile modulus of at least 100 kg/mm^2 as measured by ASTM D882.

10. A sail as claimed in Claim 9 further characterized in that the sheet material has a tensile modulus of from 350 to 500 kg/mm^2 as measured by ASTM D882.

11. A sail as claimed in claim 9 or claim 10 further characterized in that it comprises a luff sleeve for receiving a mast, the luff sleeve being made from material having a high degree of flexibility as compared to the sheet material, and the luff sleeve being joined to the sheet material constituting the remainder of the sail.

12. A sail as claimed in Claim 11 further characterized in that the material of the luff sleeve is a woven polyester mesh with a polyethylene film laminated to it.

13. A sail as claimed in any of claims 9 to 12 further characterized in that the sheet material is a polyester film having a thickness of at least 100 microns.

14. A sail as claimed in any one of claims 9 to 12 further characterized in that the polyester film has a thickness of from 100 to 300 microns.

15. A sail as claimed in any of claims 9 to 14 further characterized in that the area of the sail made of the sheet material is made in a one piece panel.

16. A sail having a luff and roach in the leech extending beyond a straight line joining the head and the clew of the sail, characterized in that the sail, apart form the region of the luff, is made from sheet synthetic plastics material having a tensile modulus of at least 100 kg/mm^2 as measured by ASTM D882.

17. A sail as claimed in Claim 16 further characterized in that the sheet synthetic plastics material has a tensile modulus of from 350 to 500 kg/mm^2 as measured by ASTM D882.

18. A sail as claimed in Claim 16 or 17 further characterized in that it comprises a luff sleeve for receiving a mast, the luff sleeve being made from material having a high degree of flexibility, the luff sleeve being joined to the sheet synthetic plastics material constituting the remainder of the sail.

19. A sail as claimed in any of Claims 16 to 18 further characterized in that the sheet synthetic plastics material is a polyester film having a thickness of at least 100 microns.

20. A sail as claimed in any one of claims 16 to 18 further characterized in that the sheet material has a thickness of from 100 to 350 microns.

21. A sail according to any preceding claim further characterized in that reinforcing strips are fixed to edges of the sheet material to prevent or inhibit tearing of the sheet starting at the edges.

22. A sail as claimed in any preceding claim further characterized in that it has roach extending downwardly beyond a straight line joining the tack to the clew, the lower edge having no localized stiffening to support that roach.

Nouvellement déposé

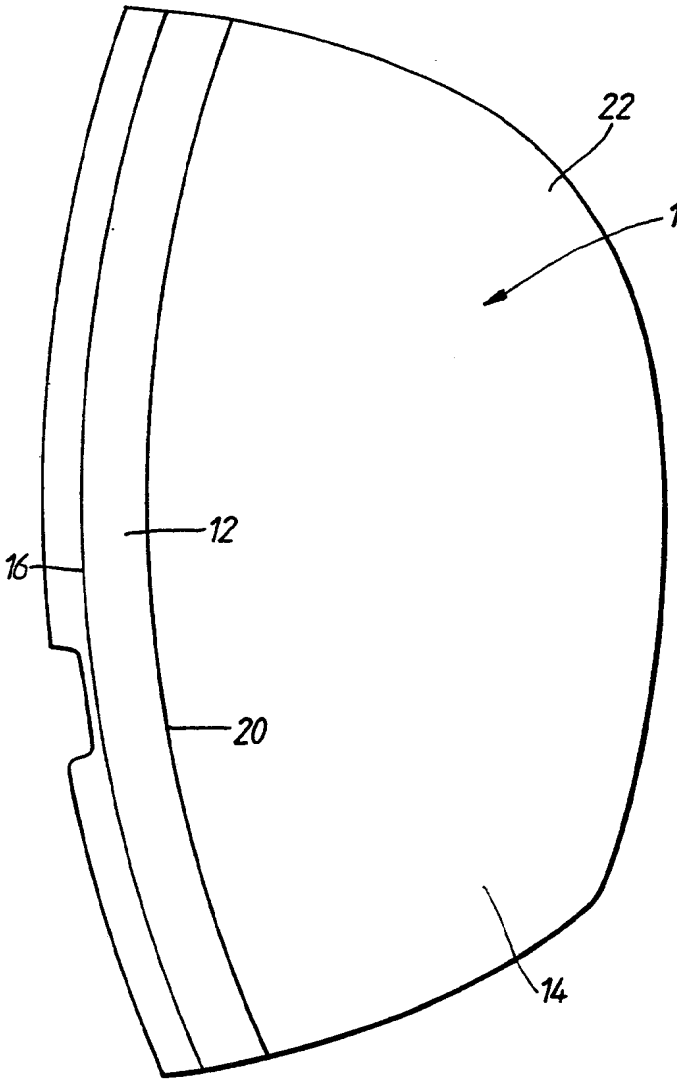

Fig. 1.

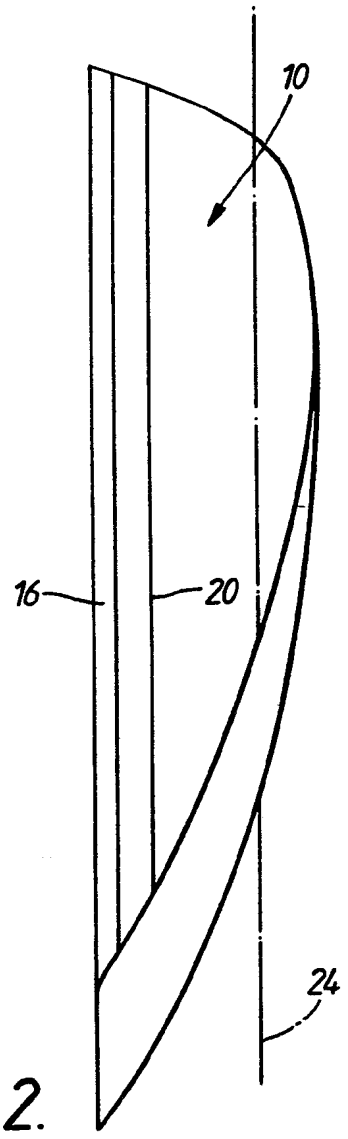

Fig. 2.

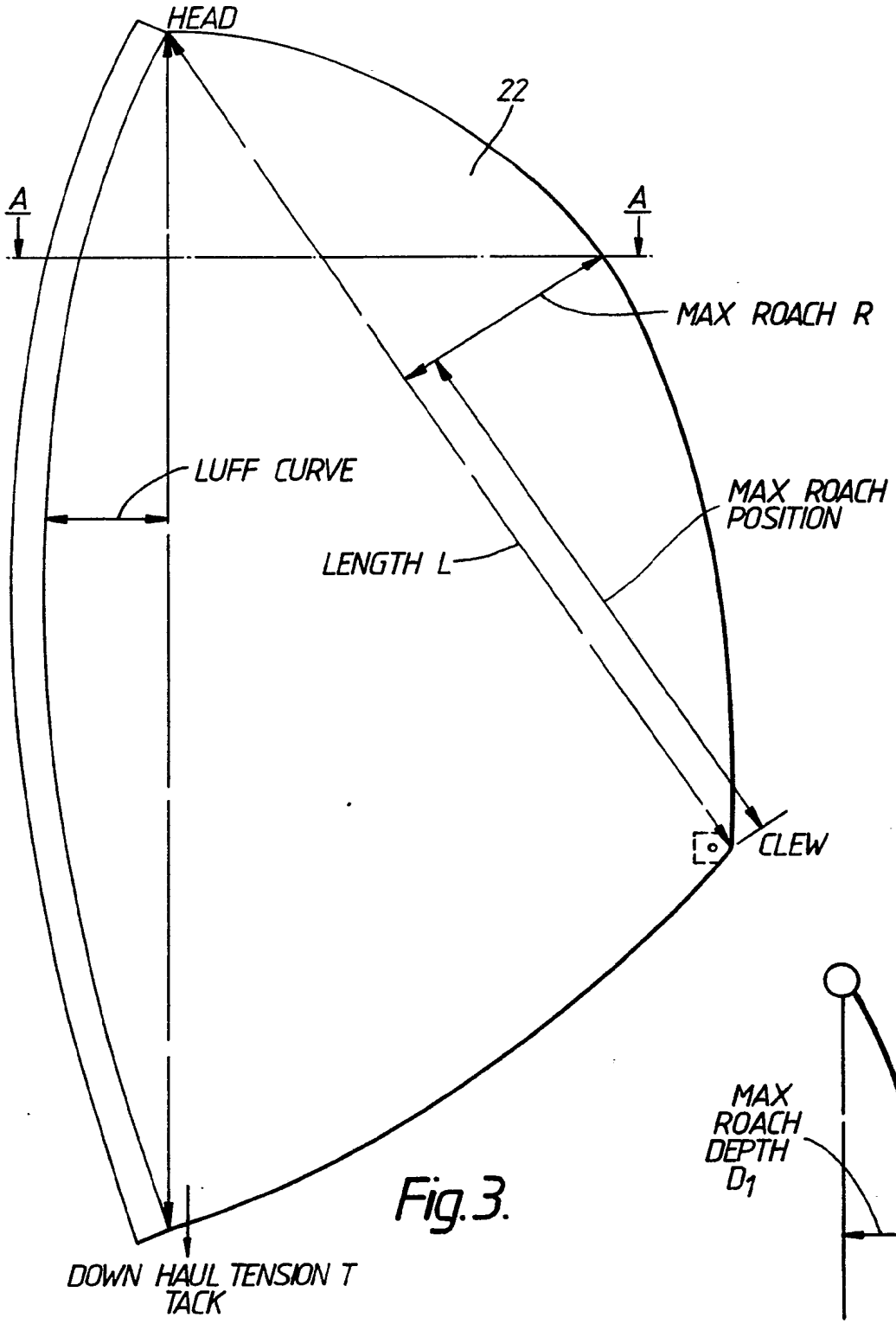
HEAD
22
A
A
MAX ROACH R
LUFF CURVE
MAX ROACH POSITION
LENGTH L
CLEW
DOWN HAUL TENSION T
TACK

Fig.3.

MAX ROACH DEPTH D_1

Fig.4.

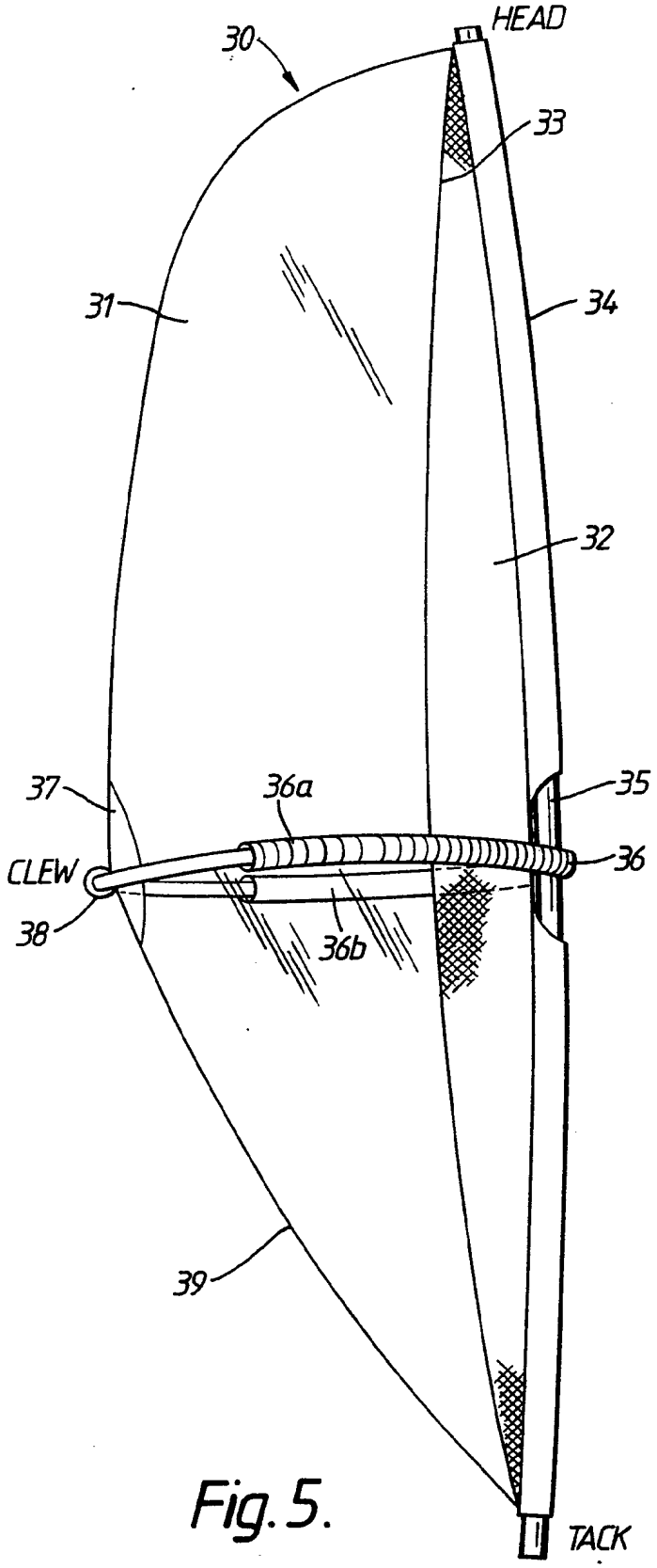

Fig. 5.

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 89 30 9131

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	EP-A-0 224 729 (BAINBRIDGE/AQUABATTEN) * Figure 4 *	1	B 63 H 9/06
A		9,16	
X	US-A-2 909 142 (HOOD) * Figure 1 *	1	
A		9	
X	DE-A-2 501 326 (SCHEFFERLING) * Figures 4-6 *	1	
A		9,22	
A	EP-A-0 056 657 (NORTH SAILS) * Page 2, line 1 - page 3, line 35 *	1,4,8, 11,15, 18,22	
A	EP-A-0 249 427 (SOBSTAD) * Column 12, lines 16-51 *	1,5,12, 16	
A	DE-A-3 531 121 (PASCHER) * Column 1, line 46 - column 2, line 35; figures 1-5 *	1,9,16	
A	FR-A-1 149 799 (DEBARGE) * Figure 2 *	21	TECHNICAL FIELDS SEARCHED (Int. Cl.5) B 63 H

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	13-03-1990	HUNT A.E.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P0401)

Espacenet

Bibliographic data: ES1073250 (U) — 2010-11-25

RIG FOR WINDSURF BOARDS

Inventor(s): BANARES VILELLA IGNACIO [ES] ± (BANARES VILELLA, IGNACIO)

Applicant(s): BANARES VILELLA IGNACIO [ES] ± (BANARES VILELLA, IGNACIO)

Classification: **- international:** ***B63B15/02; B63H9/08***
- cooperative: B63H8/20 (EP, US); B63H8/40 (EP, US); B63H9/0615 (EP)

Application number: ES20100030997U 20101004

Priority number(s): ES20100030997U 20101004

Also published as: ES1073250 (Y) WO2012045897 (A1)

Abstract of ES1073250 (U)

Rigging for windsurfing boards, of the type that include a windsurf sail (1) fixed on a mast (2) by means of a longitudinal luff (11) defined on its front edge, characterized in that it comprises a pneumatic chamber (3) equipped with an inflation valve (31), and shaped inside the luff (11) and operationally suitable to favor the floating of said rig on the water surface and its lighter halyard during the start of navigation in the water. (Machine-translation by Google Translate, not legally binding)

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(54) Título: **Aparejo para tablas de windsurf.**

ES 1 073 250 U

DESCRIPCIÓN

Aparejo para tablas de windsurf.

Objeto de la invención

La presente invención se refiere a un aparejo para tablas de windsurf, más concretamente al aparejo que comprende el mástil y la vela que impulsa la navegación.

Campo de aplicación de la invención

Esta invención es aplicable en el sector de la náutica, y más concretamente en el sector dedicado a la construcción de aparejos para tablas de windsurf.

Antecedentes de la invención

Una tabla de windsurf comprende, además de la tabla propiamente dicha, un aparejo superior que proporciona el empuje necesario para la navegación. Básicamente este aparejo comprende una vela fijada sobre un mástil mediante un grátil longitudinal definido en su borde anterior, y a su vez dicha vela está extendida mediante una botavara transversal. El mástil se encuentra anclado por su pie o extremo inferior mediante una rótula, eje cardán o pieza flexible a la parte superior de la tabla, de tal forma que cuando el usuario suelta la botavara el aparejo cae y queda tumbado sobre el agua.

La práctica de la navegación en condiciones de vientos débiles requiere el uso de aparejos con velas de mayores dimensiones, con capacidad de suministrar una mayor potencia. Estas velas se optimizan mediante el uso de estructuras que las tensan y curvan, tal como los "camber inducer" y el uso de sables flexibles, que aumentan el rendimiento gracias a una mejora en el perfil del grátil y el borde de ataque de la vela.

Por su tamaño y complejidad, este tipo de aparejos resultan pesados y difíciles de montar. Una vez en el agua, y debido a su particular construcción, tienen tendencia a llenarse de agua en las caídas. Esto hace imposible iniciar la navegación con la tabla en el agua y dificulta enormemente su posterior drizado, pues cuando el grátil se inunda, la cantidad de agua embolsada vuelve el aparejo con la vela sumamente pesado.

Todo ello hace que navegar con este tipo de aparejos resulte complicado y físicamente exigente en caso de caída.

Descripción de la invención

El aparejo para tablas de windsurf, objeto de esta invención, presenta unas particularidades técnicas destinadas a que el aparejo sea más ligero y no se llene de agua cuando se encuentra tumbado sobre la superficie del agua.

El aparejo es del tipo de los que comprenden una vela de windsurf fijada sobre un mástil mediante un grátil longitudinal definido en su borde anterior.

De acuerdo con la invención, este aparejo comprende una cámara neumática dotada con una válvula de inflado, y conformada en el interior del grátil, siendo dicha cámara neumática operativamente apta para favorecer la flotación del aparejo sobre la superficie del agua y permitir un drizado más ligero durante el inicio de la navegación en el agua o realizar la maniobra denominada "water start".

De esta forma el espacio del grátil que no se encuentra ocupado por el mástil no se puede llenar con agua al caer el aparejo al agua, mejorando la flotabilidad del mismo. Además, como el grátil no se llena de agua, el peso del aparejo es menor y el drizado requiere menos esfuerzo.

La válvula de inflado está colocada próxima a un extremo de la cámara neumática para su disposición accesible.

Una vez utilizado el aparejo, la cámara neumática se desinfla, permitiendo la reducción de volumen de la vela, el desmontaje y su enrollado.

La cámara neumática presenta una configuración alargada y de sección transversal variable, acorde al espacio dejado por el mástil en el interior del grátil. Así, se reduce el espacio que puede ocupar el agua en caso de que el aparejo caiga, y se adapta a la forma que toma la vela mediante la aplicación de los "camber inducer" y los sables. Es más, la presión del aire en el interior de la cámara neumática y en conjunción con el diseño de las líneas de corte de la vela, se puede conseguir dar forma al perfil de la vela.

También se optimiza el aumento de potencia de las velas con este tipo de perfil, al resultar la vela mucho más ligera y sencilla de montar. El aparejo reduce la necesidad de elementos estructurales, mediante el uso de sables perfilados más cortos y la eliminación de cuñas.

Además la vela es más duradera debido al efecto amortiguador de la cámara neumática ante las vibraciones y caídas.

Descripción de las figuras

Para complementar la descripción que se está realizando y con objeto de facilitar la comprensión de las características de la invención, se acompaña a la presente memoria descriptiva un juego de dibujos en los que, con carácter ilustrativo y no limitativo, se ha representado lo siguiente:

- La figura 1 muestra una vista en alzado de un aparejo con la vela sujeta al mástil.
- La figura 2 muestra una vista en perspectiva del aparejo tumbado.

Realización preferente de la invención

Como se puede observar en las figuras referenciadas el aparejo para tablas de windsurf comprende una vela (1) de windsurf fijada sobre un mástil (2) mediante un gratil (11) longitudinal en su borde. En el espacio interior del gratil (11) que no ocupa el mástil (2) se encuentra una cámara neumática (3) dotada con una válvula de inflado (31).

La cámara neumática (3) presenta una configuración alargada de sección transversal variable, de acorde al espacio dejado por el mástil (2) en el interior del grátil (11). Esta cámara neumática (3) presenta la válvula de inflado (31) en proximidad con el extremo o puño (12) inferior, facilitando el inflado y desinflado.

En una realización la vela puede presentar unos sables flexibles (4) y unos sables con "camber inducer" (5).

Una vez descrita suficientemente la naturaleza de la invención, así como un ejemplo de realización preferente, se hace constar a los efectos oportunos que los materiales, forma, tamaño y disposición de los elementos descritos podrán ser modificados, siempre y cuando ello no suponga una alteración de las características esenciales de la invención que se reivindican a continuación.

REIVINDICACIONES

1. Aparejo para tablas de windsurf, del tipo de los que comprenden una vela (1) de windsurf fijada sobre un mástil (2) mediante un grátil (11) longitudinal definido en su borde anterior, **caracterizado** porque comprende una cámara neumática (3) dotada con una válvula de inflado (31), y conformada en el interior del grátil (11) y operativamente apta para favorecer la flotación de dicho aparejo sobre la superficie del agua y su drizado más ligero durante el inicio de la navegación en el agua.

2. Aparejo, según la reivindicación 1, **caracterizado** porque la válvula de inflado (31) está colocada próxima a un extremo de la cámara neumática (3).

3. Aparejo, según cualquiera de las reivindicaciones anteriores, **caracterizado** porque la cámara neumática (3) presenta una configuración alargada y de sección transversal variable, acorde al espacio dejado por el mástil (2) en el interior del grátil (11).

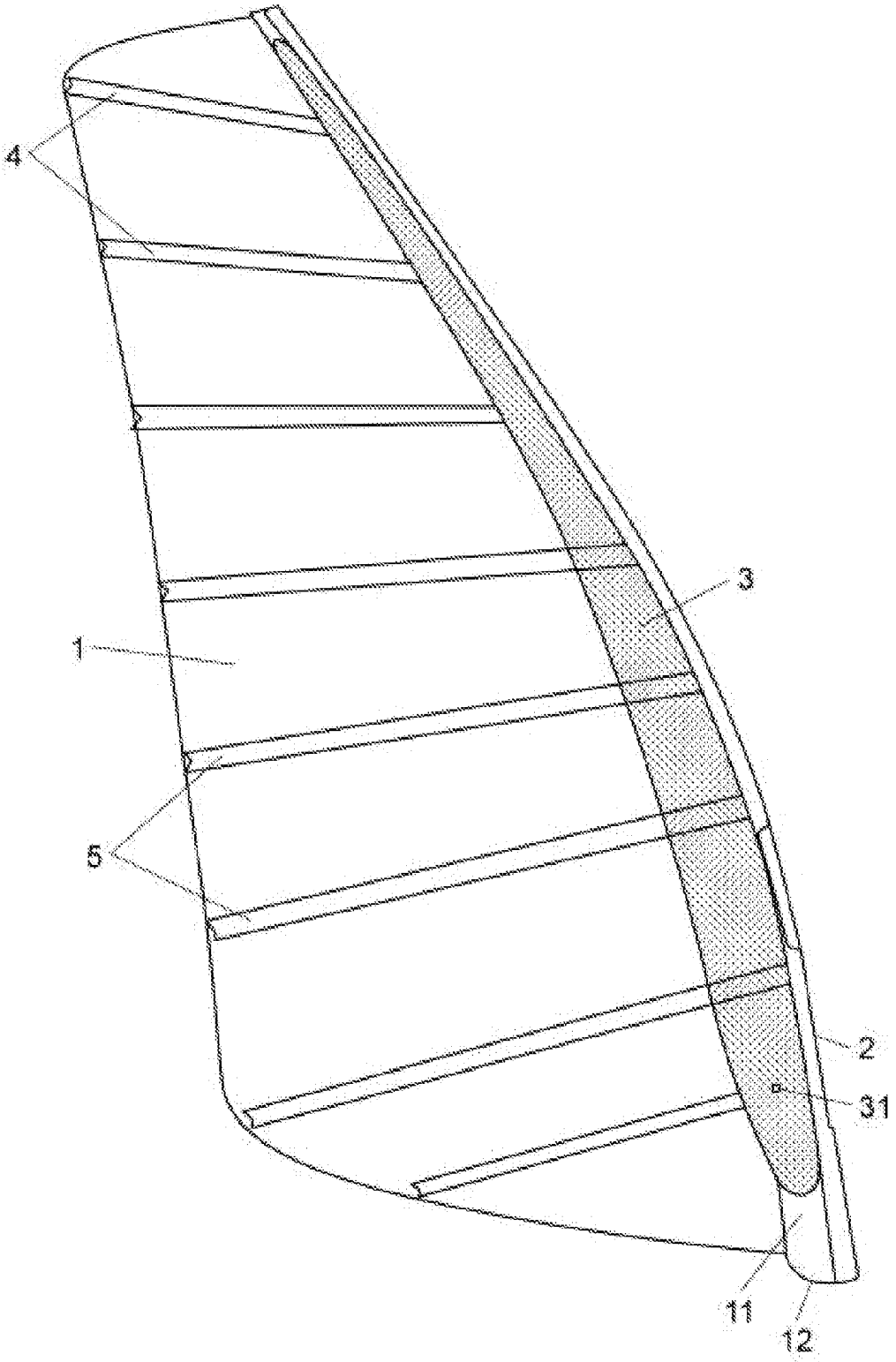

Fig. 1

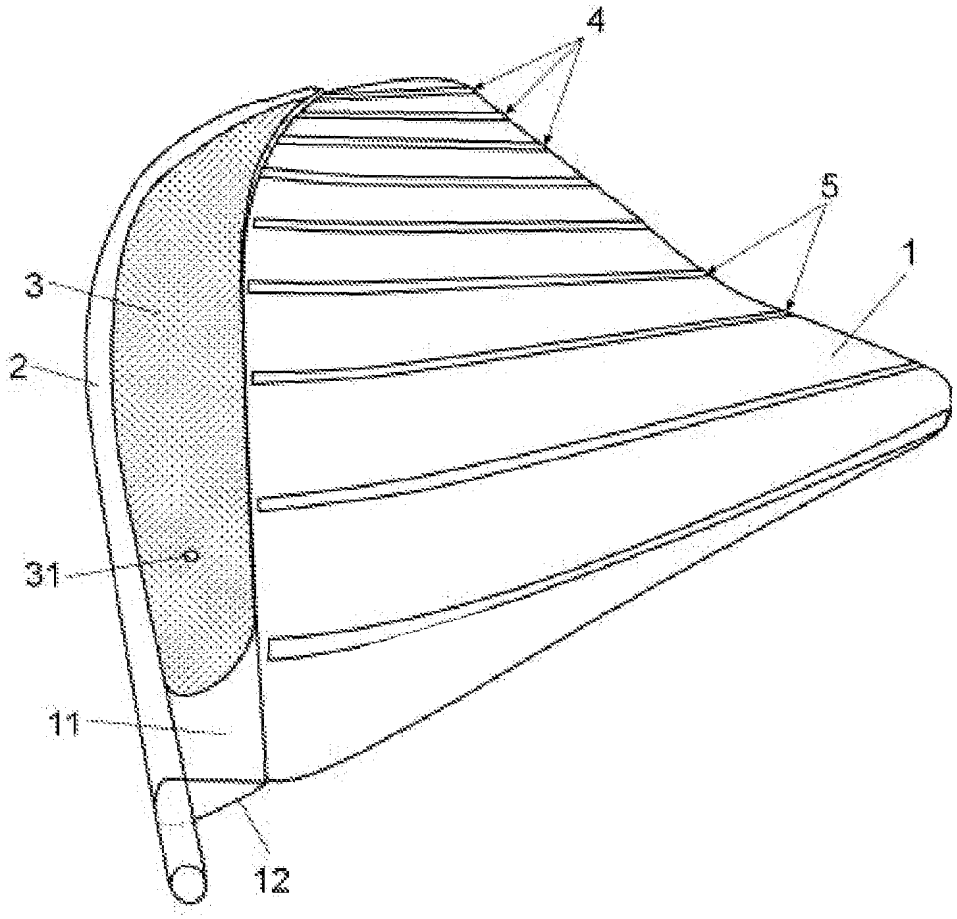

Fig. 2

Espacenet

Bibliographic data: FR2585324 (A1) — 1987-01-30

Sail equipped with flexible linear reinforcement for wind-propelled vehicles, in particular for boats

Inventor(s): EYMARD MICHEL ± (MICHEL EYMARD)

Applicant(s): ZODIAC [FR] ± (ZODIAC)

Classification: **- international:** ***B63H9/06;*** (IPC1-7): B63H9/06
- cooperative: **B63H9/067 (EP); B63H9/0678 (EP)**

Application number: FR19850011332 19850724

Priority number(s): FR19850011332 19850724

Also published as: FR2585324 (B1)

Abstract of FR2585324 (A1)

The sail has at least three attachment points A, B, C intended to connect it to the rigging of the vehicle. The sail comprises at least one flexible linear reinforcement R fixed in a continuous manner to the surface of the sail 1, the two ends of this flexible linear reinforcement interacting mechanically with one or two of the three abovementioned attachment points A, B, C, the modulus of longitudinal elasticity of the material constituting the abovementioned flexible linear reinforcement R being greater than the moduli of elasticity of the material constituting the sail 1 so that the tensioning of the sail 1 by its three attachment points A, B, C and/or by the wind causes the tensioning of the flexible linear reinforcement R, said flexible linear reinforcement having at least one curved part, the radius of curvature of which is selected so as to obtain a desired predetermined distribution of the tensions in the sail 1.

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(60) Références à d'autres documents nationaux apparentés :

(71) Demandeur(s) : *ZODIAC, société anonyme.* — FR.

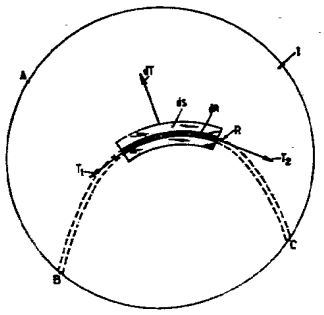
(72) Inventeur(s) : Michel Eymard.

(73) Titulaire(s) :

(74) Mandataire(s) : Cabinet Plasseraud.

(54) Voile équipée d'un renfort linéaire souple pour véhicules à propulsion éolienne, notamment pour embarcations.

(57) La voile présente au moins trois points d'attache A, B, C destinés à la relier au gréement du véhicule. La voile comporte au moins un renfort linéaire souple R fixé de façon continue sur la surface de la voile 1, les deux extrémités de ce renfort linéaire souple coopérant mécaniquement avec un ou deux des trois susdits points d'attache A, B, C, le module d'élasticité longitudinal du matériau constituant le susdit renfort linéaire souple R étant plus grand que les modules d'élasticité du matériau constituant la voile 1 de façon que la mise en tension de la voile 1 par ses trois points d'attache A, B, C et/ou par le vent provoque la mise en tension du renfort linéaire souple R, ledit renfort linéaire souple présentant au moins une partie courbe dont le rayon de courbure est choisi pour obtenir une répartition prédéterminée souhaitée des tensions dans la voile 1.



FR 2 585 324 - A1

Vente des fascicules à l'IMPRIMERIE NATIONALE, 27, rue de la Convention — 75732 PARIS CEDEX 15

L'invention est relative aux voiles pour véhicules à propulsion éolienne, notamment pour embarcations.

On sait que les voiles d'un tel véhicule sont reliées, par au moins trois points d'attache, au gréement du véhicule et que leur rôle est de transmettre les efforts auxquels elles sont soumises à ce gréement.

On sait également que les efforts auxquels est soumise une voile engendrent dans cette voile des tensions dont on connait mal la répartition dans la voile : de ce fait la construction de la voile est rendue difficile et onéreuse.

La présente invention a pour but de simplifier cette construction, de la rendre moins onéreuse, tout en permettant d'obtenir une voile plus performante que celles réalisées jusqu'à ce jour.

Selon l'invention la voile présente au moins trois points d'attache destinés à la relier au gréement du véhicule et elle est caractérisée par le fait qu'elle comporte au moins un renfort linéaire souple fixé de façon continue sur la surface de la voile, les deux extrémités de ce renfort linéaire souple coopérant mécaniquement avec un ou deux des trois susdits points d'attache, le module d'élasticité longitudinal du matériau constituant le susdit renfort linéaire souple étant plus grand que les modules d'élasticité du matériau constituant la voile de façon que la mise en tension de la voile par ses trois points d'attache et/ou par le vent provoque la mise en tension du renfort linéaire souple, ledit renfort linéaire souple présentant au moins une partie courbe dont le rayon de courbure est choisi pour obtenir une répartition prédéterminée souhaitée des tensions dans la voile.

Grâce à cette disposition on constate que lorsque la voile est mise en tension :

- son matériau constitutif se déforme plus que la déformation longitudinale du renfort linéaire souple de sorte que l'essentiel des efforts de tension est transmis au renfort linéaire souple,

- un élément de surface de voile pris au niveau d'un élément de renfort linéaire souple est soumis à une tension élémentaire résultante induite par la variation en grandeur et en orientation des deux tractions opposées s'exerçant sur ledit élément de renfort linéaire souple l'ensemble de ces tensions élémentaires déterminant la répartition prédéterminée souhaitée des tensions dans la voile.

Les deux extrémités du renfort linéaire souple peuvent coopérer mécaniquement directement avec un ou deux des trois points d'attache de la voile, c'est-à-dire aboutir à un ou deux des susdits trois points d'attache.

Les deux extrémités du renfort linéaire souple peuvent également coopérer mécaniquement indirectement avec un ou deux des trois points d'attache de la voile, c'est-à-dire être reliées à un ou deux des susdits trois points d'attache par l'intermédiaire d'un lien de traction.

La partie courbe du renfort linéaire souple peut être une courbe parabolique, la répartion des tensions dans dans la voile étant alors uniforme et orientée parallèlement à l'axe de la parabole.

La partie courbe du renfort linéaire souple peut être une courbe exponentielle (de forme $r = e^{m\theta^2}$, r étant le rayon, m un coefficient et θ l'angle polaire), la répartition des tensions dans la voile étant alors radiale, indépendante de l'angle et linéairement décroissante avec le rayon.

L'invention consiste, mises à part les dispositions dont il vient d'être question, en certaines

autres dispositions qui s'utilisent de préférence en même temps et qui seront plus explicitement décrites ci-après.

L'invention pourra, de toute façon, être bien comprise à l'aide du complément de description qui suit ainsi que des dessins ci-annexés, lesquels complément et dessins sont relatifs à des formes d'exécution préférées de l'invention, supposées appliquées à une embarcation, et ne comportent bien entendu aucun caractère limitatif.

La figure 1 est un schéma expliquant le principe de l'invention.

La figure 2 représente une voile de planche à voile établie suivant une première forme d'exécution de l'invention.

La figure 3 représente une voile type "grand voile" d'un bateau à voile établie suivant une deuxième forme d'exécution de l'invention.

La figure 3a illustre une variante de la forme d'exécution de l'invention représentée sur la figure 3.

La figure 4 représente un spinnaker de bateau à voile établi suivant une troisième forme d'exécution de l'invention.

Sur la figure 1 on a montré schématiquement une voile 1 dont le contour est symbolisé par un cercle et dont les trois points d'attache la reliant au gréement (non représenté) de l'embarcation sont indiqués en A, B et C.

Cette voile 1 comporte un renfort linéaire souple R fixé de façon continue (par exemple cousu ou collé) sur la surface de la voile 1.

Les deux extrémités de ce renfort linéaire souple R coopèrent mécaniquement avec deux des trois points d'attache, les points B et C, en étant reliées directement aux dits points d'attache B et C.

Le module d'élasticité longitudinal du matériau constituant le renfort linéaire souple R est plus grand que les modules d'élasticité du matériau constituant la

voile 1 de façon que la mise en tension de la voile 1 par ses trois points d'attache A, B, C et/ou par le vent provoque la mise en tension du renfort linaire souple R; en effet lorsque la voile 1 est mise en tension son matériau constitutif se déforme plus que la déformation longitudinale du renfort linéaire souple R de sorte que l'essentiel des efforts de tension est transmis au renfort linéaire souple R.

Le renfort linéaire souple R présente au moins une partie courbe dont le rayon de courbure est choisi pour obtenir une répartition prédéterminée souhaitée des tensions dans la voile 1; en effet lorsque la voile 1 est mise en tension un élément de surface dS de voile, pris au niveau d'un élément dR de renfort linéaire souple, est soumis à une tension élémentaire résultante dT induite par la variation en grandeur et en orientation des deux tractions T_1 et T_2 opposées s'exerçant sur ledit élément dR de renfort linéaire souple, l'ensemble de ces tensions élémentaires dT déterminant la répartition prédéterminée souhaitée des tensions dans la voile 1.

Sur les figures 2, 3 et 4 on a représente des voiles 1 de différents types, à savoir,

une voile de planche à voile (figure 2) qui présente une ligne d'attache entre les points d'attache A et B suivant le mât 2 de la planche et un point d'attache C défini par l'extrémité du wishbone 3 de la planche,

une voile 1, la grand voile, d'un bateau (figure 3) qui présente une première ligne d'attache entre les points d'attache A et B suivant le mât 4 du bateau et une seconde ligne d'attache entre les points d'attache B et C suivant la bôme 5 du bateau,

une voile 1, le spinnaker, d'un bateau (figure 4) qui présente trois points d'attache A, B et C.

La voile de planche à voile représentée à la figure 2 comporte deux renforts linéaires souples R_1 et R_2.

Le premier de ces renforts R_1 part du point d'attache A situé en tête du mât 2 et aboutit à un point d'attache M situé entre les points d'attache A et B sur la ligne d'attache AB, et il est fixé sur la voile 1 selon une courbe formée par un segment de parabole d'axe X_1.

Le second de ces renforts R_2 part du point d'attache C défini par l'extrémité du wishbone 3 et aboutit à un point intérieur J relié au point d'attache B situé vers le pied du mât 2 par un lien de traction 6, ce second renfort R_2 étant fixé sur la voile 1 selon une courbe formée par un segment de parabole d'axe X_2 parallèle à l'axe X_1 de la parabole du premier renfort R_1.

Grâce à la présence des deux renforts R_1 et R_2 le champ des tensions dans la voile 1 est alors le suivant :

champ uniforme, figuré par les flèches dT, parallèle à la direction des axes X_1 et X_2 dans la région de la voile comprise entre les points AMJC ;

champ nul dans les deux régions de la voile comprises entre les points MJB et entre les points BJC.

Il est à remarquer qu'au point d'attache A la traction T_A qui s'exerce sur le premier renfort linéaire souple R_1 est supérieure à la traction T_M qui s'exerce sur ce premier renfort linéaire souple R_1 au point d'attache M.

De même la traction T_C qui s'exerce au point d'attache C sur le second renfort linéaire souple R_2 est supérieure à la traction T_J qui s'exerce sur ce second renfort linéaire souple R_2 au point intérieur J et qui est retransmise par le lien de traction 6 au point d'attache B.

La grand voile représentée à la figure 3 comporte deux renforts linéaires souples R_1 et R_2.

Le premier de ces renforts R_1 part du point d'attache A situé en tête du mât 4 et aboutit à un point d'attache M situé entre les points d'attache A et B sur la ligne d'attache AB, et il est fixé sur la voile 1 selon

une courbe formée par un segment de parabole d'axe X_1.

Le second de ces renforts R_2 part du point d'attache C défini par l'extrémité de la bôme 5 et aboutit à un point intérieur J relié au point d'attache B situé vers le pied du mât 4 par un lien de traction 7, ce second renfort R_2 étant fixé sur la voile 1 selon une courbe formée par un segment de parabole d'axe X_2 parallèle à l'axe X_1 de la parabole du premier renfort R_1.

Grâce à la présence des deux renforts R_1 et R_2 le champ des tensions dans la voile est alors le suivant :

champ uniforme, figuré par les flèches dT, parallèle à la direction des axes X_1 et X_2 dans la région de la voile comprise entre les points AMJC ;

champ nul dans les deux régions de la voile comprises entre les points MJB et entre les points BJC.

Il est à remarquer qu'au point d'attache A la traction T_A qui s'exerce sur le premier renfort linéaire souple R_1 est supérieure à la traction T_M qui s'exerce sur ce premier renfort linéaire souple R_1 au point d'attache M.

De même la traction T_C qui s'exerce au point d'attache C sur le second renfort linéaire souple R_2 est supérieure à la traction T_J qui s'exerce sur ce second renfort linéaire souple R_2 au point intérieur J et qui est retransmise par le lien de traction 7 au point d'attache B.

Selon une variante, la grand voile 1 peut comporter un premier renfort R_1 qui part du point d'attache A situé en tête du mât 4 et aboutit à ce même point d'attache A, ce premier renfort R_1 étant fixé sur la voile 1 selon une courbe formée par un segment de courbe exponentielle. Le champ des tensions dans la partie supérieure de la voile 1 est alors un champ radial constant convergeant au point d'attache A, (tension indépendante de l'angle et linéairement décroissante avec le rayon),ce champ radial se trouvant transformé en un champ uniforme parallèle par

la latte 8 qui travaille alors en compression (figure 3a, sur laquelle les mêmes chiffres de référence en désignent les mêmes organes que sur la figure 3).

Le spinnaker représenté à la figure 4 comporte trois renforts linéaires souples R_1, R_2 et R_3.

Le premier de ces renforts R_1 part du point d'attache A et revient à ce point d'attache A et il est fixé sur la voile 1 selon une courbe formée par un segment de courbe exponentielle.

Le deuxième renfort R_2 part du point d'attache B et aboutit à ce même point d'attache B et il est fixé sur la voile 1 selon une courbe formée par un segment de courbe exponentielle.

Le troisième renfort R_3 part du point d'attache C et aboutit à ce même point d'attache C et il est fixé sur la voile 1 selon une courbe formée par un segment de courbe exponentielle.

Grâce à la présence des trois renforts R_1, R_2 et R_3, le champ des tensions dans la voile 1 est alors le suivant :

champ radial constant, (tension indépendante de l'angle et linéairement décroissante avec le rayon) figuré par les flèches dT, convergeant au point d'attache A dans la région de la voile aboutissant au point d'attache A;

champ radial constant, (tension indépendante de l'angle et linéairement décroissante avec le rayon) figuré par les flèches dT, convergeant au point d'attache B dans la région de la voile aboutissant au point d'attache B ;

champ radial constant, (tension indépendante de l'angle et linéairement décroissante avec le rayon) figuré par les flèches dT, convergeant au point d'attache C dans la région de la voile aboutissant au point d'attache C.

Pour des raisons de construction il est possible que certains ou la totalité de ces trois renforts R_1, R_2 et R_3 n'aboutissent pas respectivement aux points d'attache A, B et C, mais soient reliés à ces points

d'attache par des liens de traction.

Finalement et quelque soit la forme d'exécution envisagée on dispose d'un voile dont la construction est plus simple et moins onéreuse que les voiles classiques, et ce notamment en raison de la possibilité d'utiliser un matériau unidirectionnel et souple, ce choix d'un matériauunidirectionnel étant rendu possible grâce au fait que l'on peut obtenir dans la voile, une répartition prédéterminée souhaitée (par exemple uniforme) des tensions; de plus la voile étant constituée en matériau unidirectionnel elle est moins déformable dans le sens de ce matériau.

REVENDICATIONS

1. Voile pour véhicule à propulsion éolienne, notamment pour embarcation, présentant au moins trois points d'attache (A,B,C) destinés à la relier au gréement du véhicule caractérisée par le fait qu'elle comporte au moins un renfort linéaire souple (R, R_1, R_2, R_3) fixé de façon continue sur la surface de la voile (1), les deux extrémités de ce renfort linéaire souple coopérant mécaniquement avec un ou deux des trois susdits points d'attache (A,B-C), le module d'élasticité longitudinal du matériau constituant le susdit renfort linéaire souple (R, R_1, R_2, R_3) étant plus grand que les modules d'élasticité du matériau constituant la voile (1) de façon que la mise en tension de la voile (1) par ses trois points d'attache (A,B,C) et/ou par le vent provoque la mise en tension du renfort linéaire souple (R, R_1, R_2, R_3), ledit renfort linéaire souple présentant au moins une partie courbe dont le rayon de courbure est choisi pour obtenir une répartition prédéterminée souhaitée des tensions dans la voile (1).

2. Voile selon la revendication 1, caractérisée par le fait que le renfort linéaire souple (R, R_1, R_2, R_3) aboutit à son ou ses points d'attache (A,B,C).

3. Voile selon la revendication 1, caractérisée par le fait que le renfort linéaire souple (R, R_1, R_2, R_3) est relié à son ou ses points d'attache (A,B,C) par l'intermédiaire d'au moins un lien de traction (6,7).

4. Voile selon l'une quelconque des revendications 1 à 3, caractérisée par le fait que la partie courbe du renfort linéaire souple (R, R_1, R_2, R_3) est une courbe parabolique.

5. Voile selon l'une quelconque des revendications 1 à 3, caractérisée par le fait que la partie courbe du renfort linéaire souple (R, R_1, R_2, R_3) est une courbe exponentielle.

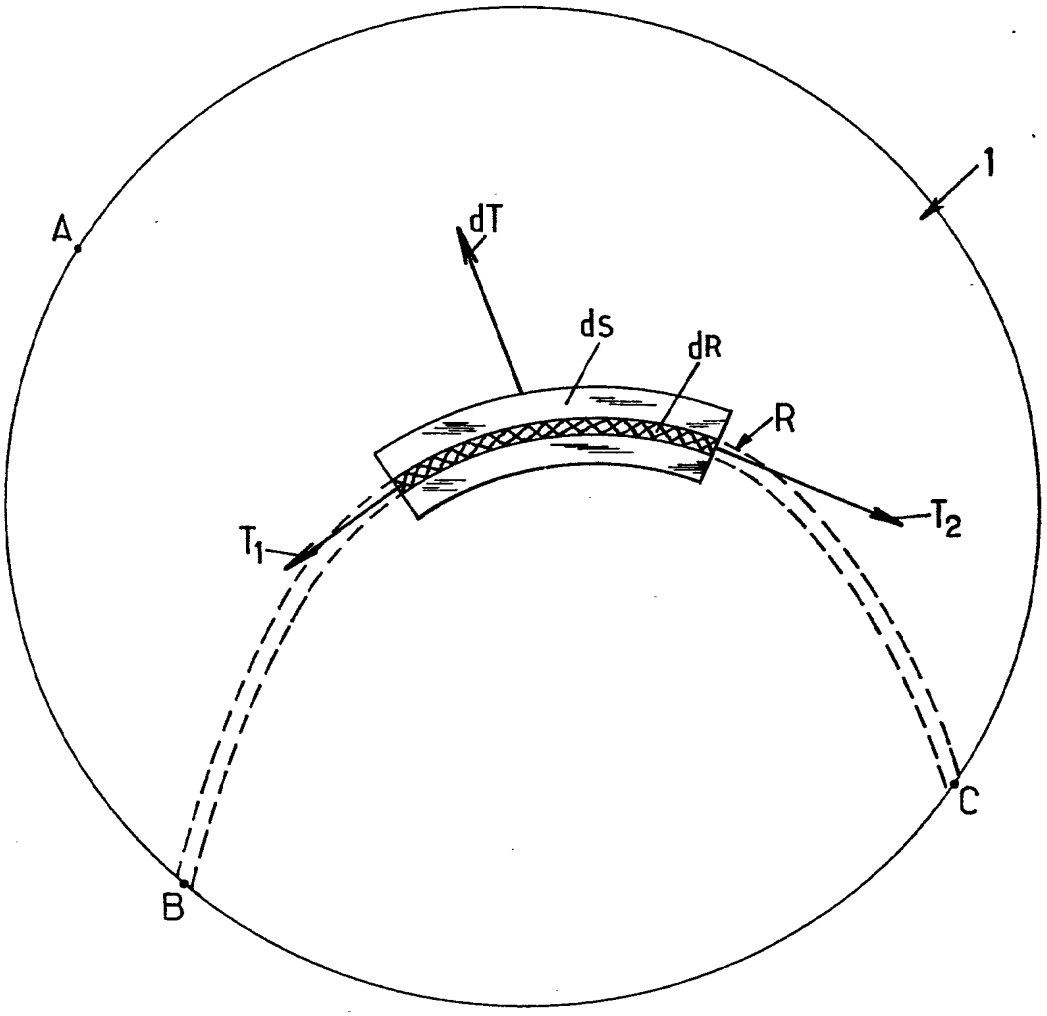


FIG.1.

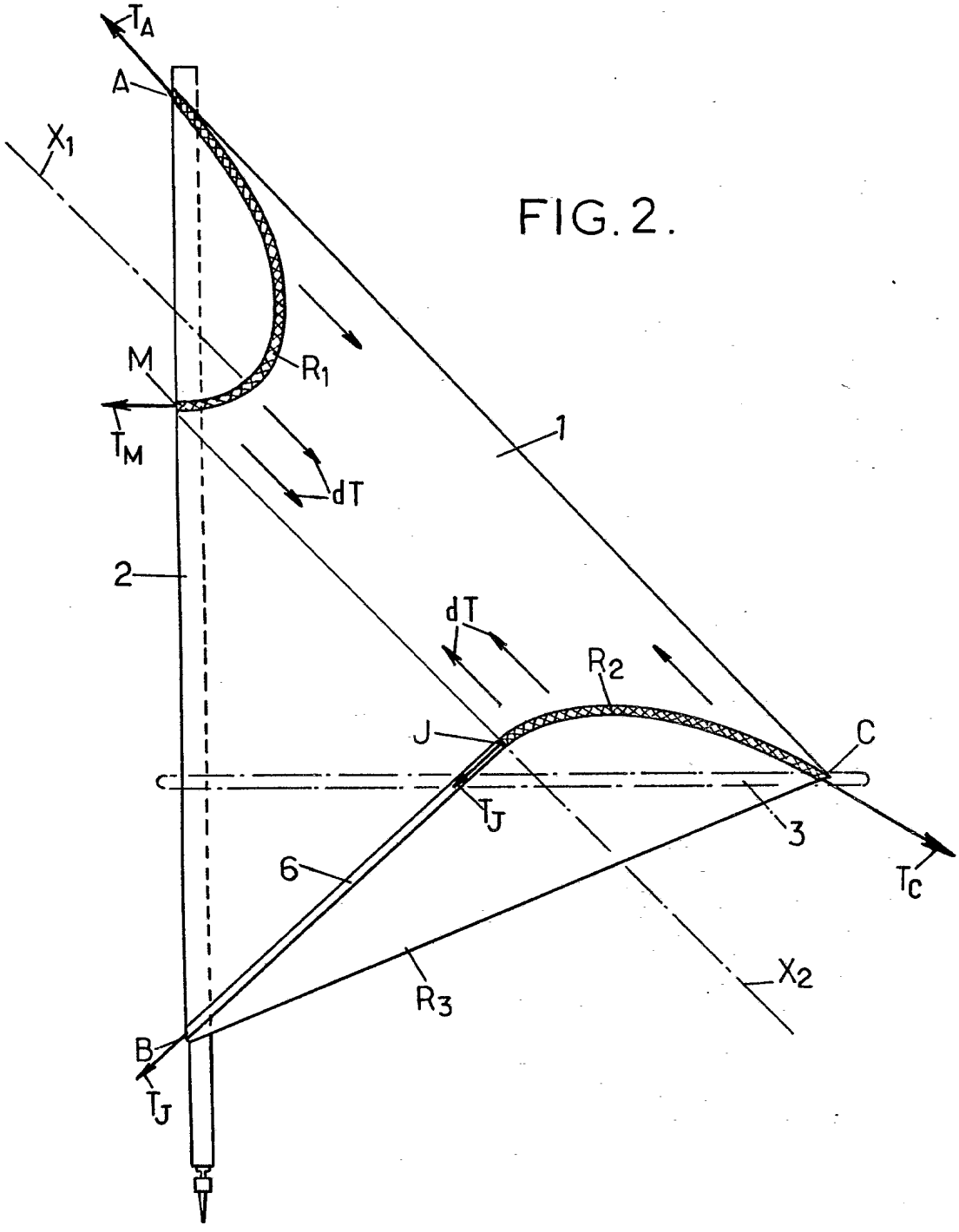


FIG. 2.

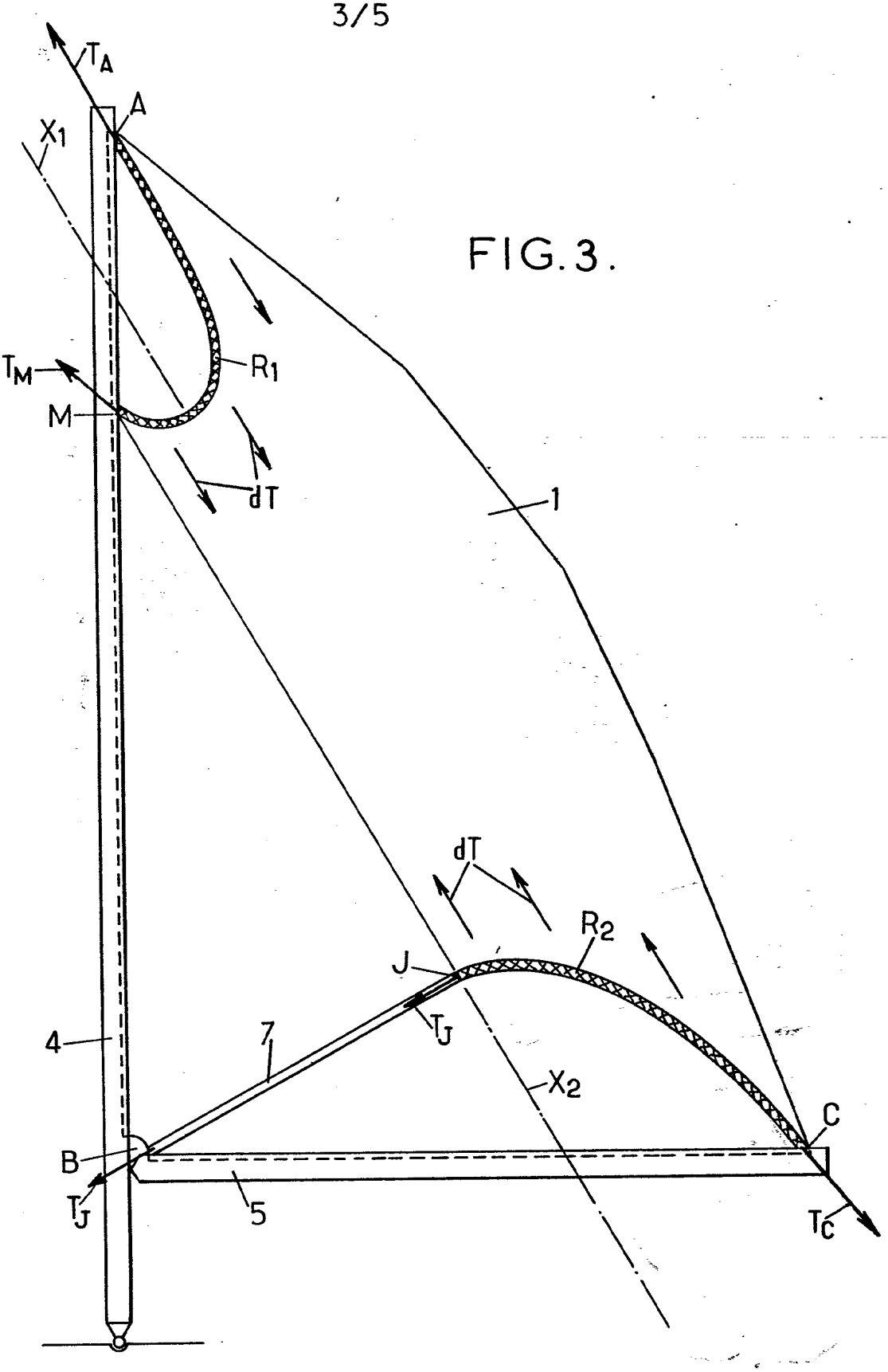


FIG.3.

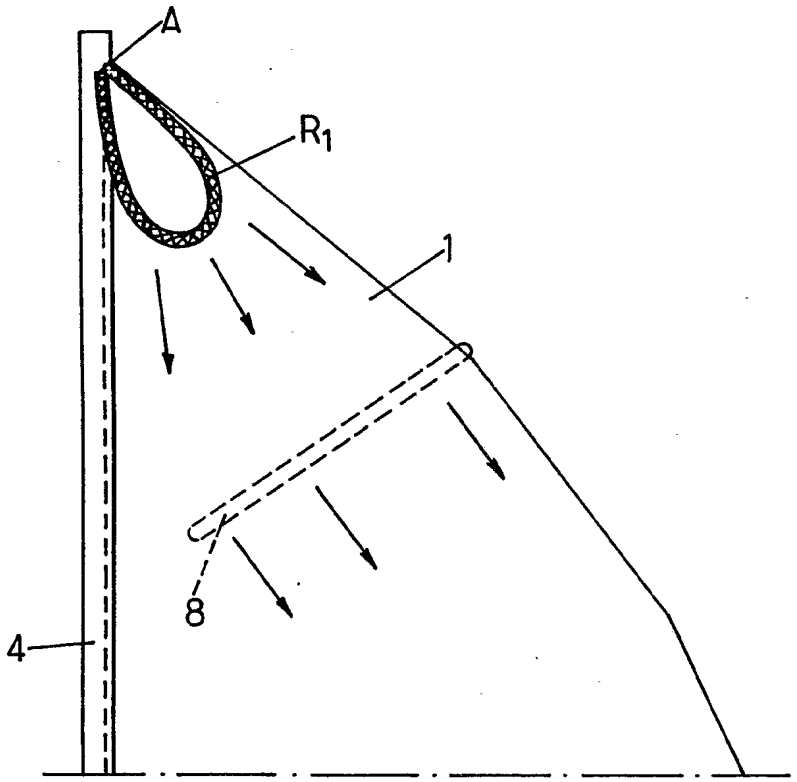


FIG. 3a.

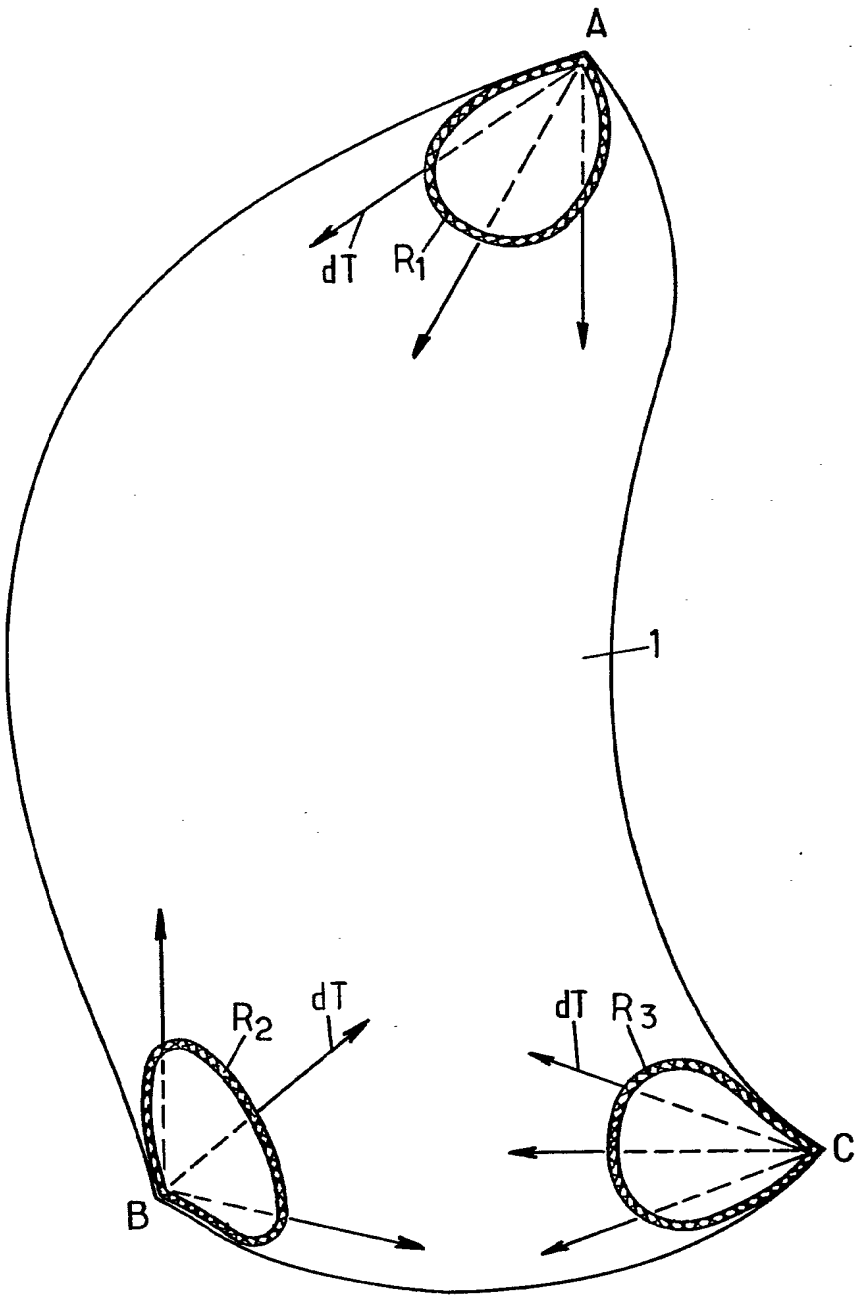


FIG.4.

PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

To:

DENTONS PATENT ATTORNEYS AUSTRALASIA LIMITED
18 Viaduct Harbour Ave
1010 Auckland
New Zealand

PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL SEARCH REPORT AND THE WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY, OR THE DECLARATION

(PCT Rule 44.1)

	Date of mailing *(day/month/year)* 31 March 2022
Applicant's or agent's file reference TNZ003-2002	**FOR FURTHER ACTION** See paragraphs 1 and 4 below
International application No. **PCT/IB2021/061985**	International filing date 17 December 2021
Applicant COLLIE, Stephen James	

1. [X] The applicant is hereby notified that the international search report and the written opinion of the International Searching Authority have been established and are transmitted herewith.

Filing of amendments and statement under Article 19:
The applicant is entitled, if he so wishes, to amend the claims of the international application (see Rule 46):

When? The time limit for filing such amendments is normally two months from the date of transmittal of the international search report.

How? Directly to the International Bureau preferably through ePCT, or on paper to:
The International Bureau of WIPO, 34, chemin des Colombettes, 1211 Geneva 20, Switzerland

For more detailed instructions, see *PCT Applicant's Guide*, International Phase, paragraphs 9.004 – 9.011.

2. [ ] The applicant is hereby notified that no international search report will be established and that the declaration under Article 17(2)(a) to that effect and the written opinion of the International Searching Authority are transmitted herewith.

3. [ ] **With regard to any protest** against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

[ ] the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.

[ ] no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. Reminders

The applicant may **submit comments on an informal basis on the written opinion of the International Searching Authority** to the International Bureau. These comments will be made available to the public after international publication. The International Bureau will send a copy of such comments to all designated Offices unless an international preliminary examination report has been or is to be established.

Shortly after the expiration of **18 months from the priority date, the international application will be published** by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau before the completion of the technical preparations for international publication (Rules 90*bis*.1 and 90*bis*.3).

Within **19 months** from the priority date, but only in respect of some designated Offices, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase **until 30 months** from the priority date (in some Offices even later); otherwise, the applicant must, **within 20 months** from the priority date, perform the prescribed acts for **entry into the national phase** before those designated Offices. In respect of other designated Offices, the time limit of **30 months** (or later) will apply even if no demand is filed within 19 months. For details about the applicable time limits, Office by Office, see www.wipo.int/pct/en/texts/time_limits.html and the *PCT Applicant's Guide*, National Chapters.

Within **22 months from the priority date, the applicant may request that a supplementary international search be carried out** by a different International Searching Authority that offers this service (Rule 45*bis*.1). The procedure for requesting supplementary international search is described in the *PCT Applicant's Guide*, International Phase, paragraphs 8.006-8.032.

Name and mailing address of the ISA/AU	**Authorised officer**
AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA Email address: pct@ipaustralia.gov.au	Dr Arun Sharma AUSTRALIAN PATENT OFFICE (ISO 9001 Quality Certified Service) Telephone No. +61262223642

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference		**FOR FURTHER ACTION**
TNZ003-2002		see Form PCT/ISA/220 as well as, where applicable, item 5 below.
International application No.	International filing date *(day/month/year)*	(Earliest) Priority Date *(day/month/year)*
PCT/IB2021/061985	17 December 2021	17 December 2020

Applicant

COLLIE, Stephen James

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of **5** sheets.

☐ It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**

a. With regard to the **language,** the international search was carried out on the basis of:

☒ The international application in the language in which it was filed.

☐ A translation of the international application into , which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).

b. ☐ This international search report has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43.6*bis*(a)).

c. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2. ☐ **Certain claims were found unsearchable** (See Box No. II).

3. ☐ **Unity of invention is lacking** (See Box No. III).

4. With regard to the **title,**

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract,**

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2, by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regard to the **drawings**,

a. the figure of the **drawings** to be published with the abstract is Figure No. **2**

☒ as suggested by the applicant.

☐ as selected by this Authority, because the applicant failed to suggest a figure.

☐ as selected by this Authority, because this figure better characterizes the invention.

b. ☐ none of the figures is to be published with the abstract.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB2021/061985

A. CLASSIFICATION OF SUBJECT MATTER

B63H 9/06 (2020.01) B63H 8/00 (2020.01)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

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

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

Database (PATENW): IPCs, CPCs B63H9/067/LOW, B63H9/06/LOW, B63H9/04/LOW, B63H8/00/LOW, Keywords (luff, elasticity, varying, material, modulus, strain, thickness, two, different, strain, stiff) and like terms., Espacenet (Worldwide), AusPat & Internal Databases provided by IP Australia: Applicant and inventor name search. Google Patents: (sail, luff, elasticity, varying, material, modulus, strain, thickness) and like terms. Google Search: Keywords (sail, luff, elasticity, varying, material, modulus, thickness, two, different, strain, stiff). Cited and citing prior art for relevant documents.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
	Documents are listed in the continuation of Box C	

[X] Further documents are listed in the continuation of Box C

[X] See patent family annex

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"D" document cited by the applicant in the international application

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
31 March 2022	31 March 2022

Name and mailing address of the ISA/AU

AUSTRALIAN PATENT OFFICE
PO BOX 200, WODEN ACT 2606, AUSTRALIA
Email address: pct@ipaustralia.gov.au

Authorised officer

Dr Arun Sharma
AUSTRALIAN PATENT OFFICE
(ISO 9001 Quality Certified Service)
Telephone No. +61262223642

INTERNATIONAL SEARCH REPORT		International application No.
C (Continuation).	DOCUMENTS CONSIDERED TO BE RELEVANT	**PCT/IB2021/061985**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0375111 A1 (GAASTRA INTERNATIONAL LICENSING N.V.) 27 June 1990 Figure 5; column 5, lines 3-10; column 7, lines 21-34	1, 3-4, 20, 26, 29-30
A	US 4672907 A (SMALE) 16 June 1987 Figures 1-9; Column 1, lines 26-30; Column 2, lines 18-36; Column 2, line 57 - Column 3 line 35	1-30
A	ES 1073250 U (BANARES VILELLA IGNACIO) 25 November 2010 Figures 1, 2; Machine Translation	1-30
A	US 4854255 A (KIEF) 08 August 1989 Figures 1-18; Column 4, lines 6-25; Column 6, line 64-Column 7, line 22; Column 8, line 53-Column 9, line 19	1-30
A	US 6843194 B1 (BAUDET) 18 January 2005 Figures 1-11; Column 4, line 66- Column 5, line 11; Column 5, lines 32 -44, lines 52-67	1-30
A	US 5315948 A (BROWN) 31 May 1994 Figures 1-3; Column 1, lines 38-60; Column 2, lines 20-33; Column 4, lines 40-54	1-30
A	DE 3320321 A1 (MENZ,WOLFGANG,DIPL.-ING) 06 December 1984 Figures; Machine Translation	1-30
A	FR 2585324 A1 (ZODIAC) 30 January 1987 Figures 1-4; Machine Translation	1-30

INTERNATIONAL SEARCH REPORT Information on patent family members	International application No. **PCT/IB2021/061985**

This Annex lists known patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document/s Cited in Search Report		Patent Family Member/s	
Publication Number	**Publication Date**	**Publication Number**	**Publication Date**
EP 0375111 A1	27 June 1990	EP 0375111 A1	27 Jun 1990
US 4672907 A	16 June 1987	US 4672907 A	16 Jun 1987
		AU 2809284 A	22 Nov 1984
		AU 556456 B2	06 Nov 1986
		AU 4917790 A	31 May 1990
		AU 7198987 A	13 Aug 1987
		CA 1250489 A	28 Feb 1989
		DK 240484 A	17 Nov 1984
		EP 0126614 A1	28 Nov 1984
		EP 0126614 B1	27 Jan 1988
		IE 55443 B1	12 Sep 1990
		JP S6127798 A	07 Feb 1986
		NZ 204231 A	20 Feb 1987
		NZ 205302 A	20 Feb 1987
		NZ 205303 A	20 Feb 1987
		ZA 843633 B	24 Dec 1984
ES 1073250 U	25 November 2010	WO 2012045897 A1	12 Apr 2012
US 4854255 A	08 August 1989	US 4854255 A	08 Aug 1989
		EP 0114050 A2	25 Jul 1984
		JP S59192694 A	01 Nov 1984
		JP H078674 B2	01 Feb 1995
US 6843194 B1	18 January 2005	US 6843194 B1	18 Jan 2005
		AU 2004279613 A1	21 Apr 2005
		AU 2004279613 B2	13 Nov 2008
		CA 2541421 A1	21 Apr 2005
		EP 1670681 A1	21 Jun 2006
		EP 1670681 B1	11 Jul 2007
		JP 2007507391 A	29 Mar 2007
		JP 4685781 B2	18 May 2011
		WO 2005035357 A1	21 Apr 2005
US 5315948 A	31 May 1994	US 5315948 A	31 May 1994
DE 3320321 A1	06 December 1984	DE 3320321 A1	06 Dec 1984

Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.

INTERNATIONAL SEARCH REPORT Information on patent family members	International application No. **PCT/IB2021/061985**

This Annex lists known patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document/s Cited in Search Report		Patent Family Member/s	
Publication Number	**Publication Date**	**Publication Number**	**Publication Date**
FR 2585324 A1	30 January 1987	FR 2585324 A1	30 Jan 1987
		FR 2585324 B1	13 Nov 1987

End of Annex

Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.

PATENT COOPERATION TREATY

From the:
INTERNATIONAL SEARCHING AUTHORITY

To:

DENTONS PATENT ATTORNEYS AUSTRALASIA LIMITED
18 Viaduct Harbour Ave
1010 Auckland
New Zealand

PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43*bis*.1)

Date of mailing *(day/month/year)*
31 March 2022

Applicant's or agent's file reference
TNZ003-2002

FOR FURTHER ACTION
See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/IB2021/061985	17 December 2021	17 December 2020

International Patent Classification (IPC) or both national classification and IPC
B63H 9/06 (2020.01) B63H 8/00 (2020.01)

Applicant
COLLIE, Stephen James

1. This opinion contains indications relating to the following items:

- [X] Box No. I — Basis of the opinion
- [ ] Box No. II — Priority
- [ ] Box No. III — Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- [ ] Box No. IV — Lack of unity of invention
- [X] Box No. V — Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement
- [ ] Box No. VI — Certain documents cited
- [ ] Box No. VII — Certain defects in the international application
- [ ] Box No. VIII — Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1*bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA	Date of completion of this opinion	**Authorised Officer**
AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA Email address: pct@ipaustralia.gov.au	31 March 2022	Dr Arun Sharma AUSTRALIAN PATENT OFFICE (ISO 9001 Quality Certified Service) Telephone No. +61262223642

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/IB2021/061985

Box No. I Basis of this opinion

1. With regard to the **language,** this opinion has been established on the basis of:

   [X] The international application in the language in which it was filed

   [ ] A translation of the international application into, , which is the language of a translation furnished for the purposes of international search (under Rules 12.3(a) and 23.1(b)).

2. [ ] This opinion has been established taking into account **the rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(b))

3. [ ] With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing:

   a. [ ] forming part of the international application as filed:

      [ ] in the form of an Annex C/ST.25 text file.

      [ ] on paper or in the form of an image file.

   b. [ ] furnished together with the international application under PCT Rule 13ter.1(a) for the purposes of international search only in the form of an Annex C/ST.25 text file.

   c. [ ] furnished subsequent to the international filing date for the purposes of international search only:

      [ ] in the form of an Annex C/ST.25 text file (Rule 13ter.1(a)).

      [ ] on paper or in the form of an image file (Rule 13ter.1(b) and Administrative Instructions, Section 713).

4. [ ] In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that forming part of the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

5. Additional comments:

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY	International Application No. PCT/IB2021/061985

Box No. V **Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims **2, 4-25, 27-28**	**YES**
	Claims **1, 3, 26, 29-30**	**NO**
Inventive step (IS)	Claims **2, 5-19, 21-25, 27-28**	**YES**
	Claims **1, 3-4, 20, 26, 29-30**	**NO**
Industrial applicability (IA)	Claims **1-30**	**YES**
	Claims **NONE**	**NO**

2. CITATIONS AND EXPLANATIONS:

CITATIONS

D1: EP 0375111 A1 (GAASTRA INTERNATIONAL LICENSING N.V.) 27 June 1990
D2: Document cited in International Search Report only
D3: Document cited in International Search Report only
D4: Document cited in International Search Report only
D5: Document cited in International Search Report only
D6: Document cited in International Search Report only
D7: Document cited in International Search Report only
D8: Document cited in International Search Report only

NOVELTY (N)

Claims 1, 3, 26, 29-30 (NO)

D1 anticipates claims 1, 3, 26, 29 and 30.

D1 (Figure 5; column 5, lines 3-10; column 7, lines 21-34) discloses a sail (30) comprising a head, a tack, and a luff (34) extending between the head and the tack; a luff region (32) extending along the luff; wherein the luff region has a higher degree of elasticity compared to a remainder of the sail (main panel (31) is relatively stiff and luff region made from sail-making material having a high degree of flexibility) (Claim 1).

Claim 3: Sail (31) is main sail (Column 5, lines 31-32).

Claims 26, 29 and 30 – Claims 26, 29 and 30 are not novel when compared to the disclosure of prior art because it is implicit that in carrying out the teaching of D1 , the skilled person would inevitably arrive at a method falling within the terms of the claims, for example, laying out material to form the sail; arranging material in the luff region and curing or sewing the sail to form a cohesive structure and that in the direction along a luff of the sail, the luff region has a higher degree of elasticity than the remainder of the sail and sewing together component pieces of fabric or laminate.

Claims 2, 4-25, 27-28 (YES)

Claims 2, 4-25, 27-28 meet the criteria set forth in PCT Article 33(2) for novelty because none of the individual documents cited above disclose a sail or a method of making sail as defined in these claims.

As explained above for claim 1, D1 discloses a sail (30) comprising a head, a tack, and a luff (34) extending between the head and the tack; a luff region (32) extending along the luff and that the luff region has a higher degree of elasticity compared to a remainder of the sail but D1 does not disclose with regard to claims 2, 4, 5-8, 10-13, 17-19 - the average stiffness of the second material (i.e stiffer material) is in the range of 2 to 25 times higher than the average stiffness of the first material and that the sail is head sail, with regard to claim 9 - an absence of sail fibres, or sailcloth fibres, that extend in a direction parallel, or at least substantially parallel, to the luff in the luff region of the sail, claim 14- the sail includes a third region having an elasticity less than other regions of the sail, claim 20 - the difference in elasticity is achieved by a lesser material thickness in the luff region compared with the remainder of the sail, claim 21- in a luff direction, a ratio of a stiffness of the region outside the luff region and the stiffness of the luff region is in the range of 2-25 times greater, preferably in the range of 10-20 time greater, and more preferably is equal to

about 15 times greater, claim 22- an orientation of a material in the luff region is different from an orientation of a material in the remainder of the sail, claim 23- the luff region does not comprise any carbon fibres oriented within 15degs of parallel to the luff, and wherein the remainder of the sail does comprise carbon fibres oriented within 15degs of parallel to the luff, claim 24- the sail is a twin skin mainsail having two skins defining the sail, claim 25- tensioning the luff region assists to flatten the sail to a greater extent than would be achievable if the luff was of equivalent stiffness to a remainder of the sail and claims 27-29 - the step of laying out material comprises laying out tapes of resin infused fibrous material, laying out fibres glued between sheets of plastic laminate.

Therefore, the subject matter of claims 2, 4-25, 27-28 is new and meets the requirements of PCT Article 33(2) with regard to novelty.

INVENTIVE STEP (IS)

Claims: 1, 3-4, 20, 26, 29-30 (NO)

Claims 1, 3, 26, 29-30 as per novelty as explained above.

Claims: 4, 20

Claim 4: In light of D1, claim 4 cannot provide a patentable inventive step because same configuration can be used for head sail (claim 4).

Claim 20: In light of D1, it is obvious to a person skilled in the art that a that lesser material thickness in the luff region compared with the remainder of the sail would result in difference of elasticity.

Claims: 2, 5-19, 21-25, 27-28 (YES)

The invention defined in claims 1, 2, 5-19, 21-25, 27, 28 meets the criteria set forth in PCT Article 33(3) with regard to the requirement of Inventive Step.

The invention defined by claims 2, 5-19, 21-25, 27-28 is not obvious in the light of any of the cited documents individually nor is it disclosed in any obvious combination of them. It is also considered that a sail or a method of making sail as defined in these claims would not be obvious to a person skilled in the art in light of common general knowledge either by itself or in combination with any of these documents, in particular with regard to claims 2, 5-8, 10-13, 17-19 - the average stiffness of the second material (i.e. stiffer material) is in the range of 2 to 25 times higher than the average stiffness of the first material, with regard to claim 9 - an absence of sail fibres, or sailcloth fibres, that extend in a direction parallel, or at least substantially parallel, to the luff in the luff region of the sail, claim 14- the sail includes a third region having an elasticity less than other regions of the sail, claim 21- in a luff direction, a ratio of a stiffness of the region outside the luff region and the stiffness of the luff region is in the range of 2-25 times greater, preferably in the range of 10-20 time greater, and more preferably is equal to about 15 times greater, claim 22- an orientation of a material in the luff region is different from an orientation of a material in the remainder of the sail, claim 23- the luff region does not comprise any carbon fibres oriented within 15degs of parallel to the luff, and wherein the remainder of the sail does comprise carbon fibres oriented within 15degs of parallel to the luff, claim 24- the sail is a twin skin mainsail having two skins defining the sail, claim 25- tensioning the luff region assists to flatten the sail to a greater extent than would be achievable if the luff was of equivalent stiffness to a remainder of the sail and claims 27-28 - the step of laying out material comprises laying out tapes of resin infused fibrous material, laying out fibres glued between sheets of plastic laminate.

INDUSTRIAL APPLICABILITY (IA)

Claims 1-30 (YES)

The invention defined in the claims is considered to meet the requirements of Industrial Applicability under Article 33(4) of the PCT because it can be made by, or used in, industry.

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27 July 2022

International Searching Authority

RESPONSE TO THE OBJECTIONS CONTAINED IN THE WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AURHORITY
Stephen James Collie
International patent application PCT/IB2021/061985
Dentons ref: TNZ003-2004

We refer to the Written Opinion of the International Searching Authority (WO-ISA) and the objections contained therein.

1. Summary

D1 (EP0375111) fails to disclose a luff region having a higher degree of elasticity compared to a remainder of the sail.

D1 is silent as to the underlying principle and functionality of the sail as claimed in the present application, which resides in the interaction of two areas of the sail, facilitated by a difference in the elasticity of these areas, and instead describes the use of a specific material to prevent a curvature of the sail in two perpendicular directions.

2. The invention

The sail as defined in claim 1 provides an improved way of modifying the shape of a sail in order to react to different wind conditions and directions of sail, while maintaining the conventional mast and rigging design.

This functionality is achieved by the interaction of different areas of the sail which have different degrees of elasticity, and a key feature of the claim is the feature of

F1. the luff region has a higher degree of elasticity compared to a remainder of the sail.

As explained in greater detail in the originally filed description in e.g. paragraph [0086], with reference to Figure 2 which is reproduced below for the examiner's convenience, when the tack of the claimed sail is pulled down at (17), then the material in the luff region, which *has a higher degree of elasticity compared to the remainder of the sail*, is able to translate the applied tensile force into deformation, without bearing much of the load. As a consequence, the load is transferred to the area of greater stiffness (16) outside the luff area, which in turn moves in the direction of a force F pulling the sail to the front (i.e., in a direction of where the luff is in relation to the remainder of the sail), and straightens which results in a reduction of sail camber.

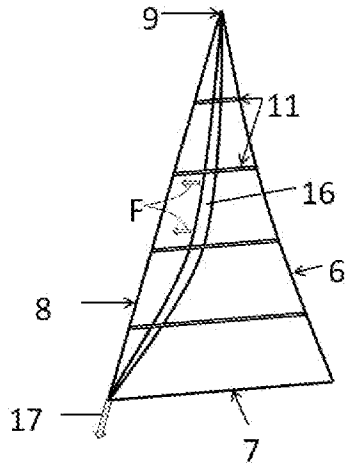


Figure 1: Edited copy of Figure 2 of the present application

As we will show in the following, D1 not only fails to disclose the feature F1, which is why the invention as defined in claim 1 is novel, but is also silent as to the underlying idea, principle, and functionality of the claimed sail, which as mentioned above resides in the interaction of two areas of the sail having different degrees of elasticity, and therefore cannot render the invention obvious.

3. Novelty

Contrary to the assessment expressed in the WO-ISA, the invention as defined in claim 1 is novel over D1 in that D1 fails to disclose at least the feature F1 defined above.

In the WO-ISA, it is alleged that the luff region of the sail disclosed in D1 has a *higher degree of elasticity compared to a remainder of the sail*. To support this finding, the WOI-ISA contains the statement that *the main panel (31) [of the sail of D1] is relatively stiff and luff region made from sail-making material having a high degree of flexibility.*

We respectfully submit that the disclosure of D1 that the luff area of the sail disclosed therein has a "high degree of flexibility" compared to the main panel does not amount to a disclosure of the feature F1 which refers to "a higher degree of elasticity" of the luff area compared to the remainder of the sail.

The reason for this is that a material with "*high elasticity*" is understood as a material that undergoes a high amount of deformation under load, while "*flexible*" refers to the characteristic of a material to be bendable, i.e. to adapt to a curved shape. In D1, the term "*flexible*" is used in an even more specific sense and is meant to express that the material is able to *adapt a curved shape in two perpendicular directions*.

We will briefly explain these implications in the following.

As set out in D1, the sail disclosed therein employs areas of roach which are made of a sheet material which

> "*is a synthetic plastics film having the characteristic that it* ***resists simultaneous bending*** *about two planes which are each transverse to the other. Materials of this kind are generally quite rigid or stiff so that they would not normally be considered suitable for sail making*".
>
> (cf. col.3, l.38 onwards, emphasis added)

D1 also details that

> "*the sheet material must have the characteristic that it is less "floppy" than conventional sail making material and behaves like a sheet of paper when curved i.e. it tends to* ***resist curvature*** *in a direction transverse to the first direction of curvature. The present invention has significant advantages over conventional sails in that it* ***eliminates the need for individual battens*** *and batten pockets to support areas of roach, thereby providing a substantial saving in the weight of the sail*".
>
> (cf. col.3, l. 55 onwards, emphasis added)

As will be understood in the light of the above-cited passages, the main panel (31) of the sail disclosed in D1 is designed to **resist bending** in two perpendicular planes. The purpose of this configuration is to allow the sail in the area of the main panel to retain its shape also in the absence of battens (cf. col. 4, l.5 onwards). This is the important feature of the sail disclosed in D1, or of the material used to build the sail, as it solves the technical problem of omitting the battens and batten pockets.

In contrast thereto, in order to allow for a simple insertion of the mast into a pocket in the luff region, the luff region of the sail of D1 is

> *"made from conventional sailmaking material having a* ***high degree of flexibility*** *as compared to the sheet material used in the areas of roach."*
>
> (col. 5, l.3 onwards, emphasis added)

In another instance D1 recites that

> *"[t]he luff panel 32 is comprised of a laminate of a woven material and a plastics sheet material of conventional construction such that the luff panel 32 has all of the characteristics of conventional sail making material in that it is impervious to air,* ***is very flexible****, strong and relatively light-weight."*
>
> (col. 7, l.28 onwards, emphasis added)

It is obvious that the term "flexible" is used in D1 to contrast the bending behaviour of the material in the luff region to the bending behaviour of the material in the main panel of the sail. While the material in the main panel resists bending in two planes and therefore eliminates the need to use battens, the luff region is flexible so that the mast can easily and safely be inserted in the luff pocket.

It must therefore be noted that in D1, the terms "bending resistance" and "flexible" are used in a very specific sense, wherein "bending resistance" refers to a material's ability to withstand bending in one direction once a curved shape in a direction perpendicular thereto is established, and "flexible" simply denotes the absence of this property.

We therefore submit that the term "flexible" as used in D1 does not reflect or imply any characteristics of the luff material regarding its elasticity, and clearly cannot be interpreted as disclosing the feature F1 of claim 1 according to which *the luff region has a higher degree of elasticity compared to a remainder of the sail*.

Claim 1 is therefore novel over D1.

4. Inventive step

D1 does not render the subject-matter of claim 1 obvious, for the following reasons.

It has been explained in section 1 above that the sail defined in claim 1 achieves a shift of the sail's position of camber when tension is applied between the head and the tack of the sail, as a result of the luff region having a higher degree of elasticity compared to the remainder of the sail. It is important to note that it is the relative distribution of elasticity between the luff region and the remainder of the sail that enables the sail according to the invention to favourably provide this additional means of sail trim which has not been known before the disclosure of the invention.

In contrast thereto, the sail disclosed in D1 does not take advantage of any such difference in sail material properties, let alone difference in elasticity, to achieve an effect in relation to the trim of the sail. Rather differently, the principle or idea disclosed in D1 resides in the sail being able to assume a convex, part-cylindrical curved shape due to the use of sheet material (e.g. col.3, l.22-37) and in the absence of battens.

D1 also discloses that in principle for the sail to achieve the beneficial effects,

> "*[…] the sheet material can be used to constitute* ***the whole of the sail*** *and in many instances it may not even be necessary to provide separate panels and the like which would otherwise have to be joined together by sewing or bonding, so that effectively the sail can be made of one piece or material without having joints.*"
>
> (col. 4, l.52 onwards, emphasis added)

In other words, for the sail of D1 to work as intended it does not matter what material the luff region is made of, and the inventive idea to make use of different material properties in specific areas of the sail in order to create an additional tool to adjust sail trim is completely absent in D1. As mentioned in e.g. col. 5, l.40 onwards, the reason why a flexible material may be used for the luff pocket resides solely in ease of rigging, i.e. is present for the user's convenience when setting up the sail.

It is hence apparent that D1 does not at all incite the skilled person to look into material pairings where the material used for *the luff region has a higher degree of elasticity compared to a remainder of the sail*, as stipulated in claim 1.

According to a further aspect, D1 teaches that

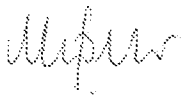
> *"[t]he luff panel 32 is comprised of a lamination of a woven material and a plastics sheet material of conventional construction such that the luff panel 32 has all of the characteristics of conventional sail making material in that it is impervious to air, is very flexible,* ***strong*** *and relatively light-weight.*"
>
> (col. 7, l.28 onwards, emphasis added)

We hold that this passage effectively prevents the skilled person from modifying the sail disclosed in D1 to employ a material for the luff region which exhibits *a higher degree of elasticity than a remainder of the sail* as stipulated in claim 1, since it teaches the skilled person that high levels of force must be transferred by the luff region, which is why a strong material is to be used. The characteristic "strong" is usually used for materials which are able to bear high levels of force without undergoing high levels of deformation.

Accordingly, D1 is not only silent about the underlying concept of the sail defined in D1, but also teaches the skilled person away from modifying the sail of D1 to include the distinguishing features of claim 1.

The subject-matter of claim 1 must therefore be considered as being based on the exercise of inventive skill.

Yours sincerely



Dr Sebastian Moeller
Associate, Patent Attorney

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PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference TNZ003-2002	**FOR FURTHER ACTION** See Form PCT/IPEA/416	
International application No. **PCT/IB2021/061985**	International filing date *(day/month/year)* 17 December 2021	Priority date *(day/month/year)* 17 December 2020

International Patent Classification (IPC) or national classification and IPC

B63H 9/067 (2020.01) B63H 9/068 (2020.01)

Applicant

COLLIE, Stephen James

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of **5** sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
   a. [X] a total of **5** sheets, as follows:
      - [X] sheets of the description, claims and/or drawings which have been amended and/or sheets containing rectifications authorized by this Authority, unless those sheets were superseded or cancelled, and any accompanying letters (see Rules 46.5, 66.8, 70.16, 91.2, and Section 607 of the Administrative Instructions).
      - [ ] sheets containing rectifications not taken into account by this Authority because they were not available at the time when this Authority began to draw up this report, and any accompanying letters (Rules 66.4*bis*, 70.2(e), 70.16 and 91.2).
      - [ ] Superseded sheets and any accompanying letters, where this Authority either considers that the superseding sheets contain an amendment that goes beyond the disclosure in the international application as filed, or the superseding sheets were not accompanied by a letter indicating the basis for the amendments in the application filed, as indicated in item 4 of Box No. I and the Supplemental Box (see Rule 70.16(b)).

   b. [ ] a separate electronic file containing a sequence listing *(sent to the International Bureau only)*.
4. This report contains indications relating to the following items:

[X]	Box No. I	Basis of the report
[ ]	Box No. II	Priority
[ ]	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
[ ]	Box No. IV	Lack of unity of invention
[X]	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement
[ ]	Box No. VI	Certain documents cited
[ ]	Box No. VII	Certain defects in the international application
[X]	Box No. VIII	Certain observations on the international application

Date of submission of the demand	Date of completion of this report
27 July 2022	15 September 2022
Name and mailing address of the IPEA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA Email address: pct@ipaustralia.gov.au	**Authorised officer** Arun Sharma AUSTRALIAN PATENT OFFICE (ISO 9001 Quality Certified Service) Telephone No. +61 2 6222 3642

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/IB2021/061985

Box No. I Basis of the report

1. With regard to the **language**, this report has been established on the basis of:

[X] The international application in the language in which it was filed:

[ ] A translation of the international application into , which is the language of a translation furnished for the purposes of :

[ ] international search (under Rules 12.3(a) and 23.1 (b)).

[ ] publication of the international application (under Rule 12.4(a)).

[ ] international preliminary examination (Rules 55.2(a) and/or 55.3(a) and (b)).

2. With regard to the **elements** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

[X] the international application as originally filed/furnished, or

[ ] the description: pages , as originally filed/furnished

pages , received by this Authority on with the letter of

[ ] the claims: Nos. , as originally filed/furnished

Nos. , as amended (together with any statement) under Article 19,

Nos. , received by this Authority on with the letter of

[ ] the drawings: pages , as originally filed/furnished

pages , received by this Authority on with the letter of

[ ] a sequence listing - see Supplemental Box Relating to Sequence Listing.

3. [ ] The amendments have resulted in the cancellation of:

[ ] the description, pages

[ ] the claims, Nos.

[ ] the drawings, sheets/figs

[ ] the sequence listing (specify):

4. [ ] This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since either they are considered to go beyond the disclosure as filed, or they were not accompanied by a letter indicating the basis for the amendments in the application as filed, as indicated in the Supplemental Box (Rules 70.2(c) and (*c-bis*)):

[ ] the description, pages

[ ] the claims, Nos.

[ ] the drawings, sheets/figs

[ ] the sequence listing (specify):

5. [ ] This report has been established:

[ ] taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rules 66.1(d-*bis*) and 70.2(e)).

[ ] without taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rules 66.4*bis* and 70.2(e)).

6. With regard to top-up searches (Rules 66.1*ter* and 70.2(f)):

[X] A top-up search was carried out by this Authority on 25 August 2022.

[ ] Additional relevant documents have been discovered during the top-up search.

[ ] No top-up search was carried out by this Authority because it would serve no useful purpose.

7. [ ] Supplementary international search report(s) from Authority(ies) has/have been received and taken into account in establishing this report (Rule 45*bis*.8(b) and (c)).

** If item 4 applies, some or all of those sheets may be marked "superseded."*

Box No. V **Reasoned statement under Article 35(2) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims **1-30**	**YES**
	Claims **NONE**	**NO**
Inventive step (IS)	Claims **1-30**	**YES**
	Claims **NONE**	**NO**
Industrial applicability (IA)	Claims **1-30**	**YES**
	Claims **NONE**	**NO**

2. CITATIONS AND EXPLANATIONS:

CITATIONS

D1: EP 0375111 A1 (GAASTRA INTERNATIONAL LICENSING N.V.) 27 June 1990
D2: US 4672907 A (SMALE) 16 June 1987
D3: ES 1073250 U (BANARES VILELLA IGNACIO) 25 November 2010
D4: US 4854255 A (KIEF) 08 August 1989
D5: US 6843194 B1 (BAUDET) 18 January 2005
D6: US 5315948 A (BROWN) 31 May 1994
D7: DE 3320321 A1 (MENZ,WOLFGANG,DIPL.-ING) 06 December 1984
D8: FR 2585324 A1 (ZODIAC) 30 January 1987
D9: GB 2194499 A (THE ADRENALIN COMPANY LIMITED) 09 March 1988

NOVELTY (N)
Claims 1-30 (YES)

Claims 1-30 meet the criteria set forth in PCT Article 33(2) for novelty because none of the individual documents cited above disclose a sail as defined.

D1 is the closest prior art. Regarding claim 1, D1 ((Figure 5; column 5, lines 3-10; column 7, lines 21-34)) discloses sail (30) comprising a head, a tack, and a luff (34) extending between the head and the tack and a luff region (32) extending along the luff but does not disclose that the luff region has a higher degree of elasticity compared to a remainder of the sail (31). Regarding claim 25, D1 fails to disclose that the degree of elasticity of the luff region and the degree of elasticity of a region of the sail adjacent the luff region are configured such that, when the sail is mounted to a sailing boat, tensioning the luff region assists to flatten the sail to a greater extent than would be achievable if the luff was of equivalent stiffness to a remainder of the sail and regarding claim 26, D1 fails to disclose that arranging material in a luff region of the sail and in the remainder of the sail such that in the direction of the luff, the luff region has a higher degree of elasticity compared to the remainder of the sail. Therefore, the subject matter of claims 1, 25 and 26 is new and meets the requirements of PCT Article 33(2) with regard to novelty.

The appended claims 2-24 and 27-30 define further features to those defined in claim 1 and 26 respectively. Therefore, the subject matter of claims 2-24 and claims 27-30 is also new and meets the requirements of PCT Article 33(2) with regard to novelty

INVENTIVE STEP (IS)

Claims 30 (YES)

Claims 1-30 meet the criteria set forth in PCT Article 33(3) with regard to the requirement of Inventive Step.

The invention defined by claims 1, 25 and 26 is not obvious in the light of any of the cited documents individually nor is it disclosed in any obvious combination of them. It is also considered that a sail, or method of making a sail as defined would not be obvious to a person skilled in the art in light of common general knowledge either by itself or in combination with any of these documents, in particular with regard to claim 1 – that the luff region has a higher degree of elasticity compared to a remainder of the sail (31), claim 25 - the degree of elasticity of the luff region and the degree of elasticity of a region of the sail adjacent the luff region are configured such that, when the sail is mounted to a sailing boat, tensioning the luff region assists to flatten the sail to a greater extent than would be achievable if the luff was of equivalent stiffness to a remainder of the sail and regarding claim 26 -

arranging material in a luff region of the sail and in the remainder of the sail such that in the direction of the luff, the luff region has a higher degree of elasticity compared to the remainder of the sail. Therefore, the subject matter of claims 1, 25 and 26 is not obvious and meets the requirements of PCT Article 33(3) with regard to inventive step.

Claims 2-24 and 27-30 depend on claims 1 and 26 respectively and add further aspects of inventive concept. Therefore, the subject matter of claims 2-24 and 27-30 is also not obvious and meets the requirements of PCT Article 33(3) with regard to inventive step.

INDUSTRIAL APPLICABILITY (IA)
Claims 1-30 (YES)

The invention defined in the claims 1-30 is considered to meet the requirements of Industrial Applicability under Article 33(4) of the PCT because it can be made by, or used in, industry.

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY	International application No.
	PCT/IB2021/061985
Box No. VIII Certain observations on the international application	

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

1. Description (Paragraph [0086]) describes " a luff tensioner 17" but Figure 2 does not depict it.

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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
18/211,036	06/16/2023		3300	to be advised	30	4

CONFIRMATION NO. 2954

193853
Bryan Cave Leighton Paisner LLP (DC)
1155 F Street NW
Washington, DC 20004-1357

FILING RECEIPT

OC000000059139811

Date Mailed: 07/11/2023

Receipt is acknowledged of this non-provisional utility 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 FIRST INVENTOR, 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 corrected Filing Receipt, including a properly marked-up ADS showing the changes with strike-through for deletions and underlining for additions. If you received a "Notice to File Missing Parts" or other Notice requiring a response for this application, please submit any request for correction 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 provided that the request is grantable.

Inventor(s)

Stephen James COLLIE, Auckland, NEW ZEALAND;

Applicant(s)

Team New Zealand Limited, Auckland, NEW ZEALAND;

Power of Attorney: None

Domestic Priority data as claimed by applicant

This application is a CON of PCT/IB2021/061985 12/17/2021
which claims benefit of 63/127,127 12/17/2020

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.

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: Yes

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 07/07/2023

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 18/211,036**

Projected Publication Date: To Be Determined - pending completion of Corrected Papers.

Non-Publication Request: No

Early Publication Request: No
Title

SAIL STRUCTURE

Preliminary Class

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

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

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The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

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PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 18/211,036

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	320
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	700
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	800
TOTAL CLAIMS (37 CFR 1.16(i))	30 minus 20 =	* 10			OR	x 100 =	1000
INDEPENDENT CLAIMS (37 CFR 1.16(h))	4 minus 3 =	* 1				x 480 =	480
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
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	2300

APPLICATION AS AMENDED - PART II

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT A	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))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE($)	ADDITIONAL FEE($)	OR	RATE($)	ADDITIONAL FEE($)
AMENDMENT B	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))									
	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	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
18/211,036	06/16/2023	Stephen James COLLIE	to be advised

CONFIRMATION NO. 2954

193853
Bryan Cave Leighton Paisner LLP (DC)
1155 F Street NW
Washington, DC 20004-1357

FORMALITIES LETTER

OC000000059139833

Date Mailed: 07/11/2023

NOTICE TO FILE CORRECTED APPLICATION PAPERS

Filing Date Granted

An application number and filing date have been accorded to the above-identified nonprovisional application. The application is informal since it does not comply with the regulations for the reason(s) indicated below. Applicant is given **TWO MONTHS** from the date of this Notice within which to file all required items below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

- **Drawing Items**

  The drawings submitted on 06/16/2023 are not acceptable because:
  - Figure(s) 12a-b have text (e.g. reference characters, sheet numbers, and view numbers) that is illegible. Figure text must be plain and legible. See 37 CFR 1.84(1) and (p)(1). Replacement drawing sheets containing legible text in compliance with 37 CFR 1.84 and 1.121(d) are required.

Replies must be received in the USPTO within the set time period or must include a proper Certificate of Mailing or Transmission under 37 CFR 1.8 with a mailing or transmission date within the set time period. For more information and a suggested format, see Form PTO/SB/92 and MPEP 512.

Replies should be addressed to:

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/llvuong/

TO: DCIPDocketing@bclplaw.com
FROM: noreply@uspto.gov
CC: patentcenter_eofficeaction@uspto.gov
SUBJECT: USPTO: Patent Electronic System - Correspondence Notification for Customer Number 193853

Tue Jul 11 05:17:25 EDT 2023

Dear Patent Center Customer:

Correspondence Address:

Bryan Cave Leighton Paisner LLP (DC)
1155 F Street NW
Washington,DISTRICT OF COLUMBIA,20004-1357
UNITED STATES

This is a courtesy notification regarding the following USPTO patent application(s) associated with your Customer Number, 193853, that have new outgoing correspondence. This correspondence is now available for viewing in Patent Center.

The official date of notification of the outgoing correspondence will be indicated on the form (e.g., PTOL-90) accompanying the correspondence.

Disclaimer:
The list of documents shown below are provided as a courtesy and is not part of the official file wrapper. The content of the images shown in the Image File Wrapper is the official record.

Application	Document	Mailroom Date	Attorney Docket No.
18211036	APP.FILE.REC	07/11/2023	to be advised
18211036	NT.CR.APP.PA	07/11/2023	to be advised

To view your correspondence online, please sign in to Patent Center and then select Workbench/View correspondence. To update your email address(es), select Manage/Manage customer numbers.

If you have any questions, please contact the Patent Electronic Business Center (EBC) at ebc@uspto.gov or 866-217-9197 Monday – Friday, 6 a.m. to midnight ET.

Please do not reply to this email as it was sent from an unmonitored mailbox.

Sincerely,

The Patent Center Team

Electronic Acknowledgement Receipt

EFS ID:	48321671
Application Number:	18211036
International Application Number:	
Confirmation Number:	2954
Title of Invention:	SAIL STRUCTURE
First Named Inventor/Applicant Name:	Stephen James COLLIE
Customer Number:	193853
Filer:	Bruce B. Vance
Filer Authorized By:	
Attorney Docket Number:	to be advised
Receipt Date:	19-JUL-2023
Filing Date:	16-JUN-2023
Time Stamp:	18:07:22
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Preliminary Amendment	2nd_PreAmd_for_TeamNZ_finalized.pdf	161342 82866a108aac3aa2f053df3828f7cd72ed9180be	no	7

Warnings:

Information:	
Total Files Size (in bytes):	161342

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.

Docket No.: to be advised

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of: Stephen James COLLIE	Customer No.: 193853
Application No.: 18/211,036	Confirmation No.: 2954
Filed: June 16, 2023	Art Unit: TBA
For: SAIL STRUCTURE	Examiner: TBA

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

SECOND PRELIMINARY AMENDMENT

Dear Sir:

Prior to examination on the merits, please amend the above-identified U.S. patent application as follows.

Amendments to the Claims begin on page **2** of this paper.

Remarks begin on page 7 of this paper.

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims

1. (*Currently Amended*) A sail, comprising:

a head,

a tack, [[and]]

a luff extending between the head and the tack; and

a luff region extending along the luff;

wherein the luff region has a higher degree of elasticity compared to a remainder of the sail.

2. (*Currently Amended*) The sail of claim 1, ~~comprising~~ wherein ~~at least two different materials being a first material in~~ the luff region of the sail includes a first material and a ~~second material that defines the~~ remainder of the sail includes at least a second material,

wherein the first material and the second material are different, and

wherein [[the]] an average stiffness of the second material ~~(i.e stiffer material)~~ is in [[the]] a range of ~~2 to 25~~ 2–20 times higher than [[the]] an average stiffness of the first material.

3. (*Currently Amended*) The sail of claim 1, wherein the sail is a mainsail.

4. (*Currently Amended*) The sail of claim 1, wherein the sail is a headsail.

5. (*Currently Amended*) The sail of claim 2, wherein the first material has a failure strain of at least about 2.5% to about 30%.

6. (*Currently Amended*) The sail of claim 2, wherein the first material has a failure strain of at least about 2 to about 10 times the failure strain of the second material.

7. (*Currently Amended*) The sail of claim 2, wherein the first material has an average Young's Modulus of about 1 to about 60 GPa.

8. (*Currently Amended*) The sail of claim 2, wherein the first material has an average elasticity that is at least about 100% to about 2400% higher than an average elasticity of the second material.

9. (*Currently Amended*) The sail of claim 1, wherein there is an absence of sail fibres, or sailcloth fibres, that extend in a direction parallel, or at least substantially parallel, to the luff in the luff region of the sail.

10. (*Currently Amended*) The sail of claim 7, wherein there are sail fibres, or sailcloth fibres, in the luff region of the sail, the sail fibres, or sailcloth fibres, extending in a line that leaves an angle of greater or equal than about 15 degrees free from fibres relative to a direction parallel to the luff of the sail.

11. (*Currently Amended*) The sail of claim 2, wherein the first material extends at least 50% to about 95% of [[the]] a distance between the head and the tack of the sail.

12. (*Currently Amended*) The sail of claim 2, wherein the first material extends up to about 10% to about 50% of [[the]] a width of the sail towards [[the]] a leech of the sail.

13. (*Currently Amended*) The sail of claim 10, wherein the first material extends towards [[the]] a leech of the sail to a greater extent in the middle of the sail [[(]]relative to [[the]] a height of the sail[[)]] compared to the luff regions towards the head and the tack of the sail.

14. (*Currently Amended*) The sail of claim 1, wherein the sail includes a third region having an elasticity less than other regions of the sail ~~(i.e. the luff region and the remainder of the sail)~~, this third region extending along at least a portion of [[the]] a margin of the luff region between the luff region and the remainder of the sail.

15. (*Currently Amended*) The sail of claim 14, wherein the third region extends from the head to the tack of the sail.

16. (*Currently Amended*) The sail of claim 14, wherein the third ~~material~~ region comprises carbon.

17. (*Currently Amended*) The sail of claim 2, wherein the first material comprises a gradient of reducing elasticity in [[the]] a direction from luff to leech, as defined by its:

(i) failure strain, or

(ii) average ~~Youngs~~ Young's Modulus, or

(iii) both (i) and (ii).

18. (*Original*) The sail of claim 17, wherein the first material comprises polyester.

19. (*Original*) The sail of claim 17, wherein the first material comprises polyester in combination with one or more of aramid and UHMWPE.

20. (*Currently Amended*) The sail of claim 1, wherein [[the]] a difference in elasticity is achieved by a lesser material thickness in the luff region compared with the remainder of the sail.

21. (*Currently Amended*) The sail of claim 1, wherein in a luff direction, a ratio of a stiffness of ~~the region~~ regions outside the luff region and the stiffness of the luff region is in [[the]] a range of 2–25 times greater~~, preferably in the range of 10–20 time greater, and more preferably is equal to about 15 times greater~~.

22. (*Currently Amended*) The sail of claim 1, wherein an orientation of a material in the luff region is different from an orientation of a material in the remainder of the sail, such that the luff region has a higher degree of elasticity compared to the remainder of the sail.

23. (*Currently Amended*) The sail of claim 1, wherein the luff region does not comprise any carbon fibres oriented within ~~15degs~~ 15 degrees of parallel to the luff, and

wherein the remainder of the sail does comprise carbon ~~fibers~~ fibres oriented within ~~15degs~~ 15 degrees of parallel to the luff.

24. (*Currently Amended*) The sail of claim 1, wherein the sail is a twin skin mainsail having two skins defining the sail,

wherein each skin has a luff region extending along the luff, and

wherein each luff region has a higher degree of elasticity compared to a remainder of the respective skin.

25. (*Currently Amended*) A sail, comprising:

a head and a tack;

a luff edge extending between the head and the tack; and

a luff region comprising the luff edge and at least a portion of the sail adjacent the luff edge;

wherein [[the]] a degree of elasticity of the luff region and [[the]] a degree of elasticity of a region of the sail adjacent the luff region are configured such that, when the sail is mounted to a sailing boat, tensioning the luff region assists to flatten the sail to a greater extent than would be achievable if the luff was of equivalent stiffness to a remainder of the sail.

26. (*Currently Amended*) A method of making a sail comprising the steps of:

[[-]] laying out material to form the sail;

[[-]] arranging material in a luff region of the sail and in [[the]] a remainder of the sail such that in [[the]] a direction of the luff, the luff region has a higher degree of elasticity compared to the remainder of the sail; and

[[-]] curing or sewing the sail to form a cohesive structure.

27. (*Currently Amended*) The method ~~according to~~ of claim 26, wherein the step of laying out material comprises laying out tapes of resin infused fibrous material.

28. (*Currently Amended*) The method ~~according to~~ of claim 26, wherein the step of laying out material comprises laying out fibres glued between sheets of plastic laminate.

29. (*Currently Amended*) The method ~~according to~~ of claim 26, wherein the step of laying out material comprises sewing together component pieces of fabric or laminate.

30. (*Currently Amended*) A method of making a sail having a luff region, wherein in [[the]] a direction along a luff of the sail, the luff region has a higher degree of elasticity than [[the]] a remainder of the sail.

REMARKS

By this Preliminary Amendment, claims 1–17 and 20–30 have been amended. No new matter has been added.

If these papers are not considered timely filed by the Patent and Trademark Office, then a petition is hereby made under 37 C.F.R. § 1.136, and any additional fees required under 37 C.F.R. § 1.136 for any necessary extension of time, or any other fees required to complete the filing of this response, may be charged to Deposit Account No. 02-4467. Please credit any overpayment to Deposit Account No. 02-4467.

Dated: July 19, 2023

Respectfully submitted,

By: */Bruce B. Vance/*

Bruce B. Vance
Registration No.: **66,187**
Bryan Cave Leighton Paisner LLP
1155 F Street NW
Washington, DC 20004-1357
Telephone (202) 508-6045
Attorneys for Applicant

Docket No.: to be advised

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of: Stephen James COLLIE	Customer No.: 193853
Application No.: 18/211,036	Confirmation No.: 2954
Filed: June 16, 2023	Art Unit: TBA
For: SAIL STRUCTURE	Examiner: TBA

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

RESPONSE TO NOTICE TO FILE CORRECTED APPLICATION PAPERS

Dear Sir:

Further to the Notice to File Corrected Application Papers mailed July 11, 2023, Applicant is concurrently submitting a Replacement Sheet for Figures 12a–b in compliance with 37 CFR §§1.84 and 1.121(d). Acceptance of the attached Replacement Sheet and continued prosecution of this application are respectfully requested.

Dated: July 28, 2023

Respectfully submitted,

By: */Bruce B. Vance/*
Bruce B. Vance
Registration No.: **66,187**
Bryan Cave Leighton Paisner LLP
1155 F Street NW
Washington, DC 20004-1357
Telephone (202) 508-6045
Attorneys for Applicant

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
18/211,036	06/16/2023	Stephen James COLLIE	to be advised

CONFIRMATION NO. 2954

193853
Bryan Cave Leighton Paisner LLP (DC)
1155 F Street NW
Washington, DC 20004-1357

FORMALITIES LETTER

OC000000059139833

Date Mailed: 07/11/2023

NOTICE TO FILE CORRECTED APPLICATION PAPERS

Filing Date Granted

An application number and filing date have been accorded to the above-identified nonprovisional application. The application is informal since it does not comply with the regulations for the reason(s) indicated below. Applicant is given **TWO MONTHS** from the date of this Notice within which to file all required items below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

- **Drawing Items**

  The drawings submitted on 06/16/2023 are not acceptable because:
  - Figure(s) 12a-b have text (e.g. reference characters, sheet numbers, and view numbers) that is illegible. Figure text must be plain and legible. See 37 CFR 1.84(1) and (p)(1). Replacement drawing sheets containing legible text in compliance with 37 CFR 1.84 and 1.121(d) are required.

Replies must be received in the USPTO within the set time period or must include a proper Certificate of Mailing or Transmission under 37 CFR 1.8 with a mailing or transmission date within the set time period. For more information and a suggested format, see Form PTO/SB/92 and MPEP 512.

Replies should be addressed to:

Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

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- the item(s) for which a reply period is set forth above.

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/llvuong/

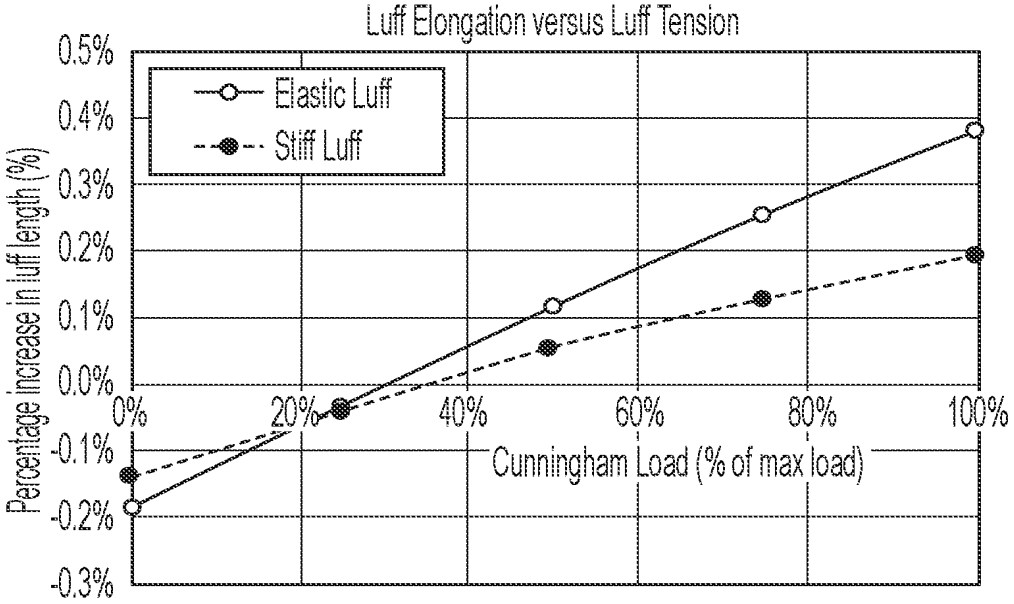

Figure 12a

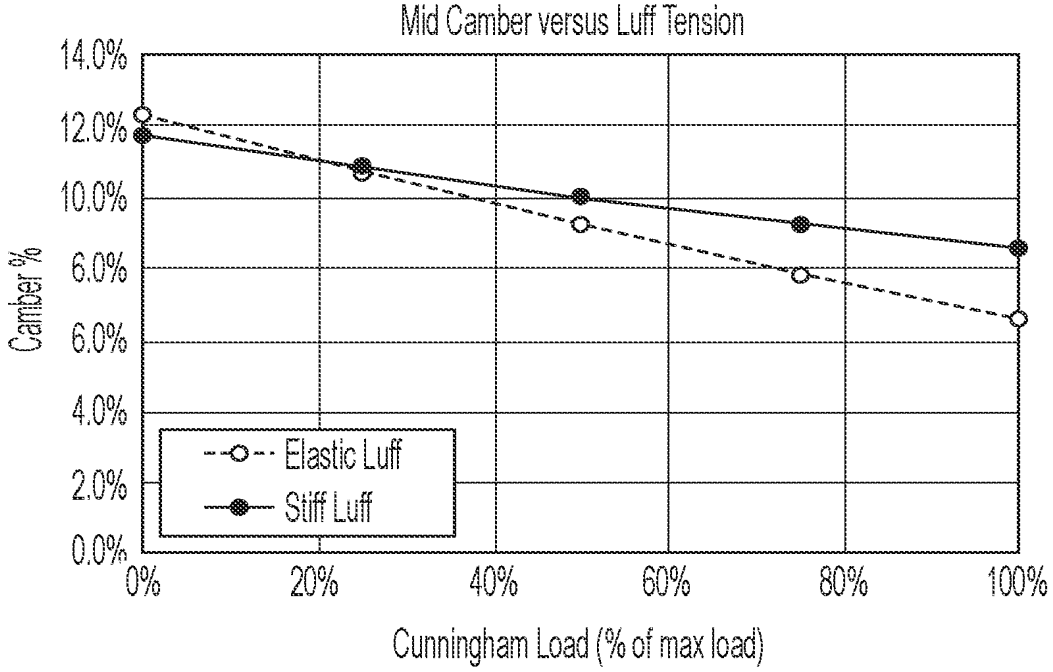

Figure 12b

Electronic Acknowledgement Receipt

EFS ID:	48368051
Application Number:	18211036
International Application Number:	
Confirmation Number:	2954
Title of Invention:	SAIL STRUCTURE
First Named Inventor/Applicant Name:	Stephen James COLLIE
Customer Number:	193853
Filer:	Bruce B. Vance
Filer Authorized By:	
Attorney Docket Number:	to be advised
Receipt Date:	28-JUL-2023
Filing Date:	16-JUN-2023
Time Stamp:	21:50:14
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Applicant Response to Pre-Exam Formalities Notice	18211036_Response_to_NTFCAP.pdf	132707 cf3b38466e8baccd73839b28e49bcd2a53093ed8	no	1

Warnings:

Information:					
2	Miscellaneous Incoming Letter	18211036_NTFCAP.pdf	60085 0ff373d96d00c7a4189f8cacbee51346bb5556c0	no	2
Warnings:					
Information:					
3	Drawings-only black and white line drawings	18211036_Replacement_sheet.pdf	499498 e19e2816644d87c0c879f6dc36b2ffbc42f026dc	no	1
Warnings:					
Information:					
			Total Files Size (in bytes):	692290	

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New Applications Under 35 U.S.C. 111

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

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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

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	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
18/211,036	06/16/2023		3300	to be advised	30	4

CONFIRMATION NO. 2954

UPDATED FILING RECEIPT

193853
Bryan Cave Leighton Paisner LLP (DC)
1155 F Street NW
Washington, DC 20004-1357

OC00000060117979

Date Mailed: 08/03/2023

Receipt is acknowledged of this non-provisional utility 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 FIRST INVENTOR, 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 corrected Filing Receipt, including a properly marked-up ADS showing the changes with strike-through for deletions and underlining for additions. If you received a "Notice to File Missing Parts" or other Notice requiring a response for this application, please submit any request for correction 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 provided that the request is grantable.

Inventor(s)

Stephen James COLLIE, Auckland, NEW ZEALAND;

Applicant(s)

Team New Zealand Limited, Auckland, NEW ZEALAND;

Power of Attorney: None

Domestic Priority data as claimed by applicant

This application is a CON of PCT/IB2021/061985 12/17/2021
which claims benefit of 63/127,127 12/17/2020

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.

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: Yes

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 07/07/2023

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 18/211,036**

Projected Publication Date: 11/09/2023

Non-Publication Request: No

Early Publication Request: No
Title

SAIL STRUCTURE

Preliminary Class

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

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Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

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Title 37, Code of Federal Regulations, 5.11 & 5.15

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NOT GRANTED

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PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 18/211,036

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	320
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	700
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	800
TOTAL CLAIMS (37 CFR 1.16(i))	30 minus 20 =	* 10			OR	x 100 =	1000
INDEPENDENT CLAIMS (37 CFR 1.16(h))	4 minus 3 =	* 1				x 480 =	480
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
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	2300

APPLICATION AS AMENDED - PART II

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT A	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))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE($)	ADDITIONAL FEE($)	OR	RATE($)	ADDITIONAL FEE($)
AMENDMENT B	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))									
	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.

TO: DCIPDocketing@bclplaw.com
FROM: noreply@uspto.gov
CC: patentcenter_eofficeaction@uspto.gov
SUBJECT: USPTO: Patent Electronic System - Correspondence Notification for Customer Number 193853

Thu Aug 03 05:55:09 EDT 2023

Dear Patent Center Customer:

Correspondence Address:

Bryan Cave Leighton Paisner LLP (DC)
1155 F Street NW
Washington,DISTRICT OF COLUMBIA,20004-1357
UNITED STATES

This is a courtesy notification regarding the following USPTO patent application(s) associated with your Customer Number, 193853, that have new outgoing correspondence. This correspondence is now available for viewing in Patent Center.

The official date of notification of the outgoing correspondence will be indicated on the form (e.g., PTOL-90) accompanying the correspondence.

Disclaimer:
The list of documents shown below are provided as a courtesy and is not part of the official file wrapper. The content of the images shown in the Image File Wrapper is the official record.

Application	Document	Mailroom Date	Attorney Docket No.
18211036	APP.FILE.REC	08/03/2023	to be advised

To view your correspondence online, please sign in to Patent Center and then select Workbench/View correspondence. To update your email address(es), select Manage/Manage customer numbers.

If you have any questions, please contact the Patent Electronic Business Center (EBC) at ebc@uspto.gov or 866-217-9197 Monday – Friday, 6 a.m. to midnight ET.

Please do not reply to this email as it was sent from an unmonitored mailbox.

Sincerely,

The Patent Center Team

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.
18/211,036	06/16/2023	Stephen James COLLIE	to be advised	2954

193853 7590 08/23/2023

Bryan Cave Leighton Paisner LLP (DC)
1155 F Street NW
Washington, DC 20004-1357

EXAMINER
CENTRAL, DOCKET

ART UNIT	PAPER NUMBER
OPAP	

NOTIFICATION DATE	DELIVERY MODE
08/23/2023	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):

DCIPDocketing@bclplaw.com

Decision Granting Request for Prioritized Examination (Track I)	**Application No.** 18/211,036	**Applicant(s)** COLLIE, Stephen James	
	Examiner CHERYL P GIBSON BAYLOR	**Art Unit** OPET	**AIA (FITF) Status** Yes

1. THE REQUEST FILED 16 June 2023 IS **GRANTED** .

   The above-identified application has met the requirements for prioritized examination
   - A. ☑ for an original nonprovisional application (Track I).
   - B. ☐ for an application undergoing continued examination (RCE).

2. **The above-identified application will undergo prioritized examination**. The application will be accorded special status throughout its entire course of prosecution until one of the following occurs:
   - A. filing a **petition for extension of time** to extend the time period for filing a reply;
   - B. filing an **amendment to amend the application to contain more than four independent claims, more than thirty total claims** , or a multiple dependent claim;
   - C. filing a **request for continued examination** ;
   - D. filing a notice of appeal;
   - E. filing a request for suspension of action;
   - F. mailing of a notice of allowance;
   - G. mailing of a final Office action;
   - H. completion of examination as defined in 37 CFR 41.102; or
   - I. abandonment of the application.

Telephone inquiries with regard to this decision should be directed to CHERYL GIBSON BAYLOR at (571)272-3213. In his/her absence, calls may be directed to Petition Help Desk at (571) 272-3282.

/CHERYL GIBSON BAYLOR/ Paralegal Specialist, OPET	

TO: DCIPDocketing@bclplaw.com
FROM: noreply@uspto.gov
CC: patentcenter_eofficeaction@uspto.gov
SUBJECT: USPTO: Patent Electronic System - Correspondence Notification for Customer Number 193853

Thu Aug 24 06:12:13 EDT 2023

Dear Patent Center Customer:

Correspondence Address:

Bryan Cave Leighton Paisner LLP (DC)
1155 F Street NW
Washington,DISTRICT OF COLUMBIA,20004-1357
UNITED STATES

This is a courtesy notification regarding the following USPTO patent application(s) associated with your Customer Number, 193853, that have new outgoing correspondence. This correspondence is now available for viewing in Patent Center.

The official date of notification of the outgoing correspondence will be indicated on the form (e.g., PTOL-90) accompanying the correspondence.

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Application	Document	Mailroom Date	Attorney Docket No.
18211036	TRACK1.GRANT	08/23/2023	to be advised

To view your correspondence online, please sign in to Patent Center and then select Workbench/View correspondence. To update your email address(es), select Manage/Manage customer numbers.

If you have any questions, please contact the Patent Electronic Business Center (EBC) at ebc@uspto.gov or 866-217-9197 Monday – Friday, 6 a.m. to midnight ET.

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Sincerely,

The Patent Center Team

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
18/211,036	06/16/2023	Stephen James COLLIE	to be advised	2954

193853 7590 09/13/2023

Bryan Cave Leighton Paisner LLP (DC)
1155 F Street NW
Washington, DC 20004-1357

EXAMINER
POLAY, ANDREW

ART UNIT	PAPER NUMBER
3617	

NOTIFICATION DATE	DELIVERY MODE
09/13/2023	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):

DCIPDocketing@bclplaw.com

Office Action Summary	Application No. 18/211,036	Applicant(s) COLLIE, Stephen James	
	Examiner ANDREW POLAY	Art Unit 3617	AIA (FITF) Status Yes

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

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 2 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 19 July 2023.

☐ 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) 1-30 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) _____ is/are rejected.

8) ☐ Claim(s) _____ is/are objected to.

9) ☑ Claim(s) 1-30 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 28 July 2023 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 _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

4) ☐ Other: _____.

2Notice of Pre-AIA or AIA Status

The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

REQUIREMENT FOR UNITY OF INVENTION

1. As provided in 37 CFR 1.475(a), a national stage application shall relate to one invention only or to a group of inventions so linked as to form a single general inventive concept ("requirement of unity of invention"). Where a group of inventions is claimed in a national stage application, the requirement of unity of invention shall be fulfilled only when there is a technical relationship among those inventions involving one or more of the same or corresponding special technical features. The expression "special technical features" shall mean those technical features that define a contribution which each of the claimed inventions, considered as a whole, makes over the prior art.

The determination whether a group of inventions is so linked as to form a single general inventive concept shall be made without regard to whether the inventions are claimed in separate claims or as alternatives within a single claim. See 37 CFR 1.475(e).

WHEN CLAIMS ARE DIRECTED TO MULTIPLE CATEGORIES OF INVENTIONS

2. As provided in 37 CFR 1.475(b), a national stage application containing claims to different categories of invention will be considered to have unity of invention if the claims are drawn only to one of the following combinations of categories:

(1) A product and a process specially adapted for the manufacture of said product; or

(2) A product and process of use of said product; or

(3) A product, a process specially adapted for the manufacture of the said product, and a use of the said product; or

(4) A process and an apparatus or means specifically designed for carrying out the said process; or

(5) A product, a process specially adapted for the manufacture of the said product, and an apparatus or means specifically designed for carrying out the said process.

Otherwise, unity of invention might not be present. See 37 CFR 1.475(c).

3. Restriction is required under 35 U.S.C. 121 and 372.

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1.

In accordance with 37 CFR 1.499, applicant is required, in reply to this action, to elect a single invention to which the claims must be restricted.

Group I, claims 1-24 are drawn to a sail with higher degree up elasticity in the luff region than a remainder of the sail.

Group II, claims 25 is drawn to a sail where the degree of elasticity in the luff region is configured to assist with flattening the sail when tensioning the luff.

Group III, claims 26-30 are drawn to a a method of making a sailing such that the material in the luff region is arranged to have a higher degree of elasticity and is cured or sewn.

The record does not demonstrate a general inventive concept clearly linking the claims such that a single special technical feature that makes a contribution over prior art is clear. Claims 1, 25, 26 are anticipated by Gaastra (EP 0375111 A1) *a posteriori* and therefore cannot be considered to have a special technical feature that defines over the prior art. Therefore, Groups I-III do not satisfy the requirement for unity of invention.

Applicant is advised that the reply to this requirement to be complete must include (i) an election of an invention to be examined even though the requirement may be traversed (37 CFR 1.143) **and (ii) identification of the claims encompassing the elected invention**.

The election of an invention may be made with or without traverse. To reserve a right to petition, the election must be made with traverse. If the reply does not distinctly and specifically point out supposed errors in the restriction requirement, the election shall be treated as an election without traverse. Traversal must be presented at the time of election in order to be considered timely. Failure to timely traverse the requirement will result in the loss of right to petition under 37 CFR 1.144. If claims are added after the election, applicant must indicate which of these claims are readable upon the elected invention.

Should applicant traverse on the ground that the inventions are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the inventions to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103 or pre-AIA 35 U.S.C. 103(a) of the other invention.

Conclusion

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANDREW POLAY whose telephone number is (408)918-9746. The examiner can normally be reached on M-F 9-5 Pacific.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joe Morano can be reached on 5712726684. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Andrew Polay/
7 September 2023

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	18/211,036	COLLIE, Stephen James
	Examiner	**Art Unit**
	ANDREW POLAY	3617

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	09/07/2023								
	1	÷								
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	3	÷								
	4	÷								
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	28	÷								
	29	÷								
	30	÷								

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	18211036
Filing Date	2023-06-16
First Named Inventor	Stephen James COLLIE
Art Unit	3617
Examiner Name	POLAY, Andrew
Attorney Docket Number	3012490.000001.US20

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
	1	8506739	B2	2013-08-13	GAUTIER et al.	

If you wish to add additional U.S. Patent citation information please click the Add button.

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
	1					

If you wish to add additional U.S. Published Application citation information please click the Add button.

FOREIGN PATENT DOCUMENTS

Examiner Initial*	Cite No	Foreign Document Nu	Country Code[2] i	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]
	1							☐

If you wish to add additional Foreign Patent Document citation information please click the Add button

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, pages(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	18211036
	Filing Date	2023-06-16
	First Named Inventor	Stephen James COLLIE
	Art Unit	3617
	Examiner Name	POLAY, Andrew
	Attorney Docket Number	3012490.000001.US20

	1		☐

If you wish to add additional non-patent literature document citation information please click the Add button

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.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	18211036
Filing Date	2023-06-16
First Named Inventor	Stephen James COLLIE
Art Unit	3617
Examiner Name	POLAY, Andrew
Attorney Docket Number	3012490.000001.US20

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Bruce B. Vance/	Date (YYYY-MM-DD)	2023-09-11
Name/Print	Bruce B. Vance	Registration Number	66187

This collection of information is required by 37 CFR 1.97 and 1.98. 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 1 hour 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.**

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 the Freedom of Information Act requires disclosure of these record s.

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 inspections 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.

Electronic Acknowledgement Receipt

EFS ID:	48564414
Application Number:	18211036
International Application Number:	
Confirmation Number:	2954
Title of Invention:	SAIL STRUCTURE
First Named Inventor/Applicant Name:	Stephen James COLLIE
Customer Number:	193853
Filer:	Bruce B. Vance/Angela Robertson
Filer Authorized By:	Bruce B. Vance
Attorney Docket Number:	to be advised
Receipt Date:	11-SEP-2023
Filing Date:	16-JUN-2023
Time Stamp:	13:26:33
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	3012490_000001_US20_IDS-Transmittal.pdf	30036 faf1eda907c4ca6425225bb2da1d1139961 14773	no	2

Warnings:

Information:					
2	Information Disclosure Statement (IDS) Form (SB08)	3012490_000001_US20-IDSSB08.pdf	113107 c36b5c2fa64a0d60bbe6fa0216a808cf11b8af9b	no	4
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Docket No.: 3012490.000001.US20

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN RE APPLICATION OF:
Stephen James COLLIE

CUSTOMER NUMBER: 193853

SERIAL NUMBER: 18/211,306

CONFIRMATION NO. 2954

FILED: June 16, 2023

ART UNIT: 3617

FOR: SAIL STRUCTURE

EXAMINER: POLAY, Andrew

INFORMATION DISCLOSURE STATEMENT UNDER 37 C.F.R. 1.97

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

Sir:

Applicant(s) wish to disclose the following information.

REFERENCES

■ The Applicant(s) wish to make of record the references listed on the attached PTO/SB/08. Copies of the listed references are attached, where required, as are either statements of relevancy or any readily available English translations of pertinent portions of any non-English language references

RELATED DOCUMENTS

□ For the Examiner's convenience, Applicant(s) wish to make of record the following document(s):
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The above-cited document(s) are not prior art. The above-cited document(s) should not appear on the face of any patent that issues from the above-identified application. Accordingly, these document(s) are not listed on the attached PTO/SB/08. These document(s) are believed to be relevant only in that they identify one or more of the documents cited on the attached PTO/SB/08, or were issued in another application associated with the inventor(s) and/or applicant(s) of this application.

RELATED CASES

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Dated: September 11, 2023

Respectfully submitted,

/Bruce B. Vance/
Bruce B. Vance
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Attorneys for Applicant

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Application	Document	Mailroom Date	Attorney Docket No.
18211036	CTRS	09/13/2023	3012490.000001.US20

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	18211036
Filing Date	2023-06-16
First Named Inventor	Stephen James COLLIE
Art Unit	3617
Examiner Name	POLAY, ANDREW
Attorney Docket Number	3012490.000001.US20

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
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	1	2194499	GB	A	1998-03-09	ADRENALIN CO LTD		☐

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	18211036
	Filing Date	2023-06-16
	First Named Inventor	Stephen James COLLIE
	Art Unit	3617
	Examiner Name	POLAY, ANDREW
	Attorney Docket Number	3012490.000001.US20

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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Application Number	18211036
Filing Date	2023-06-16
First Named Inventor	Stephen James COLLIE
Art Unit	3617
Examiner Name	POLAY, ANDREW
Attorney Docket Number	3012490.000001.US20

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Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

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Signature	/Bruce B. Vance/	Date (YYYY-MM-DD)	2023-10-11
Name/Print	Bruce B. Vance	Registration Number	66187

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Bibliographic data: GB2194499 (A) — 1988-03-09

Sail with elastic luff tube

Inventor(s): GRACEY NICHOLAS ± (NICHOLAS * GRACEY)

Applicant(s): ADRENALIN CO LTD ± (THE * ADRENALIN COMPANY LIMITED)

Classification: - international: *B63B35/79;* (IPC1-7): B63H9/06
- cooperative: B63H8/20 (EP, US); B63H8/40 (EP, US)

Application number: GB19860017637 19860718

Priority number(s): GB19860017637 19860718

Abstract of GB2194499 (A)

A sail 12 for a windsurfer has an elastic luff tube 13 for fitting over a mast 11. The elasticity of the luff tube allows the tube to adapt to almost any mast to produce the preferred foil shape at the leading edge of the sail and to be compatible with the flex pattern of the mast.

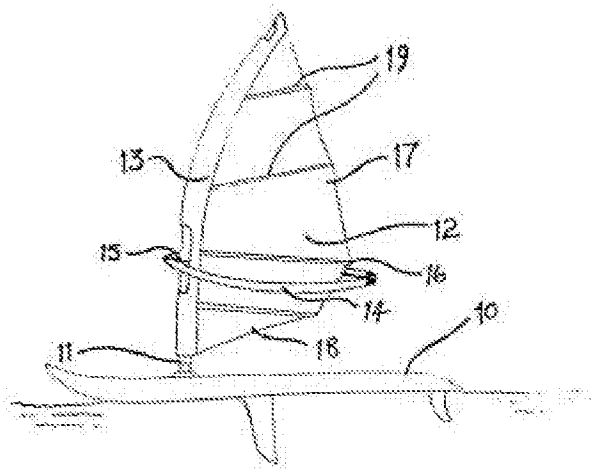

Fig. 1

(12) UK Patent Application (19) GB (11) 2 194 499 (13) A

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(21) Application No 8617637

(22) Date of filing 18 Jul 1986

(51) INT CL⁴
B63H 9/06

(52) Domestic classification (Edition J):
B7V BP

(56) Documents cited
None

(58) Field of search
B7V
Selected US specifications from IPC sub-class B63H

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(54) Sail with elastic luff tube

(57) A sail 12 for a windsurfer has an elastic luff tube 13 for fitting over a mast 11.
The elasticity of the luff tube allows the tube to adapt to almost any mast, to produce the preferred foil shape at the leading edge of the sail and to be compatable with the flex pattern of the mast.

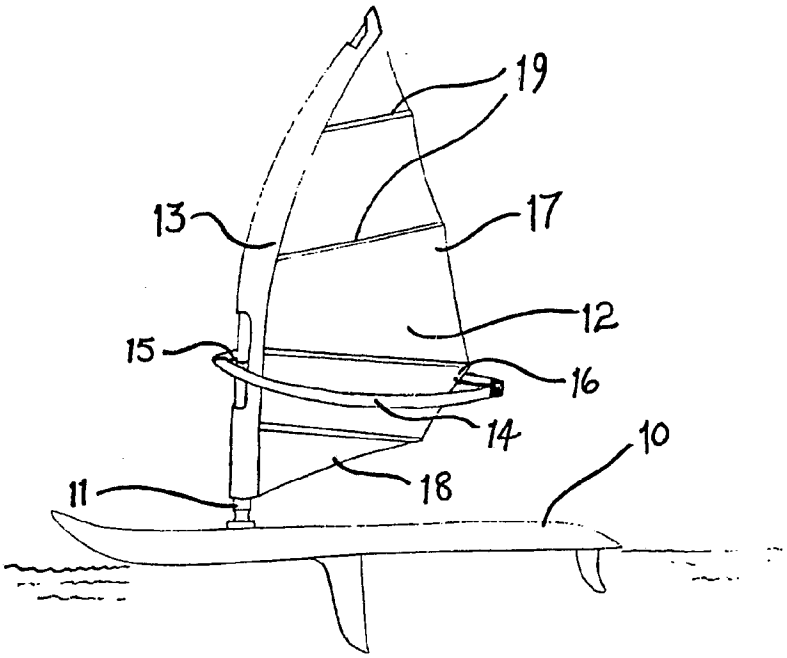

Fig. 1

GB 2 194 499 A

The claims were filed later than the filing date within the period prescribed by Rule 25(1) of the Patents Rules 1982.

18 JUL. 86- 17637 1/1
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2194499

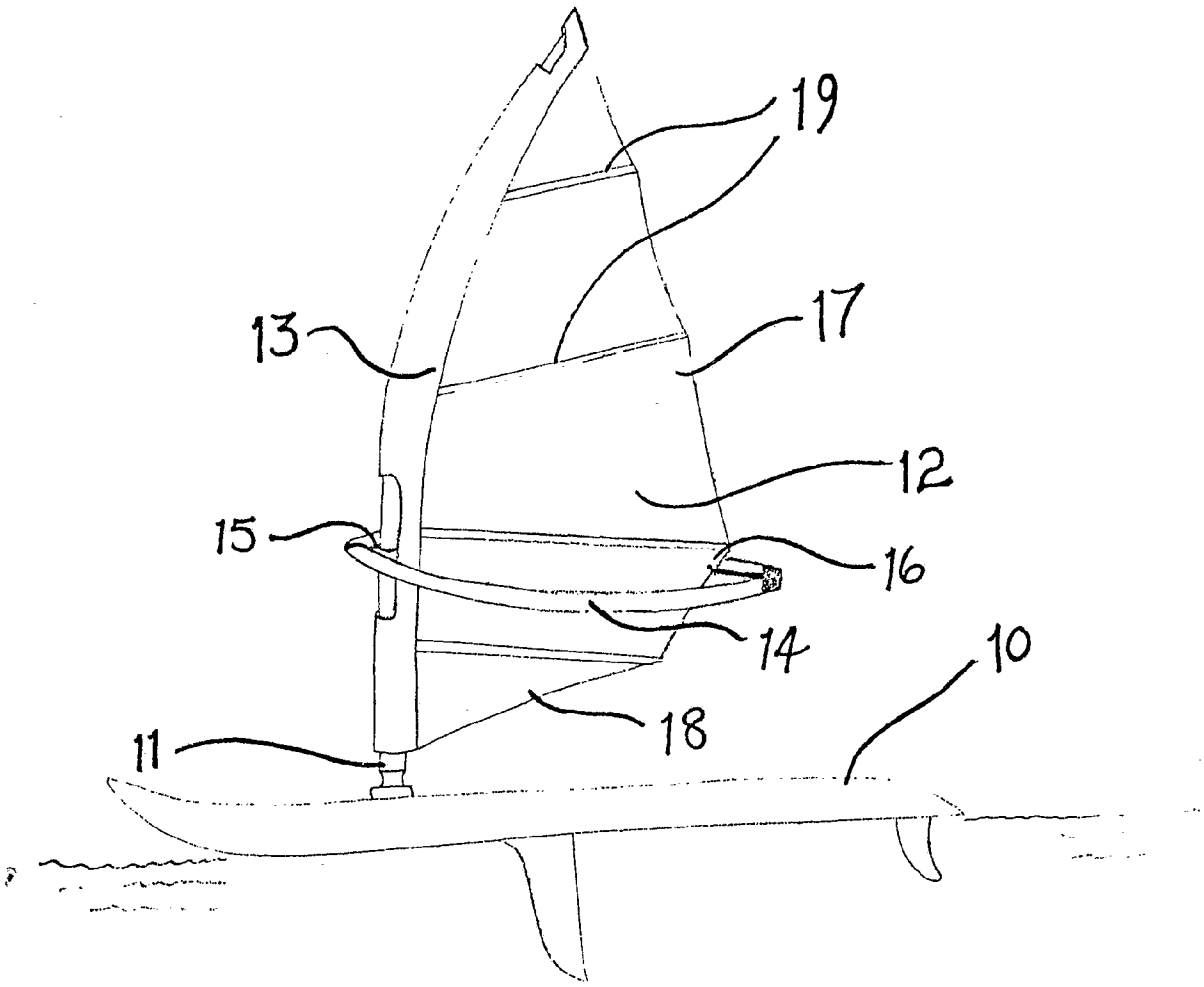

Fig. 1

SPECIFICATION

A windsurfer sail—luff tube

This invention relates to a novel design of aerodynamic non-rigid single wing of; a sail or similar locomotory device.

By way of example, a windsurfer sail is described as representative of a non-rigid single wing, which by its nature, generates lift, the science of which is true to sails and any locomotory device of similar design. In all cases described herein the single wing will be referred to as a sail, its rigid leading edge referred to as a mast and as such allows direct reference to the similar principles which are applicable when considering the other cases.

A windsurfer comprises a surfboard having a mast pivotally attached at its base to the upper surface of the board, a sail attached at its luff (by the luff tube) to the mast, often stiffened in certain positions spanning its width with full length (luff to leech) or shorter length (leech) battens, and a boom removably attached to the mast and extending rearwardly along both sides of the sail for attachment thereto at the junction between the leech and the tack.

In the simplest form, an open-ended flexible tube is attached to the luff of the sail and is passed downwardly over the mast and secured at the base of the tack.

The manner of attaching the luff to the mast may differ according to the manner in which the windsurfer is to be sailed. For example, for ease of handling it is preferable that the luff tube should be discontinuous and in fact consist of a number of spaced loops which connect the mast to the luff of the sail, so that in the event of a submersion, the sail can be righted more easily with water spilling through the free spaces between the loops.

For the purpose of this description, the luff tube will be defined herein as including a continuous tube attached to the sail throughout its length, or alternatively a series of discontinuous tubes or a number of spaced loops which combine to attach the sail to the mast generally throughout its length. Similarly a combination may be desirable.

The luff tube of a sail is typically curved, constructed from relatively inflexible material. The mast attached at the luff should be flexible enough to adopt the shape of the luff whilst stiff enough to avoid excessive distortion in gusts of wind. Ideally the flex pattern of the mast should be equivalent to that of the luff, the mast curvature being produced by tension at the 'head' of the sail (at the top of the mast) and the very base of the luff (at the bottom of the mast), with very little tension, if any, between the luff tube and mast along its length.

The cross-sectional profile of the sail at the luff; across the mast and luff tube (a function of its construction and the batten positioning relative to the mast), determines the laminar airflow pattern and thus the lift across the sail, hence to a large degree, determines the overall performance characteristics of the sail.

With conventional fun sails and fully-battened sails, a number of battens are introduced into the sail which stabilise the shape of the sail and prevent flapping at the leech, which causes an immediate loss of power due to the production of an irregular laminar airflow. The battens are free to float from one side to next and do not come in contact with the mast; a 'Floating' batten-system.

For high performance sailing the user might select a sail known as 'Rotating asymmetric foil', which is attained by ensuring that the battens (generally tapered), extend forwardly to the very edge of the luff, so that they tend to lie alongside the mast. With this arrangement, when changing direction to a bearing, where aerodynamic lift is desirable on the opposite side of the sail, the battens pass, often with a rapid snap action, around the mast to lie on the opposite side thereof. By lying alongside the mast the battens present the sail tangentially rather than radially to the mast, ensuring a preferred aerodynamic shape; a 'Rotating' batten-system.

Another variation used in 'Wave Sailing' is the 'Asymmetric' system whereby the battens are locked to a selected side of the mast thus providing a powerful foil shape when sailing in one direction out through the waves, and a less efficient foil shape for the ride back with the waves to the shore; a 'Fixed' batten-system.

The incorporation of an extended double batten-system at the luff, leads the battens to the mast, forming a foil shape on the windward and leeward sides of the mast. The batten-ends at the luff edge do not have to pass to opposite sides of the mast. A system known as a 'Camber Inducer'.

For racing, a sail with an extended luff tube may be adopted; i.e. the width of the tube is enlarged to ensure a smooth transition of laminar air flow from the mast to the body of the sail. This adaption on either or both sides of the sail, avoids the establishment of eddy currents on the modified side(s).

It can therefore be seen that a variety of sails are available, of different shapes, sizes, luff and batten types, all of which are very dependent on the fit of the luff and positioning of the battens with respect to the mast; each designed to have specific performance characteristics of speed, control and manoeuvrability. Mast types are also varied with different lengths, tapers and stiffness distribution, therefore each having its own characteristic flex properties.

A particular sail incorporated with mast, boom and board, will therefore be chosen to suit a specific range of wind and wave condi-

tions or chosen to give optimum performance, under the specific conditions of competition or of personal preference in fun sailing.

However the efficiency of the sail as well as being dependent on its shape and cut, relies heavily on the fit of the luff to the mast. Due to the independent production of masts to sails this fit is often far from perfect: It is possible that a mast will not adopt the shape of a luff perfectly; with some areas of the luff under great stress whilst other areas are left free to flap causing turbulence. Also the luff of a sail will often restrict the normal flex of the mast and sail to strong gusts of wind thereby causing uneven distortions, hence loss of control and power.

It is an object of the present invention to provide a means by which a sail for a windsurfer may readily adapt to suit almost any mast type, producing the preferred foil shape at the leading edge and of a compatible flex pattern to a wide range of mast types.

According to the present invention there is provided a sail for a windsurfer, having an elastic luff tube (as herein defined).

A specific embodiment of the invention will now be described, by way of example only, with reference to the accompanying drawing in which;–

Figure 1 is a schematic illustration of a windsurfer of known type.

Referring now to Fig. 1, it can be seen that a conventional windsurfer consists essentially of a surfboard 10 upon which the user stands, a mast 11 pivotally attached at its base to the board 10. A sail 12 consisting of luff 13, leech 17 and tack 18, attached by a luff tube 13 to the leading edge 11, and a boom 14 removably attached at 15 to the leading edge and extending along both sides of the sail 12 to a point 16 at the base of the leech 17. A number of battens 19 are inserted in fixed pockets in the sail 12 to provide rigidity and to maintain a smooth aerodynamic shape in use.

A windsurfer sail made in accordance with the present invention has an elastic luff tube at 13, made of suitably elastic neoprene or any suitable flexible and resilient material which will therefore conform to the shape of most mast types whilst being sufficiently rigid to hold the shape of the sail to the mast in strong winds.

It will be appreciated that a sail made in accordance with the invention will be readily adaptable to almost any mast type. By using a suitably elastic luff tube, the luff may conform more closely to the shape of the mast providing the preferred aerodynamic shape and will tend to flex with the mast in sudden gusts of wind therefore not creating uneven distortions in the sail.

In addition, the elasticity of the luff tube allows a tight fit over the mast; in the event of submersion very little water is trapped in the space between the luff tube and mast, which enables the sail to be easily righted, an effect which is further enhanced by the use of closed-cell neoprene as the elastic material for the luff tube, which adds bouyancy to the entire 'rig' (mast, boom and sail).

The importance of sail adaptability can be realised when considering that masts and sails are produced independently i.e. not specifically for any particular mast/sail combination. Several users having the same sail type often possess different mast types; a production sail will have to function efficiently with a variety of mast types. Similarly individuals often possess a single mast but a variety of sails with different performance characteristics for various conditions; one mast type will need to function efficiently with a variety of sail types.

The present invention provides a means by which a single sail, by virtue of its elastic luff tube, can efficiently adapt to almost any mast type thereby providing the preferred foil shape at the leading edge.

The invention is not limited to the above examples only, many variations, such as might readily occur to one skilled in the art of sail production, being possible without departing from the scope thereof.

CLAIMS

1. A sail for a windsurfer, having an elastic luff tube (as herein defined).

Published 1988 at The Patent Office, State House, 66/71 High Holborn, London WC1R 4TP. Further copies may be obtained from The Patent Office, Sales Branch, St Mary Cray, Orpington, Kent BR5 3RD. Printed by Burgess & Son (Abingdon) Ltd. Con. 1/87.

Electronic Patent Application Fee Transmittal

Application Number:	18211036
Filing Date:	16-Jun-2023
Title of Invention:	SAIL STRUCTURE
First Named Inventor/Applicant Name:	Stephen James COLLIE
Filer:	Bruce B. Vance/Angela Robertson
Attorney Docket Number:	3012490.000001.US20

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

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EFS ID:	48707530
Application Number:	18211036
International Application Number:	
Confirmation Number:	2954
Title of Invention:	SAIL STRUCTURE
First Named Inventor/Applicant Name:	Stephen James COLLIE
Customer Number:	193853
Filer:	Bruce B. Vance/Angela Robertson
Filer Authorized By:	Bruce B. Vance
Attorney Docket Number:	3012490.000001.US20
Receipt Date:	11-OCT-2023
Filing Date:	16-JUN-2023
Time Stamp:	17:28:12
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
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Information:					
This is not an USPTO supplied IDS fillable form					
3	Foreign Reference	FP1_GB2194499A.pdf	735349 e4583197486afbb21733917631f853b74b38f1b4	no	5
Warnings:					
Information:					
4	Fee Worksheet (SB06)	fee-info.pdf	38025 48fa27f26c770df7f7643d468f4b4774f142499a	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	916734		

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.

Docket No.: 3012490.000001.US20

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN RE APPLICATION OF:
Stephen James COLLIE

CUSTOMER NUMBER: 193853

SERIAL NUMBER: 18/211,036

CONFIRMATION NO. 2954

FILED: June 16, 2023

ART UNIT: 3617

FOR: SAIL STRUCTURE

EXAMINER: POLAY, ANDREW

INFORMATION DISCLOSURE STATEMENT UNDER 37 C.F.R. 1.97

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

Sir:

Applicant(s) wish to disclose the following information.

REFERENCES

■ The Applicant(s) wish to make of record the references listed on the attached PTO/SB/08. Copies of the listed references are attached, where required, as are either statements of relevancy or any readily available English translations of pertinent portions of any non-English language references

RELATED DOCUMENTS

□ For the Examiner's convenience, Applicant(s) wish to make of record the following document(s):
- □ International Search Report from _____, dated _____;
- □ Written Opinion of the ISA from _____, dated _____;
- □ Office Action of European Patent Office in Appl'n No._____, dated _____;
- □ Office Action of _____ Patent Office in Appl'n No. _____, dated _____;
- □ Office Action of the U.S. Patent Office in Appl'n No. _____, dated _____;
- □ _____.

The above-cited document(s) are not prior art. The above-cited document(s) should not appear on the face of any patent that issues from the above-identified application. Accordingly, these document(s) are not listed on the attached PTO/SB/08. These document(s) are believed to be relevant only in that they identify one or more of the documents cited on the attached PTO/SB/08, or were issued in another application associated with the inventor(s) and/or applicant(s) of this application.

RELATED CASES

□ A list of Applicant's pending applications or issued patents, which may be related to the present application, is shown below:

_____

_____

_____

DEPOSIT ACCOUNT

■ Please charge any required additional fees for the papers being filed herewith, including, if not filed herewith, the amount required under 37 CFR § 1.17(p) for taking action under 37 CFR § 1.97(c) or (d), or credit any overpayment to Deposit Account No. 02-4467.

□ This is a subsequent e-IDS submission being filed simultaneously with one or more other e-IDS submissions. The required fee under 37 CFR § 1.17(p) for taking action under 37 CFR § 1.97(c) was submitted with the other one or more simultaneously filed e-IDS submissions, and it is hereby requested that the required fee serve as payment for both the other one or more simultaneously filed e-IDS submissions and this subsequent e-IDS submission. Please charge any additional fees for the papers being filed herewith, including, if not filed herewith, the amount required under 37 CFR § 1.17(p) for taking action under 37 CFR § 1.97(c) or (d), or credit any overpayment to Deposit Account No. 02-4467.

Dated: October 11, 2023

Respectfully submitted,

/Bruce B. Vance/
Bruce B. Vance
Registration No.: 66,187
BRYAN CAVE LEIGHTON PAISNER LLP
1155 F Street NW
Washington, DC 20004-1357
(202) 508-6000
Attorneys for Applicant

Docket No.: 3012490.000001.US20

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of: Stephen James COLLIE	Customer No.: 193853
Application No.: 18/211,036	Confirmation No.: 2954
Filed: June 16, 2023	Art Unit: 3617
For: SAIL STRUCTURE	Examiner: Andrew Polay

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22343-1450

RESPONSE TO ELECTION/RESTRICTION REQUIREMENT

Dear Sirs:

Prior to the examination of the claims on the merits, and in response to the Election/Restriction Requirement dated **September 13, 2023**, please consider the following election for the patent application identified above as follows:

INTRODUCTORY COMMENTS

Election Requirement begins on page **2** of this paper.

ELECTION REQUIREMENT

In response to the Election/Restriction Requirement set forth in the Office Action mailed September 13, 2023, Applicant hereby provisionally elects **Group I**, **claims 1–24**.

Applicant makes this election **with traverse**. As previously presented by Applicant's representative and as discussed in an Examiner Interview on October 17, 2023, the Examiner agreed that the present application was filed under 35 U.S.C. §111(a) and therefore not subject to the PCT unity of invention practice. *See* MPEP §1896(III); *see also* MPEP §§211.01(c), 823, and 1895 (describing what is known as a "bypass" application; that is, a 35 U.S.C. §111(a) application claiming priority to an international application). Moreover, Applicant submits that the currently pending claims are neither anticipated by (as asserted by the Examiner in the Office Action, bottom page 3) nor obvious in view of EP 0375111A1, as was successfully shown (copy provided with original application filing) in the international phase of this application's priority filing (PCT/IB2021/061985).

The Examiner indicated that while a provisional election was required, the previous unity of invention rejection would be withdrawn and all the pending claims examined together.

If these papers are not considered timely filed by the Patent and Trademark Office, then a petition is hereby made under 37 C.F.R. § 1.136, and any additional fees required under 37 C.F.R. § 1.136 for any necessary extension of time, or any other fees required to complete the filing of this response, may be charged to Deposit Account No. 02-4467. Please credit any overpayment to Deposit Account No. 02-4467.

Dated: October 18, 2023

Respectfully submitted,

By: */ Bruce B. Vance /*_____
Bruce B. Vance
Registration No.: **66,187**
Bryan Cave Leighton Paisner LLP
1155 F Street NW
Washington, D.C. 20004-1357
Voice: (202) 508-6045
Attorneys for Applicant

Electronic Acknowledgement Receipt

EFS ID:	48737499
Application Number:	18211036
International Application Number:	
Confirmation Number:	2954
Title of Invention:	SAIL STRUCTURE
First Named Inventor/Applicant Name:	Stephen James COLLIE
Customer Number:	193853
Filer:	Bruce B. Vance
Filer Authorized By:	
Attorney Docket Number:	3012490.000001.US20
Receipt Date:	18-OCT-2023
Filing Date:	16-JUN-2023
Time Stamp:	23:44:20
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Response to Election / Restriction Filed	303012490_000001_US20_Restriction_response.pdf	29126 8cfc4a06d53a794dea8192dd4521237df5da7231	no	2

Warnings:

Information:	
Total Files Size (in bytes):	29126

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

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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

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.
18/211,036	06/16/2023	Stephen James COLLIE	3012490.000001.US20	2954

193853 7590 10/23/2023

Bryan Cave Leighton Paisner LLP (DC)
1155 F Street NW
Washington, DC 20004-1357

EXAMINER	
POLAY, ANDREW	

ART UNIT	PAPER NUMBER
3617	

NOTIFICATION DATE	DELIVERY MODE
10/23/2023	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):

DCIPDocketing@bclplaw.com

Applicant-Initiated Interview Summary	**Application No.** 18/211,036	**Applicant(s)** COLLIE, Stephen James		
	Examiner ANDREW POLAY	**Art Unit** 3617	**AIA (First Inventor to File) Status** Yes	**Page** 1 of 1

All Participants (applicant, applicants representative, PTO personnel)	**Title**	**Type**
ANDREW POLAY	Primary Examiner	Video Conference
Bruce Vance	Attorney	

Date of Interview: 17 October 2023

Issues Discussed:

Election/Restriction

Applicant called to note that restriction was based on unity of invention, but Application is filed under 111a as with priority to international filing. Bypass applications are discussed by MPEP 211.01c and MPEP 1895. Also, Track 1 do not enter national stage via 371. Examiner agreed this would traverse the restriction requirement, but an election still must be included with the reply with a statement that the restriction under unitiy of invention is inapplicablefor a 111a filing.

No specific subject matter was agreed upon as allowable,

/ANDREW POLAY/ Primary Examiner, Art Unit 3617	

Applicant is reminded that a complete written statement as to the substance of the interview must be made of record in the application file. It is the applicants responsibility to provide the written statement, unless the interview was initiated by the Examiner and the Examiner has indicated that a written summary will be provided. See MPEP 713.04
Please further see:
MPEP 713.04
Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews, paragraph (b)
37 CFR § 1.2 Business to be transacted in writing

Applicant recordation instructions: The formal written reply to the last Office action must include the substance of the interview. (See MPEP section 713.04). If a reply to the last Office action has already been filed, applicant is given a non-extendable period of the longer of one month or thirty days from this interview date, or the mailing date of this interview summary form, whichever is later, to file a statement of the substance of the interview.

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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 18/211,036	Filing Date 06/16/2023	☐ To be Mailed

ENTITY: ☑ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) 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 $100 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $480 =	
☐ 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	10/18/2023	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 30	Minus	** 30	= 0		x $100 =	0
	Independent (37 CFR 1.16(h))	* 4	Minus	*** 4	= 0		x $480 =	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		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ 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.	LIE
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	/JACQUELYN L WILLIAMS/
*** 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.	

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.

TO: DCIPDocketing@bclplaw.com
FROM: noreply@uspto.gov
CC: patentcenter_eofficeaction@uspto.gov
SUBJECT: USPTO: Patent Electronic System - Correspondence Notification for Customer Number 193853

Mon Oct 23 05:12:31 EDT 2023

Dear Patent Center Customer:

Correspondence Address:

Bryan Cave Leighton Paisner LLP (DC)
1155 F Street NW
Washington,DISTRICT OF COLUMBIA,20004-1357
UNITED STATES

This is a courtesy notification regarding the following USPTO patent application(s) associated with your Customer Number, 193853, that have new outgoing correspondence. This correspondence is now available for viewing in Patent Center.

The official date of notification of the outgoing correspondence will be indicated on the form (e.g., PTOL-90) accompanying the correspondence.

Disclaimer:
The list of documents shown below are provided as a courtesy and is not part of the official file wrapper. The content of the images shown in the Image File Wrapper is the official record.

Application	Document	Mailroom Date	Attorney Docket No.
18211036	EXIN	10/23/2023	3012490.000001.US20

To view your correspondence online, please sign in to Patent Center and then select Workbench/View correspondence. To update your email address(es), select Manage/Manage customer numbers.

If you have any questions, please contact the Patent Electronic Business Center (EBC) at ebc@uspto.gov or 866-217-9197 Monday – Friday, 6 a.m. to midnight ET.

Please do not reply to this email as it was sent from an unmonitored mailbox.

Sincerely,

The Patent Center Team

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
18/211,036	06/16/2023	Stephen James COLLIE	3012490.000001.US20

CONFIRMATION NO. 2954

193853
Bryan Cave Leighton Paisner LLP (DC)
1155 F Street NW
Washington, DC 20004-1357

PUBLICATION NOTICE

OC000000064386544

Date Mailed: 11/09/2023

Title:SAIL STRUCTURE

Publication No.US-2023-0356820-A1
Publication Date:11/09/2023

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 Public Records Division. The Public Records Division can be reached by telephone at (571) 272-3150 or (800) 972-6382, by facsimile at (571) 273-3250, by mail addressed to the United States Patent and Trademark Office, Public Records Division, 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 https://portal.uspto.gov/pair/PublicPair. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

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

TO: DCIPDocketing@bclplaw.com
FROM: noreply@uspto.gov
CC: patentcenter_eofficeaction@uspto.gov
SUBJECT: USPTO: Patent Electronic System - Correspondence Notification for Customer Number 193853

Thu Nov 09 05:39:13 EST 2023

Dear Patent Center Customer:

Correspondence Address:

Bryan Cave Leighton Paisner LLP (DC)
1155 F Street NW
Washington,DISTRICT OF COLUMBIA,20004-1357
UNITED STATES

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Application	Document	Mailroom Date	Attorney Docket No.
18211036	NTC.PUB	11/09/2023	3012490.000001.US20

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Sincerely,

The Patent Center Team

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.
18/211,036	06/16/2023	Stephen James COLLIE	3012490.000001.US20	2954

193853 7590 11/22/2023

Bryan Cave Leighton Paisner LLP (DC)
1155 F Street NW
Washington, DC 20004-1357

EXAMINER	
POLAY, ANDREW	

ART UNIT	PAPER NUMBER
3617	

NOTIFICATION DATE	DELIVERY MODE
11/22/2023	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):

DCIPDocketing@bclplaw.com

Office Action Summary	Application No. 18/211,036	Applicant(s) COLLIE, Stephen James	
	Examiner ANDREW POLAY	Art Unit 3617	AIA (FITF) Status Yes

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

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 19 July 2023.

☐ 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) 1-30 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) 1-30 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 28 July 2023 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 06/16/2023, 09/11/2023, 10/11/2023.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

4) ☐ Other: _____.

Notice of Pre-AIA or AIA Status

1. The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Election/Restrictions

2. Applicant's election with traverse of the restriction requirement filed 13 September 2023 in the reply filed on 18 October 2023 is acknowledged. The traversal is on the grounds that the application is filed under 111a and Unity of Invention does not apply. This is persuasive.

The requirement is withdrawn.

Claim Rejections - 35 USC § 112

3. The following is a quotation of 35 U.S.C. 112(b):

> (b) CONCLUSION.—The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.

The following is a quotation of 35 U.S.C. 112 (pre-AIA), second paragraph:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-30 are rejected under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor (or for applications subject to pre-AIA 35 U.S.C. 112, the applicant), regards as the invention.

Where applicant acts as his or her own lexicographer to specifically define a term of a claim contrary to its ordinary meaning, the written description must clearly redefine the claim term and set forth the uncommon definition so as to put one reasonably skilled in the art on notice that the applicant

intended to so redefine that claim term. *Process Control Corp. v. HydReclaim Corp.*, 190 F.3d 1350, 1357, 52 USPQ2d 1029, 1033 (Fed. Cir. 1999). The term "elastic" in claim 1 is used by the claim to mean "being more deformable than a material not indicated as being elastic" (Applicant's circular definition requires the term it defines.) while the accepted meaning is "In engineering, the elasticity of a material is quantified by the elastic modulus such as the Young's modulus, bulk modulus or shear modulus which measure the amount of stress needed to achieve a unit of strain; a higher modulus indicates that the material is harder to deform." (See https://en.wikipedia.org/wiki/Elasticity_(physics)) The term is indefinite because the specification does not clearly redefine the term. (Applicant's inconsistent use of the term is particularly confusing in light of Applicant's arguments to the ISA 27 July 2022 which ignore the explicit engineering definition in the prior art in the enormous bold typed equation in Column 3, Applicant fail to offer a definition of "elasticity" in the present Application, then asserts that property resulting from the definition of elasticity, the prior art's ability to adapt to a curve shape, is inconsistent with Applicant's use of the term as well as the entirety of the prior art's definition. The easiest remedy may be to include an explicit definition of elasticity in the claim that does not require the circular definition from the specification.)

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a)(1) the claimed invention was patented, described in a printed publication, or in public use, on sale, or otherwise available to the public before the effective filing date of the claimed invention.

6. Claims 1, 3, 25, 26, 30 are rejected under 35 U.S.C. 102a1 as being anticipated by Gaastra (EP 0375111).

7. Regarding Claim 1, Gaastra discloses a sail, comprising, a head, a tack, a luff extending between the head and the tack; and a luff region extending along the luff; wherein the luff region (Element 12) has a higher degree of elasticity (C5, L7) compared to a remainder of the sail (Element 14).

8. Regarding Claim 3, Gaastra discloses the sail of claim 1, wherein the sail is a mainsail. (C5, L31)

9. Regarding Claim 25, Gaastra discloses sails comprising: a head and a tack; a luff edge extending between the head and the tack; and a luff region comprising the luff edge and at least a portion of the sail adjacent the luff edge; wherein a degree of elasticity of the luff region and a degree of elasticity of a region of the sail adjacent the luff region are configured such that, when the sail is mounted to a sailing boat, tensioning the luff region assists to flatten the sail to a greater extent than would be achievable if the luff was of equivalent stiffness to a remainder of the sail. (This is true of the arrangement described in Fig. 1. See MPEP 2114.)

10. Regarding Claim 26, Gaastra discloses method of making a sail comprising the steps of: laying out material to form the sail; arranging material in a luff region of the sail and in a remainder of the sail such that in a direction of the luff, the luff region has a higher degree of elasticity compared to the remainder of the sail; and curing or sewing the sail to form a cohesive structure. (C6, L57)

11. Regarding Claim 30, Gaastra discloses method of making a sail having a luff region, wherein in a direction along a luff of the sail, the luff region has a higher degree of elasticity than a remainder of the sail. (C5, L5)

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:

> A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claims 4 is rejected under 35 U.S.C. 103 as being unpatentable over Gaastra.

Regarding Claim 4, Gaastra discloses the sail of claim 1, wherein the sail is a mainsail or windsurfer sail (C5, L33) but does not explicitly disclose a headsail. It would have been obvious at the time of filing for a person of ordinary skill in the marine art to use the contruction with a more elastic luff as a mainsail which can be accomplished with a reasonable expectation of success. The motivation to modify Gaastra is to stabilize the leech of the headsail similarly to the mainsail.

Allowable Subject Matter

14. Claims 2, 5-24, 27-29 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANDREW POLAY whose telephone number is (408)918-9746. The examiner can normally be reached M-F 9-5 Pacific.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joe Morano can be reached on 5712726684. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of published or unpublished applications may be obtained from Patent Center. Unpublished application information in Patent Center is available to registered users. To file and manage patent submissions in Patent Center, visit: https://patentcenter.uspto.gov. Visit https://www.uspto.gov/patents/apply/patent-center for more information about Patent Center and https://www.uspto.gov/patents/docx for information about filing in DOCX format. For additional questions, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/ANDREW POLAY/
Primary Examiner, Art Unit 3617
16 Nov 2023

Notice of References Cited	Application/Control No. 18/211,036	Applicant(s)/Patent Under Reexamination COLLIE, Stephen James	
	Examiner ANDREW POLAY	Art Unit 3617	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-4476799-A	10-1984	Bandy; Stephen D.	B63H9/067	114/102.33
	B					
	C					
	D					
	E					
	F					
	G					
	H					
	I					
	J					
	K					
	L					
	M					

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	18/211,036	COLLIE, Stephen James
	Examiner	**Art Unit**
	ANDREW POLAY	3617

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	09/07/2023	11/16/2023							
	1	÷								
	2	÷	✓							
	3	÷	✓							
	4	÷	✓							
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	28	÷	✓							
	29	÷	✓							
	30	÷	✓							

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	18/211,036	COLLIE, Stephen James
	Examiner	Art Unit
	ANDREW POLAY	3617

CPC - Searched*		
Symbol	Date	Examiner
B63H9/068 B63H9/0678 B63H9/065 B63H9/067	11/16/2023	AP

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
Inventor, IDS, Seaerch Keyword (attached), fwd/back, similarity	11/16/2023	AP

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
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			JPO; DERWENT; IBM_TDB)				
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L13	431	(B63H9/04 B63H9/06 B63H9/061 B63H9/0615 B63H9/0621 B63H9/0628 B63H9/0635 B63H9/065 B63H9/067 B63H9/0671 B63H9/0673 B63H9/0678 B63H9/068).cpc. AND (elastic flexible flexibility elasticity stiffness plasticity) AND composite	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/11/16 09:26 PM
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		elasticity stiffness plasticity) SAME (fabric material) AND composite					
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PE2E SEARCH - Search History (Interference)

There are no Interference searches to show.

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	18211036
Filing Date	2023-06-16
First Named Inventor	Stephen James COLLIE
Art Unit	3617
Examiner Name	POLAY, ANDREW
Attorney Docket Number	3012490.000001.US20

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
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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

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	1	2194499	GB	A	1998-03-09	ADRENALIN CO LTD		☐

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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, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.P/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	18211036
	Filing Date	2023-06-16
	First Named Inventor	Stephen James COLLIE
	Art Unit	3617
	Examiner Name	POLAY, ANDREW
	Attorney Docket Number	3012490.000001.US20

	1		☐

If you wish to add additional non-patent literature document citation information please click the Add button

EXAMINER SIGNATURE

Examiner Signature	/ANDREW POLAY/	Date Considered	11/16/2023

*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.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.P/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	18211036
Filing Date	2023-06-16
First Named Inventor	Stephen James COLLIE
Art Unit	3617
Examiner Name	POLAY, ANDREW
Attorney Docket Number	3012490.000001.US20

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Bruce B. Vance/	Date (YYYY-MM-DD)	2023-10-11
Name/Print	Bruce B. Vance	Registration Number	66187

This collection of information is required by 37 CFR 1.97 and 1.98. 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 1 hour 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.**

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.P/

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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:

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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.

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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.

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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.

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Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-22)
Approved for use through 05/31/2024. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	
Filing Date	2023-06-22
First Named Inventor	Stephen James COLLIE
Art Unit	
Examiner Name	
Attorney Docket Number	

U.S.PATENTS Remove

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
	1	4672907	A	1987-06-16	SMALE	
	2	4854255	A	1989-08-08	KIEF	
	3	6843194	B1	2005-01-18	BAUDET	
	4	5315948	A	1994-05-31	BROWN	

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U.S.PATENT APPLICATION PUBLICATIONS Remove

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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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	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]

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	
Filing Date	2023-06-22
First Named Inventor	Stephen James COLLIE
Art Unit	
Examiner Name	
Attorney Docket Number	

	1	0375111	EP	A1	1990-06-27	GAASTRA INTERNATIONAL LICENSING N.V.		
	2	1073250	ES	U	2010-11-25	BANARES VILELLA IGNACIO		
	3	3320321	DE	A1	1984-12-06	MENZ,WOLFGANG, DIPL.-ING		
	4	2585324	FR	A1	1987-01-30	ZODIAC		

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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, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1		

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EXAMINER SIGNATURE

Examiner Signature	/ANDREW POLAY/	Date Considered	11/16/2023

*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.

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	
Filing Date	2023-06-22
First Named Inventor	Stephen James COLLIE
Art Unit	
Examiner Name	
Attorney Docket Number	

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

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See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Mark R. Kresloff/	Date (YYYY-MM-DD)	2023-06-22
Name/Print	Mark R. Kresloff	Registration Number	42766

This collection of information is required by 37 CFR 1.97 and 1.98. 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 1 hour 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.**

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Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	18211036
Filing Date	2023-06-16
First Named Inventor	Stephen James COLLIE
Art Unit	3617
Examiner Name	POLAY, Andrew
Attorney Docket Number	3012490.000001.US20

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
	1	8506739	B2	2013-08-13	GAUTIER et al.	

If you wish to add additional U.S. Patent citation information please click the Add button.

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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Examiner Initial*	Cite No	Foreign Document Nu	Country Code[2] i	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]
	1							☐

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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, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	18211036
	Filing Date	2023-06-16
	First Named Inventor	Stephen James COLLIE
	Art Unit	3617
	Examiner Name	POLAY, Andrew
	Attorney Docket Number	3012490.000001.US20

	1		☐

If you wish to add additional non-patent literature document citation information please click the Add button

EXAMINER SIGNATURE

Examiner Signature	/ANDREW POLAY/	Date Considered	11/16/2023

*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.

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Filing Date	2023-06-16
First Named Inventor	Stephen James COLLIE
Art Unit	3617
Examiner Name	POLAY, Andrew
Attorney Docket Number	3012490.000001.US20

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☐ See attached certification statement.

☐ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Bruce B. Vance/	Date (YYYY-MM-DD)	2023-09-11
Name/Print	Bruce B. Vance	Registration Number	66187

This collection of information is required by 37 CFR 1.97 and 1.98. 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 1 hour 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.**

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FROM: noreply@uspto.gov
CC: patentcenter_eofficeaction@uspto.gov
SUBJECT: USPTO: Patent Electronic System - Correspondence Notification for Customer Number 193853

Wed Nov 22 05:16:01 EST 2023

Dear Patent Center Customer:

Correspondence Address:

Bryan Cave Leighton Paisner LLP (DC)
1155 F Street NW
Washington,DISTRICT OF COLUMBIA,20004-1357
UNITED STATES

This is a courtesy notification regarding the following USPTO patent application(s) associated with your Customer Number, 193853, that have new outgoing correspondence. This correspondence is now available for viewing in Patent Center.

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Application	Document	Mailroom Date	Attorney Docket No.
18211036	CTNF	11/22/2023	3012490.000001.US20
18211036	892	11/22/2023	3012490.000001.US20
18211036	1449	11/22/2023	3012490.000001.US20
18211036	1449	11/22/2023	3012490.000001.US20
18211036	1449	11/22/2023	3012490.000001.US20

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Sincerely,

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www.uspto.gov

ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
18/211,036	**02/13/2024 11:48:24 AM Z ET**	**3012490.000001.US20**

Title of Invention

SAIL STRUCTURE

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	2954	FILED BY	Simon Suh
PATENT CENTER #	64302708	FILING DATE	06/16/2023
CUSTOMER #	193853	FIRST NAMED INVENTOR	Stephen James COLLIE
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Mark Kresloff

Documents

TOTAL DOCUMENTS: 1

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
3012490_000001_US20_POA.pdf	3	Power of Attorney	325 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
3012490_000001_US20_POA.pdf	271D3FEB12E0B96E611EBEB6250AF60183B73AE3533F1EFBC748E0ABF0C62FCF593D2F840162D3720BF5F4D6B980A8AB925F461267FA57591443226445312CCA

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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for 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.

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Doc Code: PA..
Document Description: Power of Attorney

PTO/AIA/82A (07-13)
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NOTE: This form is to be submitted with the Power of Attorney by Applicant form (PTO/AIA/82B) to identify the application to which the Power of Attorney is directed, in accordance with 37 CFR 1.5, unless the application number and filing date are identified in the Power of Attorney by Applicant form. If neither form PTO/AIA/82A nor form PTO/AIA82B identifies the application to which the Power of Attorney is directed, the Power of Attorney will not be recognized in the application.

Application Number	18/211,036
Filing Date	June 16, 2023
First Named Inventor	Stephen James COLLIE
Title	SAIL STRUCTURE
Art Unit	3617
Examiner Name	Andrew POLAY
Attorney Docket Number	3012490.000001.US20

SIGNATURE of Applicant or Patent Practitioner

Signature	/Mark R. Kresloff/	Date (Optional)	February 13, 2024
Name	Mark R. Kresloff	Registration Number	42,766
Title (if Applicant is a juristic entity)			
Applicant Name (if Applicant is a juristic entity)			

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. If more than one applicant, use multiple forms.

☑ *Total of 1 forms are submitted.

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

Doc Code: PA..
Document Description: Power of Attorney

PTO/AIA/82B (07-13)
Approved for use through 09/30/2025. OMB 0651-0035
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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POWER OF ATTORNEY BY APPLICANT

I hereby revoke all previous powers of attorney given in the application identified in either the attached transmittal letter or the boxes below.

Application Number	Filing Date

(Note: The boxes above may be left blank if information is provided on form PTO/AIA/82A.)

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TEAM NEW ZEALAND LIMITED

☐ Inventor or Joint Inventor (title not required below)

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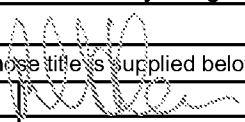
Signature		Date (Optional)	8 February 2024
Name	Russell Lenard Hamilton GREEN		
Title	General Counsel		

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
18/211,036	06/16/2023	Stephen James COLLIE	3012490.000001.US20

CONFIRMATION NO. 2954

193853
Bryan Cave Leighton Paisner LLP (DC)
1155 F Street NW
Washington, DC 20004-1357

POA ACCEPTANCE LETTER

OC000000068552083

Date Mailed: 02/21/2024

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 02/13/2024.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

Questions about the contents of this notice and the requirements it sets forth 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**.

/lqchau/

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CC: patentcenter_eofficeaction@uspto.gov
SUBJECT: USPTO: Patent Electronic System - Correspondence Notification for Customer Number 193853

Wed Feb 21 05:13:38 EST 2024

Dear Patent Center Customer:

Correspondence Address:

Bryan Cave Leighton Paisner LLP (DC)
1155 F Street NW
Washington,DISTRICT OF COLUMBIA,20004-1357
UNITED STATES

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Application	Document	Mailroom Date	Attorney Docket No.
18211036	N570	02/21/2024	3012490.000001.US20

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of: COLLIE, Stephen James	Customer No.: 193853
Application No.: 18/211,036	Confirmation No.: 2954
Filed: June 16, 2023	Art Unit: 3617
For: SAIL STRUCTURE	Examiner: Andrew Polay

Commissioner for Patents
P.O. Box 1450
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RESPONSE TO NON-FINAL REJECTION

In response to the office action dated November 22, 2023, the Applicant respectfully requests consideration of the remarks herein.

INTRODUCTORY COMMENTS

Listing of Claims begins on page **2** of this paper.

Remarks begin on page **6** of this paper.

LISTING OF CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application.

1. (Previously Presented) A sail comprising

a head,

a tack,

a luff extending between the head and the tack; and

a luff region extending along the luff;

wherein the luff region has a higher degree of elasticity compared to a remainder of the sail.

2. (Previously Presented) The sail of claim 1,

wherein the luff region of the sail includes a first material and a remainder of the sail includes at least a second material,

wherein the first material and the second material are different, and

wherein an average stiffness of the second material is in a range of 2-20 times higher than an average stiffness of the first material.

3. (Previously Presented) The sail of claim 1, wherein the sail is a mainsail.

4. (Previously Presented) The sail of claim 1, wherein the sail is a headsail.

5. (Previously Presented) The sail of claim 2, wherein the first material has a failure strain of at least about 2.5% to about 30%.

6. (Previously Presented) The sail of claim 2, wherein the first material has a failure strain of at least about 2 to about 10 times the failure strain of the second material.

7. (Previously Presented) The sail of claim 2, wherein the first material has an average Young's Modulus of about 1 to about 60 GPa.

8. (Previously Presented) The sail of claim 2, wherein the first material has an average elasticity that is at least about 100% to about 2400% higher than an average elasticity of the second material.

9. (Previously Presented) The sail of claim 1, wherein there is an absence of sail fibres, or sailcloth fibres, that extend in a direction parallel, or at least substantially parallel, to the luff in the luff region of the sail.

10. (Previously Presented) The sail of claim 7, wherein there are sail fibres, or sailcloth fibres, in the luff region of the sail, the sail fibres, or sailcloth fibres, extending in a line that leaves an angle of greater or equal than about 15 degrees free from fibres relative to a direction parallel to the luff of the sail.

11. (Previously Presented) The sail of claim 2, wherein the first material extends at least 50% to about 95% of a distance between the head and tack of the sail.

12. (Previously Presented) The sail of claim 2, wherein the first material extends up to about 10% to about 50% of a width of the sail towards a leech of the sail.

13. (Previously Presented) The sail of claim 10, wherein the first material extends towards a leech of the sail to a greater extent in the middle of the sail relative to a height of the sail compared to the luff regions towards the head and tack of the sail.

14. (Previously Presented) the sail of claim 1, wherein the sail includes a third region having an elasticity less than other regions of the sail, this third region extending along at least a portion of a margin of the luff region between the luff region and the remainder of the sail.

15. (Previously Presented) The sail of claim 14, wherein the third region extends from the head to the tack of the sail.

16. (Previously Presented) The sail of claim 14, wherein the third region comprises carbon.

17. (Previously Presented) The sail of claim 2, wherein the first material comprises a gradient of reducing elasticity in a direction from luff to leech, as defined by its:

(i) failure strain, or

(ii) average Young's Modulus, or

(iii) both (i) and (ii).

18. (Original) The sail of claim 17, wherein the first material comprises polyester.

19. (Original) The sail of claim 17, wherein the first material comprises polyester in combination with one or more of aramid and UHMWPE.

20. (Previously Presented) The sail of claim 1, wherein a difference in elasticity is achieved by a lesser material thickness in the luff region compared with the remainder of the sail.

21. (Previously Presented) The sail of claim 1, wherein in a luff direction, a ratio of a stiffness of regions outside the luff region and the stiffness of the luff region is in a range of 2-25 times greater.

22. (Previously Presented) The sail of claim 1, wherein an orientation of a material in the luff region is different from an orientation of a material in the remainder of the sail, such that the luff region has a higher degree of elasticity compared to the remainder of the sail.

23. (Previously Presented) The sail of claim 1, wherein the luff region does not comprise any carbon fibres oriented within 15 degrees of parallel to the luff, and wherein the remainder of the sail does comprise carbon fibres oriented within 15 degrees of parallel to the luff.

24. (Previously Presented) The sail of claim 1,

wherein the sail is a twin skin mainsail having two skins defining the sail,

wherein each skin has a luff region extending along the luff, and

wherein each luff region has a higher degree of elasticity compared to a remainder of the respective skin.

25. (Previously Presented) A sail comprising:

a head and a tack;

a luff edge extending between the head and the tack;

a luff region comprising the luff edge and at least a portion of the sail adjacent the luff edge;

wherein a degree of elasticity of the luff region and a degree of elasticity of a region of the sail adjacent the luff region are configured such that, when the sail is mounted to a sailing boat, tensioning the luff region assists to flatten the sail to a greater extent than would be achievable if the luff was of equivalent stiffness to a remainder of the sail.

26. (Previously Presented) A method of making a sail comprising the steps of:

laying out material to form the sail;

arranging material in a luff region of the sail and in a remainder of the sail such that in a direction of the luff, the luff region has a higher degree of elasticity compared to the remainder of the sail; and

curing or sewing the sail to form a cohesive structure.

27. (Previously Presented) The method of claim 26, wherein the step of laying out material comprises laying out tapes of resin infused fibrous material.

28. (Previously Presented) The method of claim 26, wherein the step of laying out material comprises laying out fibres glued between sheets of plastic laminate.

29. (Previously Presented) The method of claim 26, wherein the step of laying out material comprises sewing together component pieces of fabric or laminate.

30. (Previously Presented) A method of making a sail having a luff region, wherein in a direction along a luff of the sail, the luff region has a higher degree of elasticity than a remainder of the sail.

REMARKS

In the present application, claims 1-30 are pending, of which, claims 1, 25, 26 and 30 are independent claims. In view of the remarks that follow, the Applicant respectfully requests reconsideration.

Allowable Subject Matter

At the outset, the Applicant thanks the Examiner for the indication of allowable subject matter. Specifically, the office action states that claims 2, 5-24 and 27-29 recite allowable subject matter.

Claim Rejections Under 35 USC §112

The office action rejects claims 1-30 under 35 USC §112(b) for allegedly being indefinite. Specifically, the office action argues that the term "elastic" is used in claim 1 to mean "***being more deformable than a material not indicated as being elastic***." Therefore, the definition of "elastic" is circular because it requires the term it defines.

MPEP Section 2111 makes clear that a claim term must be given its plain meaning, unless inconsistent with the specification. The same standard is applied in the Federal Courts. What is meant by "plain" is the ordinary and customary meaning as known by those skilled in the art at the time of the invention.

The Applicant respectfully asserts that nothing said in the specification imparts, or was intended to impart, a special definition for the term "elastic." The highlighted quote above that the office action is applying as a definition for the term "elastic" comes from paragraph [0046] of the specification. However, this paragraph is merely attempting to point out that an elastic portion of a sail (e.g., the luff region of the sail) is more deformable than any other part of the sail that may not be elastic. Nothing in this statement disclaims or is meant to disclaim the plain and customary meaning of "elastic." Nor is anything said inconsistent with the plain and customary meaning of the term "elastic." If something is "elastic," as defined in accordance with its plain and customary meaning, it will be more deformable (reversibly deformable) than something that is not elastic.

In view of the explanation above, the Applicant respectfully requests that the Examiner reconsider the position that the specification expressly calls for a special, limited

definition of the term "elastic," thus rendering the claims indefinite. Because there was no disclaimer of the plain and customary meaning of "elastic," the plain and customary meaning should be applied in the claims, and the rejection under 35 USC §112(b) withdrawn.

Claim Rejections Under 35 USC §102 and 35 USC §103

The office action rejects claims 1, 3, 25, 26 and 30 under 35 USC §102(a)(1) for allegedly being anticipated by EP Patent 0375111 (herein "Gaastra"). The office action also rejects, under 35 USC §103, claim 4 for allegedly being obvious over Gaastra.

It is well established that in order to maintain a prima facie case of anticipation or obviousness, all of the limitations set forth in a rejected claim must be disclosed in prior art cited against the rejected claim. Gaastra fails to disclose each and every limitation of claims 1, 3, 4, 25, 26 and 30.

Independent claim 1 is directed to "a sail." The sail comprises, among other things:

> a head,
> a tack,
> a luff extending between the head and the tack; and
> a luff region extending along the luff;
> wherein ***the luff region has a higher degree of elasticity compared to a remainder of the sail***.

Independent claim 25 is also directed to a sail and, while reciting some features that are the same, or substantially the same, as those set forth in independent claim 1, claim 25 also recites:

> wherein ***a degree of elasticity of the luff region and a degree of elasticity of a region of the sail adjacent the luff region are configured such that***, when the sail is mounted to a sailing boat, ***tensioning the luff region assists to flatten the sail to a greater extent than would be achievable if the luff was of equivalent stiffness to a remainder of the sail***.

Independent claim 26 is directed to "a method of making a sail." The method comprises, among other things:

> arranging material in a luff region of the sail and in a remainder of the sail such that in a direction of the luff, ***the luff region has a***

> ***higher degree of elasticity compared to the remainder of the sail****....*

Independent claim 30 is directed to "a method of making a sail." The sail has a luff region, wherein in a direction along a luff of the sail, ***the luff region has a higher degree of elasticity than a remainder of the sail***.

Each of claims 1, 25, 26 and 30 has language making it clear that the luff region of the sail, compared to the remainder of the sail, has a ***higher degree of elasticity***. In claim 25, the wording is such that the higher degree of elasticity is realized by the luff region being less stiff than the remainder of the sail, and thus, when a tensile force is applied to the luff region (see e.g., FIG. 2), the sail is flattened to a greater extent than would be achievable if the luff region and the remainder of the sail had the same stiffness.

For at least the reasons presented above, the Applicant again respectfully submits that the Office should apply the plain and customary meaning of the term "elastic," as the specification contains no disclaimer of the plain and customary meaning. So what then is the plain and customary meaning of "elastic?" If one were to refer to various technical sources, such as physics and/or material science references, all of the definitions seem to employ similar phrases, such as the ability to stretch or elongate and return to an original shape; the ability to resist deformation by stretching or elongating; the capability of returning to an original length, shape, and the like, after being stretched, deformed, elongated, compressed or expanded.

If the Applicant applies the plain and customary meaning to the term "elastic" or "elasticity" which is simply the tendency of an object or material to exhibit elastic qualities, it becomes clear and very definite that all of the claims, including independent claims 1, 25, 26 and 30 expressly require that the luff region of the sail have ***the ability to stretch or elongate, and therefore deform, to a greater degree*** than the remaining portion of the sail when a force is applied to the sail, and return to its original state when the force is removed.

In the office action, the Examiner refers to the Applicant's remarks made in response to the written opinion associated with the corresponding PCT application. In that response, the Applicant explains, with reference to FIG. 2 (see below) that ***because the luff region has a higher degree of elasticity compared to the remainder of the sail***, an applied tensile force, e.g., at luff tensioner 17 translates into a deformation (e.g., an elongation or in-plane

deformation as described in the specification) of the luff region without bearing much of the load. As a consequence, the load is transferred to an area of less elasticity 16 outside the luff region, which in turn moves in the direction of a force F pulling the sail to the front (i.e., in a direction of the luff in relation to the remainder of the sail) which further results in a reduction of sail camber. The benefit of this is to provide a way of modifying the shape of the sail in an extremely efficient manner allowing it to better react to changing wind conditions and directions of sail, while maintaining the conventional mast and rigging design.

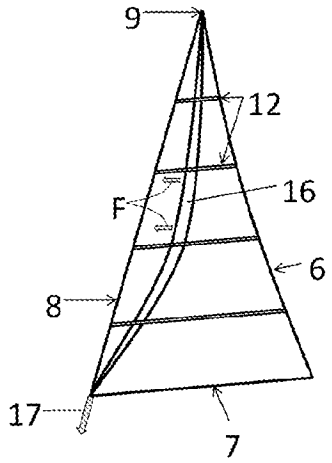

Figure 2

The invention, as is currently set forth in each of independent claims 1, 25, 26 and 30 unequivocally involves a sail having a luff region that has a higher degree of elasticity than the remainder of the sail. Because of this, the luff region is able to stretch or elongate, e.g., in the direction of arrow 17 in FIG. 2, to a greater degree than the remainder of the sail.

Turning now to the office action, it states that Gaastra discloses a sail comprising a head, a tack, a luff extending between the tack, and a luff region extending along the luff which has a higher degree of elasticity compared to a remainder of the sail. As illustrated in FIG. 5 of Gaastra, the sail comprises a main panel 31 and a luff panel 32. The main panel 31 is expressly characterized as being made of a "relatively stiff clear polyester sheet material." The luff panel 32, on the other hand, is expressly characterized as comprising "a laminate of a woven material and a plastics sheet material … that is impervious to air, ***is very flexible***, strong and relatively light-weight."

We respectfully submit that the luff area 32 of the sail disclosed in Gaastra has a ***high degree of flexibility*** compared to the main panel 31. In contrast, the luff region of the sail according to claims 1, 25 and 26, has a ***high degree of elasticity*** compared to the remainder of the sail. These are ***distinctly different material properties***, as those skilled in the art would readily appreciate.

Consider two materials. If a first material has a ***high degree of elasticity*** compared to that of the second material, then the first material has a ***greater*** ability to undergo stretching or elongation (e.g., in-plane deformation) under load and return to its original shape and/or size once the load is removed compared to the ability of the second material subject to the same load. On the other hand, if the first material has a ***high degree of flexibility*** compared to the second material, then the first material ***bends*** more easily than the second material. It is clearly understood that "bend," in terms of flexibility, means that a material is able to adapt a ***curved shape*** in two perpendicular directions or planes. Thus, while elasticity is understood to involve in-plane deformation, flexibility is understood to be deformation in two directions or planes. While elasticity is understood to involve the ability to return to an original shape or size, no such ability is necessarily attributable to flexibility. While the high degree of elasticity of the luff region in the present invention, as claimed, results in reduced camber, the high degree of flexibility in Gaastra results in more camber (see Col. 3:22-31, Col. 5:18-26, and Claim 1). For at least these reasons, elasticity and flexibility cannot be interpreted as equivalents.

Since Gaastra makes absolutely no mention anywhere in the patent, claims or figures of the word "elastic" or "elasticity," or of any material having the characteristics of elasticity or a material having a high degree of elasticity compared to another material, Gaastra cannot possibly disclose the above highlighted claim limitations from claims 1, 25, 26 and 30. Because of this, Gaastra cannot support a prima facie case of anticipation (or obviousness) with respect to any of these claims. Claims 1, 25, 26 and 30 are, therefore, patentable over Gaastra. So too are claims 3 and 4, at least because each of these claims depends from independent claim 1.

Conclusion

The Application is in condition for allowance. Notice of same is earnestly solicited. If for any reason the Examiner finds the application other than in condition for allowance, the

Examiner is requested to call the undersigned attorney at (202) 508-6012 to discuss the steps necessary for placing the application in condition for allowance. All correspondence should continue to be sent to the below-listed address.

If these papers are not considered timely filed by the Patent and Trademark Office, then a petition is hereby made under 37 CFR §1.136, and any additional fees required under 37 CFR §1.136 for any necessary extension of time, or any other fees required to complete the filing of this response, may be charged to Deposit Account No. 02-4467. Please credit any overpayment to deposit Account No. 02-4467.

Dated: February 22, 2024

Respectfully submitted,

By: */Mark R. Kresloff/*
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APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
18/211,036	**02/22/2024 03:07:35 PM Z ET**	**3012490.000001.US20**

Title of Invention

SAIL STRUCTURE

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	2954	FILED BY	Simon Suh
PATENT CENTER #	64414205	FILING DATE	06/16/2023
CUSTOMER #	193853	FIRST NAMED INVENTOR	Stephen James COLLIE
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Mark Kresloff

Documents

TOTAL DOCUMENTS: 3

DOCUMENT		PAGES	DESCRIPTION	SIZE (KB)
3012490_000001_US20_Response.pdf		11	-	103 KB
3012490_000001_US20_Response-A....pdf	(1-1)	1	Amendment/Request for Reconsideration-After Non-Final Rejection	16 KB
3012490_000001_US20_Response-CLM.pdf	(2-5)	4	Claims	26 KB
3012490_000001_US20_Response-REM.pdf	(6-11)	6	Applicant Arguments/Remarks Made in an Amendment	84 KB

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DOCUMENT	MESSAGE DIGEST(SHA-512)
3012490_000001_US20_Response.pdf	9A1DA5B7098BB1263D80668E8CC3CD9694B2784A8EDED9983EC069185FBC812CD30E68B58BE3722E538524E6BA46F0050AB6FFE6B544EF1FADC5BD64F2B3F6F8
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3012490_000001_US20_Response-REM.pdf	9DF8723F92F8D5E90B7DC23A3211865E1D00559CE754876E9C3099F5954E11A775C5B7CA371D14C65A419317E8AEDD257E0DCDDE7D2F087DCE9DA2DF673B36A4

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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.

PTO/SB/06 (09-11)
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 18/211,036	Filing Date 06/16/2023	☐ To be Mailed

ENTITY: ☑ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) 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 $100 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $480 =	
☐ 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	02/22/2024	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 30	Minus	** 30	= 0		x $100 =	0
	Independent (37 CFR 1.16(h))	* 4	Minus	*** 4	= 0		x $480 =	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		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ 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.	SLIE
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	/SHANDA E ROSS/
*** 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.	

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.**

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
18/211,036	06/16/2023	Stephen James COLLIE	3012490.000001.US20	2954

193853 7590 03/14/2024

Bryan Cave Leighton Paisner LLP (DC)
1155 F Street NW
Washington, DC 20004-1357

EXAMINER	
POLAY, ANDREW	

ART UNIT	PAPER NUMBER
3617	

NOTIFICATION DATE	DELIVERY MODE
03/14/2024	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):

DCIPDocketing@bclplaw.com

Office Action Summary	Application No. 18/211,036	Applicant(s) COLLIE, Stephen James	
	Examiner ANDREW POLAY	Art Unit 3617	AIA (FITF) Status Yes

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

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 22 Feb 2023.

☐ 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) 1-30 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) 1,3-4,25-26 and 30 is/are rejected.

8) ☑ Claim(s) 2,5-24 and 27-29 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 28 July 2023 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 _____.

3) ☑ Interview Summary (PTO-413) Paper No(s)/Mail Date 2/29/2024.

4) ☐ Other: _____.

Notice of Pre-AIA or AIA Status

The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a)(1) the claimed invention was patented, described in a printed publication, or in public use, on sale, or otherwise available to the public before the effective filing date of the claimed invention.

2. Claims 1, 3, 25, 26, 30 are rejected under 35 U.S.C. 102a1 as being anticipated by Gaastra (EP 0375111).

3. Regarding Claim 1, Gaastra discloses a sail, comprising, a head, a tack, a luff extending between the head and the tack; and a luff region extending along the luff; wherein the luff region (Element 12) has a higher degree of elasticity (C5, L7) compared to a remainder of the sail (Element 14).

4. Regarding Claim 3, Gaastra discloses the sail of claim 1, wherein the sail is a mainsail. (C5, L31)

5. Regarding Claim 25, Gaastra discloses sails comprising: a head and a tack; a luff edge extending between the head and the tack; and a luff region comprising the luff edge and at least a portion of the sail adjacent the luff edge; wherein a degree of elasticity of the luff region and a degree of elasticity of a

region of the sail adjacent the luff region are configured such that, when the sail is mounted to a sailing boat, tensioning the luff region assists to flatten the sail to a greater extent than would be achievable if the luff was of equivalent stiffness to a remainder of the sail. (This is true of the arrangement described in Fig. 1. See MPEP 2114.)

6. Regarding Claim 26, Gaastra discloses method of making a sail comprising the steps of: laying out material to form the sail; arranging material in a luff region of the sail and in a remainder of the sail such that in a direction of the luff, the luff region has a higher degree of elasticity compared to the remainder of the sail; and curing or sewing the sail to form a cohesive structure. (C6, L57)

7. Regarding Claim 30, Gaastra discloses method of making a sail having a luff region, wherein in a direction along a luff of the sail, the luff region has a higher degree of elasticity than a remainder of the sail. (C5, L5)

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:

> A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 4 is rejected under 35 U.S.C. 103 as being unpatentable over Gaastra.

Regarding Claim 4, Gaastra discloses the sail of claim 1, wherein the sail is a mainsail or windsurfer sail (C5, L33) but does not explicitly disclose a headsail. It would have been obvious at the time of filing for a person of ordinary skill in the marine art to use the construction with a more elastic

luff as a mainsail which can be accomplished with a reasonable expectation of success. The motivation to modify Gaastra is to stabilize the leech of the headsail similarly to the mainsail.

Allowable Subject Matter

10. Claims 2, 5-24, 27-29 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Response to Arguments

Applicant's arguments filed 22 Feb 2024 have been fully considered but they are not persuasive.

Regarding the 112b rejection, Applicant argued, without cite to a specific source, “it will be more deformable (reversibly deformable) than something that is not elastic.” Under the 103 arguments, Applicant argues on page 8

> “So what then is the plain and customary meaning of "elastic?" If one were to refer to various technical sources, such as physics and/or material science references, all of the definitions seem to employ similar phrases, such as the ability to stretch or elongate and return to an original shape; the ability to resist deformation by stretching or elongating; the capability of returning to an original length, shape, and the like, after being stretched, deformed, elongated, compressed or expanded.”

As best understood by Examiner, Applicant is not referencing any specific "physics and/or material science reference" because Applicant is using the term colloquially and the broadest reasonable interpretation in light of Applicant's specification is "the ability to stretch or elongate and return to an original shape; the ability to resist deformation by stretching or elongating; the capability of returning to an original length, shape, and the like, after being stretched, deformed, elongated, compressed or expanded." Examiner withdraws the 112b rejection.

103 Rejection

Regarding the 103, Applicant argues that the prior art lacks the property of "elasticity" because it uses the word "flexibility" and not the word "elasticity." "Since Gaastra makes absolutely no mention anywhere in the patent, claims or figures of the word "elastic" or "elasticity," or of any material having the characteristics of elasticity or a material having a high degree of elasticity compared to another material, Gaastra cannot possibly disclose the" … "degree of elasticity of the luff region and a degree of elasticity of a region of the sail adjacent the luff region". This neglects evidence in the 112b rejection where Examiner pointed out that tensile modulus equation in Gaasta is a synonym for elastic modulus. "Young's modulus" used by Applicant is the elastic portion of the elastic modulus curve, as stated in the previously cited Wikipedia article. The Examiner is not persuaded that Gaastra containing the definition of tensile modulus as of force per unit strain does not address elasticity.

Applicant argues that elasticity is not the same as flexibility. Examiner agrees. Applicant did not attempt to cite a specific physics and/or material science reference to show that possessing flexibility excludes elasticity. One specific scientific paper that attempts to model the relationship of flexibility to Young's modulus uses flexibility to mean "While flexibility requires the materials to undergo elastic

strain repeatably, bendability only needs materials to strain once, and that could be accomplished plastically. Examiner's position is that flexible sails also possess some degree of elasticity. (Peng, page 1, C1. See References Cited.) Applicant attempted to disprove that flexibility includes elasticity by instead using what the Peng reference use as the definition of bendability, a property that does not require elasticity. Examiner is not persuaded Applicant's narrow uncited definition of flexibility exclude the property of elasticity from the sail of Gaasta.

What Gaastra does disclose is a sail with "the luff sleeve being made from conventional sail making material having a high degree of flexibility as compared to the sheet material" (C5,L5) and "the sheet material, such as synthetic plastics film material, used to make the sail according to the present invention is heavier and/or stiffer than conventional sail making material." (C4, L10) Gaastra uses the "sheet" in the way Applicant uses "remainder of the sail." To paraphrase, Gaastra is claiming a conventional luff portion and a stiffer remainder of the sail (sheet). Applicant is claiming a more elastic luff and a stiffer remainder of the sail. Applicant also uses "less stiff" as a synonym for elastic in Applicant's paragraph 46 and higher stiffness in Claim 2. Applicant clarified that "elasticity" is a relative term to the stiffer portion in Applicant's arguments. Examiner's position is that Gaastra's stiffer remainder of the sail than the conventional luff portion anticipates Applicant's claimed sail with an elastic luff portion and a remainder of the sail that that is stiffer than the luff. The Examiner maintains the 102 rejection.

Allowable Subject Matter

Claims 2, 5-24, 27-29 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Peng (Matter, 2021) discloses that flexibility includes elasticity and bendable does not.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANDREW POLAY whose telephone number is (408)918-9746. The examiner can normally be reached M-F 9-5 Pacific.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joe Morano can be reached on 5712726684. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of published or unpublished applications may be obtained from Patent Center. Unpublished application information in Patent Center is available to registered users. To

file and manage patent submissions in Patent Center, visit: https://patentcenter.uspto.gov. Visit https://www.uspto.gov/patents/apply/patent-center for more information about Patent Center and https://www.uspto.gov/patents/docx for information about filing in DOCX format. For additional questions, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/ANDREW POLAY/
Primary Examiner, Art Unit 3617
9 March 2024

Applicant-Initiated Interview Summary	**Application No.** 18/211,036	**Applicant(s)** COLLIE, Stephen James		
	Examiner ANDREW POLAY	**Art Unit** 3617	**AIA (First Inventor to File) Status** Yes	**Page** 1 of 2

All Participants (applicant, applicants representative, PTO personnel)	**Title**	**Type**
ANDREW POLAY	Primary Examiner	Video Conference
Mark Kresloff		

Date of Interview: 29 February 2024

Issues Discussed:

35 U.S.C. 112

Examiner agreed that "wherein the luff region ... provides less resistance to in-plane elongation than a remainder of the sail" would overcome the 112b.

35 U.S.C. 103

Examiner did not agree that the prior art failed to show elasticity in the same plane as the tension.

Examiner explained that the art shows a conventional luff with a stiffer remainder; applicant claims an elastic luff with stiffer remained. Because the claims require the stiffness/elasticity difference between the two, it's anticipated.

Examiner explained that Young's modulus/tensile modulus is an intensive property independent of sample size. (Nylon has a lower elastic modulus than UHMPE.) How much something deforms with a force is elasticity is an extensive property because it is dependent on sample size (two identical rubber bands take twice as much force as one to stretch though they are made of the same material with the same Young's modulus.) Examiner would dig up an additional reference to show that the flexibility, an extensive property, is also related to elastic modulus. Elastic modulus/tensile modulus is what is cited explicitly in Gaastra. Applicant remained skeptical, and would wait for full explanation in the formal response.

Examiner confirmed the allowable claims would remain unless new art was found on subsequent searches.

/ANDREW POLAY/ Primary Examiner, Art Unit 3617	

Applicant is reminded that a complete written statement as to the substance of the interview must be made of record in the application file. It is the applicants responsibility to provide the written statement, unless the interview was initiated by the Examiner and the Examiner has indicated that a written summary will be provided. See MPEP 713.04
Please further see:
MPEP 713.04
Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews, paragraph (b)
37 CFR § 1.2 Business to be transacted in writing

Applicant-Initiated Interview Summary	**Application No.** 18/211,036	**Applicant(s)** COLLIE, Stephen James		
	Examiner ANDREW POLAY	**Art Unit** 3617	**AIA (First Inventor to File) Status** Yes	**Page** **2 of 2**

Applicant recordation instructions: The formal written reply to the last Office action must include the substance of the interview. (See MPEP section 713.04). If a reply to the last Office action has already been filed, applicant is given a non-extendable period of the longer of one month or thirty days from this interview date, or the mailing date of this interview summary form, whichever is later, to file a statement of the substance of the interview.

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

Notice of References Cited	Application/Control No. 18/211,036	Applicant(s)/Patent Under Reexamination COLLIE, Stephen James	
	Examiner ANDREW POLAY	Art Unit 3617	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date YYYY-MM-DD	Name	CPC Classification	US Classification
	A					
	B					
	C					
	D					
	E					
	F					
	G					
	H					
	I					
	J					
	K					
	L					
	M					

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date YYYY-MM-DD	Country	Name	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	Peng, Grasyon, Synder. "What makes a material bendable? A thickness-dependent metric for bendability, malleability, ductilty" Matter. 1 Sept 2021 pp2694-2696 (Year: 2021)
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in YYYY-MM-DD format are publication dates. Classifications may be US or foreign.

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	18/211,036	COLLIE, Stephen James
	Examiner	**Art Unit**
	ANDREW POLAY	3617

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	09/07/2023	11/16/2023	03/09/2024						
	1	÷		✓						
	2	÷	✓	O						
	3	÷	✓	✓						
	4	÷	✓	✓						
	5	÷	✓	O						
	6	÷	✓	O						
	7	÷	✓	O						
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	25	÷	✓	✓						
	26	÷	✓	O						
	27	÷	✓	O						
	28	÷	✓	O						
	29	÷	✓	O						
	30	÷	✓	✓						

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	18/211,036	COLLIE, Stephen James
	Examiner	Art Unit
	ANDREW POLAY	3617

CPC - Searched*		
Symbol	Date	Examiner
B63H9/068 B63H9/0678 B63H9/065 B63H9/067	03/09/2024	AP

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
Inventor, IDS, Seaerch Keyword (attached), fwd/back, similarity	03/09/2024	AP

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner

/ANDREW POLAY/ Primary Examiner, Art Unit 3617	

CellPress

Matter

Matter of Opinion

What makes a material bendable? A thickness-dependent metric for bendability, malleability, ductility

Jun Peng,[1,2,3] Matthew Grayson,[2] and G. Jeffrey Snyder[3,*]

The requirement for materials that can bend is proliferating with the growing interest in flexible electronics and devices. The terms bending and flexing are often used interchangeably even though flexing is usually meant to be elastic while bending often involves plastic deformation. Materials can be compared with a simple "bendability figure-of-merit" through the fracture strain—that is, how much a material can be bent plastically once before breaking—for a given thickness of material, which is similar to the way that yield strain serves as a figure-of-merit for flexibility.

Flexible materials are found in many new applications such as healthcare, robotics, and electronics. Although many applications require repeated flexing, some applications require a material to be bent only once without breaking. Because of the underappreciated importance of such "single deformation" bendable materials, we distinguish flexibility (ability to bend repeatedly) and bendability (ability to bend once without fracture) and formulate the primary requirements for bendability into a simple figure-of-merit to facilitate comparisons and reporting. While flexibility[1] requires the materials to undergo elastic strain repeatably, bendability only needs materials to strain once, and that could be accomplished plastically. All materials can be bent if they are sufficiently thin, so a metric for bendability must be scaled for thickness. Future applications, such as energy systems for the internet-of-things, will likely require new materials and devices where trade-offs in performance and bendability must be considered, and the goal of this paper is to clearly delineate what properties make materials bendable and define a bendability figure-of-merit to allow materials to be compared. Currently, qualitative demonstrations of flexibility,[1] such as pictures of devices being bent or worn, do not allow for quantitative comparisons of different materials and rarely distinguish between repeated flexing or a single bend. Whereas the stresses of bending and flexing and their impacts on materials are well studied in the field of mechanics, a simple guideline for experts in other fields is lacking. In the field of electronics, bendable electrically conducting materials are intensively utilized in electronic device manufacture. Thermocouples, curved displays, and solar cells, for example, may only need to be bent once during installation or fabrication. Transparent conducting oxides (TCOs),[2,3] widely used in displays of commercial electronics, only need to be bent when assembling under processing conditions, where the limitation of flexural elongation (yield strain) is less than 1%.[4] Possible future applications for wearable electronics,[5] sensors, supercapacitors, batteries, thermoelectrics,[6] and other energy-harvesting concepts have further broadened the interest in bendable materials.

Within the field of mechanics, the intensive material property that characterizes the extent of maximum elastic deformation before inducing plastic deformation is the yield strain ε_y, and that of plastic deformation before breaking or cracking is the fracture strain ε_f. The fracture strain (maximum elongation divided by total length) is readily known for most materials and is routinely measured by a tensile test.[7] Materials with a large fracture strain are typically elongated plastically and called ductile, and tensile fracture strain serves as a good metric for ductility. Ductile materials are also malleable and formable in that they deform plastically without fracturing when struck with a hammer or under compression. Compressive fracture strain also serves as a reliable metric for malleability. Most materials at high enough temperature have very high or indefinite ductility and malleability and therefore indefinite bendability, such as metals, polymers (plastics), and glasses, which allows them to be easily formed into complex shapes when heated, even semiconductor or ceramic powders. Superplastic materials have enhanced ductility by engineering grain boundaries such as nanocrystalline copper.[8]

During bending, the tensile strain ε is a suitable descriptor to characterize the point of failure. Bendability is most simply demonstrated by bending a material along a radius of curvature without breakage. This working definition can be easily quantified and related to materials parameters. We define the bendability $b = 1/r_b$, with units of m^{-1} where r_b is the minimum bending radius of curvature before fracture. The strain of a bent material (sheet or wire) with a thickness h (see Figure 1) is

$$\varepsilon = \frac{h}{2r_b}$$

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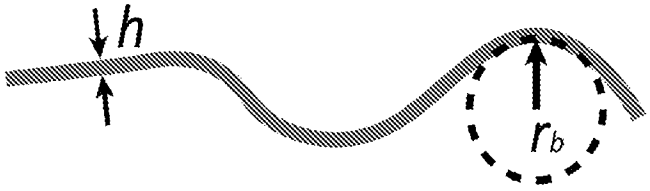

Figure 1. Fragile materials like glass, silicon, and transparent conducting oxides are bendable once at ambient temperature, if thin enough

The minimum bending radius r_b characterizes the bendability $b = 1/r_b$, $= 2\varepsilon_f/h$ of materials with a thickness h and maximum fracture strain ε_f.

The maximum fracture strain ε_f before a bending failure occurs during the greatest tensile deformation on the outer surface and compressive strain on the inner surface. The middle layer (neutral layer) experiences no strain and no stress. Thus, the bendability b depends on both the material properties through ε_f and the test geometry through h.

$$b = \frac{1}{r_b} = \frac{2}{h}\varepsilon_f$$

From this expression, it is clear that any material can be made highly bendable if made thin enough as $h \rightarrow 0$, analogous to flexible materials. From the above definition, we note that simply demonstrating bendability without reporting or recognizing the importance of thickness is of limited scientific value.

The intensive or material property that enters into b is the bending elongation (at fracture strain, ε_f), which makes it the materials figure-of-merit for bendability (b_{FoM}). Comparing two materials of the same thickness, the material with a higher ε_f will be more bendable.

$$b_{FoM} = \varepsilon_f$$

In comparison, the material property for measuring flexibility is the flexing elongation (at yield strain ε_y), which makes it the materials figure-of-merit for flexibility ($f_{FOM} = \varepsilon_y$) for repeatable bending[1] (See Figure 2).

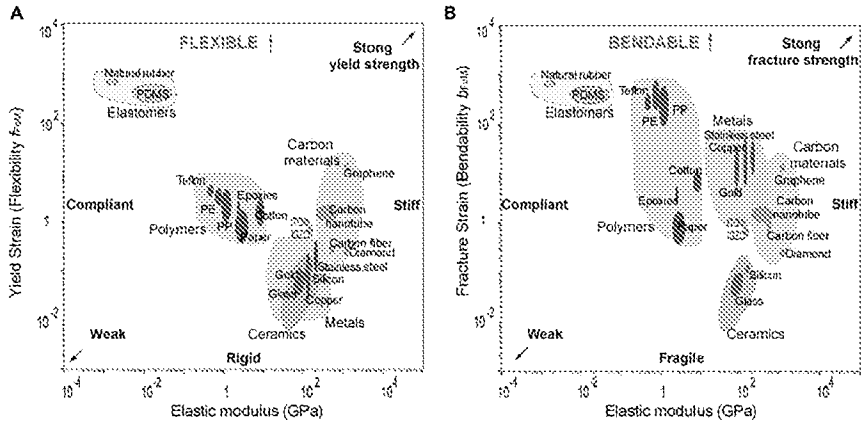

Figure 2. Comparison of bendability with flexibility at ambient temperature

(A) The flexibility figure-of-merit f_{FOM} is characterized by yield strain ε_y, varying from rigid to flexible. Increasing yield strength along the diagonal direction is indicated.

(B) The bendability figure-of-merit b_{FOM} is defined as fracture strain ε_f which indicates that bendable materials need to be compliant (low elastic modulus) and strong (high fracture strength) as opposed to stiff and weak. Whereas many brittle materials are equally bendable and flexible, polymers and metals are more bendable by 2 orders of magnitude than they are flexible. Material abbreviations: polypropylene (PP), polyethylene (PE), In-Sn-O (ITO), In-Ga-Zn-O (IGZO), and polydimethylsiloxane (PDMS). (For plotted data please see Table 1)

$$f_{FoM} = \varepsilon_y$$

Using an Ashby chart at ambient temperature (see Figure 2), we compare elastic elongation at yield and bending elongation at fracture for various common materials including elastomers, polymers, metals, ceramics, and carbon-based materials. The elastic elongation, which serves as the flexibility figure-of-merit, tends to be proportional to stiffness (elastic modulus), making very soft elastomers much more flexible than polymers or metals. The higher bendability of elastomers, in comparison, is much less extreme. The ductility of thermoplastic polymers and metals, even at room temperature makes them much more bendable than they are flexible, approaching the bendability of elastomers. Elastomers and thermoset polymers such as epoxy have identical flexibility and bendability because they are cross-linked polymers that prevent the molecules from sliding even as they allow stretching. Metals have stable slip planes while ceramics generally do not, making metals bendable and bulk ceramics not. Most common semiconductors and oxides (e.g., transparent conducting ITO and IGZO) have strong, directional bonding making them brittle, while exceptions like Ag_2S can be quite bendable.[9] The increasing temperature often leads to a brittle to ductile transition that extends the range of plastic strain, allowing permanent deformation, such as when ironing clothes, styling hair, blowing glass, or forming metals. Extreme bendability is achieved by superplastic materials with increased ductility. Examples include composite Al-based and Mg-based ceramics,[10] which are both strong but also bendable.

In conclusion, we suggest that fracture strain be used as a thickness-dependent figure-of-merit b_{FoM} for comparing and improving the bendability of functional materials and setting up criteria for materials selection. We furthermore encourage the community of researchers to report

Table 1. The data source of Figure 2

		Yield strength (elastic limit), MPa		Young's modulus, Gpa		Flexural elongation, %		Bending elongation, %	
		Low	High	Low	High	Low	High	Low	High
Elastomers	Nature rubber	21	28	0.0012	0.0021	600	780	600	780
	PDMS	1.69	2.13	0.000205	0.000215	424	782	424	782
	EVA	9.5	10	0.007	0.009	880	930	880	930
Polymers	Human hair	90	92	2.3	3.6	2.5	4	39	44
	Paper	15	34	2	4	0.375	1.7	0.38	1.7
	Teflon	19.7	21.7	0.4	0.552	3.569	5.425	200	400
	PE	19.7	29	0.621	0.896	2.199	4.67	200	800
	PP	20.7	37.2	0.896	1.55	1.335	4.152	100	600
	Epoxies	36	71.6	2.27	2.55	1.412	3.154	3	6
	Cotton fiber	100	350	7	12	0.833	5	5	11
Ceramics	Silicon	165	180	140	180	0.092	0.129	0.09	0.13
	Soda lime Glass	29.3	36.1	66	74.1	0.04	0.055	0.04	0.05
Metals	Gold	20	40	76	81	0.025	0.053	5	35
	lead	6.02	12	13	14	0.043	0.092	30	60
	silver	189	301	68.9	73.1	0.259	0.437	1	2
	Copper	50	340	120	140	0.036	0.283	6	50
	Steel	257	1140	190	210	0.122	0.6	10	49
Conducting oxides	IGZO	700	1300	137	137	0.511	0.949	*	*
	ITO	1200	1200	116	116	1.034	1.034	*	*
Caron materials	Graphene	110000	130000	1000	1050	10.476	13	*	*
	Carbon nanotubes	11000	63000	200	950	1.158	31.5	*	*
	Carbon fiber	1830	1850	530	580	0.316	0.349	0.7	2
	Diamond	2800	2930	1050	1210	0.231	0.279	0.23	0.28

1. The broad class region of carbon materials is expected based on the literature values of graphene, carbon nanotube, and carbon fibers.
2. All the literature values are listed above, and the other data including the broad class regions are from the Granta chart software database (CES EduPack, ANSYS GRANTA).
3. No tensile strength of IGZO was found. The strength is expected to be 0.7–1.3 GPa within the elastic strain of 0.5–1%.
4. The bending elongation of IGZO, ITO, graphene, and carbon nanotube is expected to be comparable to their flexural elongation. Noted as (*).

thickness in both bendability and flexibility studies to simplify a quantitative comparison across other candidate materials for a given application.

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L20	22	(B63H9/04 B63H9/06 B63H9/061 B63H9/0615 B63H9/0621 B63H9/0628 B63H9/0635 B63H9/065 B63H9/067 B63H9/0671 B63H9/0673 B63H9/0678 B63H9/068).cpc. AND (elastic flexible flexibility elasticity) WITH (tensile ADJ modulus)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/11/16 10:01 PM
L20	195	L19 AND (tractor traction)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/15 06:33 PM
L21	65	(B63H9/04 B63H9/06 B63H9/061 B63H9/0615 B63H9/0621 B63H9/0628 B63H9/0635	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/11/16 10:02 PM

		B63H9/065 B63H9/067 B63H9/0671 B63H9/0673 B63H9/0678 B63H9/068).cpc. AND (elastic flexible flexibility elasticity) WITH ((tensile elastic young's) ADJ modulus)					
L21	1	L20 AND (cavitate cavitation anti-cavitation) WITH (strut gearcase (gear ADJ case) torpedo)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/15 06:34 PM
L22	105	"909142"	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/11/16 11:27 PM
L22	33	((B63H20/32 B63H2020/323 B63H2020/326 B63H20/34).cpc. OR (B63H21/26.cpc. B63H21/265.cpc. B63H21/28.cpc.)) AND (cavitate cavitation anti-cavitation) WITH (trailing NEAR3(end edge))	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/15 07:34 PM
L23	49	((US-9932099-B1 OR US-9359059-B1 OR US-8545280-B1 OR US-5967866-A OR US-5916003-A OR US-4898553-A OR US-4792313-A OR US-4781632-A OR US-4636175-A OR US-11111849-B1 OR US-6705907-B1 OR US-6623320-B1 OR US-5759073-A OR US-5632658-A OR US-5343823-A OR US-4741670-A OR US-5820425-A OR US-5807151-A OR US-6059618-A).did. AND USPT.dbnm.) OR ((US-20150367920-A1 OR WO-2004074089-A1 OR EP-1336561-A1 OR US-20030114052-A1 OR US-20170334537-A1).did. AND	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 02:35 AM

		DWPI.dbnm.) OR ((DE-227725-C OR CN-107472490-A OR DE-58562-C).did. AND FPRS.dbnm.) OR ((US-20210354801-A1 OR US-20170334537-A1 OR US-20160090162-A1 OR US-20150360760-A1 OR US-20150239540-A1 OR US-20140364265-A1 OR US-20110226173-A1 OR US-20110130056-A1 OR US-20080171479-A1 OR US-20070098559-A1 OR US-20020185050-A1 OR US-20100285708-A1).did. AND PGPB.dbnm.) OR ((CN-111132899-A OR WO-2021058388-A1 OR CN-110316345-A OR WO-2012007709-A1 OR WO-2004074088-A1 OR CN-105775085-A OR FR-2532908-A1).did. AND FTDB.dbnm.) OR ((US-3606579-A OR US-RE21634-E OR US-3306246-A).did. AND USOC.dbnm.)					
L23	9	"909142".pn.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/11/16 11:28 PM
L24	24	L23 AND thrust	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 02:41 AM
L24	3	"0909142".pn.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/11/16 11:28 PM
L25	23	"2909142".pn.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/11/16 11:28 PM
L25	6	L23 AND thrust WITH	(US-PGPUB; USPAT;	OR	ON	ON	2022/03/16

		(cavitatation cavitat$4)	USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				02:42 AM
L26	238	(B63H020/006 B63H5/10 B63H2005/103 B63H2005/106 B63H2020/006).cpc. AND (thrust torque) WITH (fraction$2 proportion$3 more)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 10:32 AM
L27	240	(B63H020/006 B63H5/10 B63H2005/103 B63H2005/106 B63H2020/006).cpc. AND (thrust torque) WITH (fraction$2 proportion$3 (more greater NEAR3(forward front)))	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 10:32 AM
L28	81	(B63H020/006 B63H5/10 B63H2005/103 B63H2005/106 B63H2020/006).cpc. AND (thrust torque) WITH (fraction$2 proportion$3 (more greater NEAR3(forward front))) NEAR4 propeller	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 10:34 AM
L29	3	(B63H020/006 B63H5/10 B63H2005/103 B63H2005/106 B63H2020/006).cpc. AND (thrust torque) WITH (fraction$2 proportion$3 (more greater NEAR3(forward front))) NEAR4 propeller SAME (cavitation cavitat$4)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 10:35 AM
L30	35	(B63H020/006 B63H5/10 B63H2005/103 B63H2005/106 B63H2020/006).cpc. AND (thrust torque) WITH (fraction$2 proportion$3 (more greater NEAR3(forward front))) NEAR4 propeller AND	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 10:38 AM

		(cavitation cavitat$4)					
L31	64	"5009621"	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 10:39 AM
L32	404	(B63H020/006 B63H5/10 B63H2005/103 B63H2005/106 B63H2020/006).cpc. AND ((thrust torque) WITH ((forward front first) NEAR4 propeller))	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 10:45 AM
L33	80	(B63H020/006 B63H5/10 B63H2005/103 B63H2005/106 B63H2020/006).cpc. AND ((thrust torque) WITH ((forward front first) NEAR4 propeller) WITH (more fraction$3 propoportion$4))	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 10:45 AM
L34	89	(B63H020/006 B63H5/10 B63H2005/103 B63H2005/106 B63H2020/006).cpc. AND ((thrust torque) WITH ((forward front first) NEAR4 propeller) WITH (greater more fraction$3 propoportion$4))	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 10:46 AM
L35	60	(B63H020/006 B63H5/10 B63H2005/103 B63H2005/106 B63H2020/006).cpc. AND ((thrust torque) WITH (split$4))	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 10:53 AM
L36	57	((US-9932099-B1 OR US-9359059-B1 OR US-8545280-B1 OR US-5967866-A OR US-5916003-A OR US-4898553-A OR US-4792313-A OR US-4781632-A OR US-4636175-A OR US-11111849-B1 OR US-6705907-B1 OR US-6623320-B1 OR US-5759073-A OR US-5632658-A OR US-	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 02:10 PM

		5343823-A OR US-4741670-A OR US-5820425-A OR US-5807151-A OR US-6059618-A OR US-5009621-A OR US-9248898-B1 OR US-3646834-A).did. AND USPT.dbnm.) OR ((US-20150367920-A1 OR WO-2004074089-A1 OR EP-1336561-A1 OR US-20030114052-A1 OR US-20170334537-A1 OR US-5009621-A).did. AND DWPI.dbnm.) OR ((DE-227725-C OR CN-107472490-A OR DE-58562-C).did. AND FPRS.dbnm.) OR ((US-20210354801-A1 OR US-20170334537-A1 OR US-20160090162-A1 OR US-20150360760-A1 OR US-20150239540-A1 OR US-20140364265-A1 OR US-20110226173-A1 OR US-20110130056-A1 OR US-20080171479-A1 OR US-20070098559-A1 OR US-20020185050-A1 OR US-20100285708-A1 OR US-20090053944-A1 OR US-20200130794-A1 OR US-20150225053-A1).did. AND PGPB.dbnm.) OR ((CN-111132899-A OR WO-2021058388-A1 OR CN-110316345-A OR WO-2012007709-A1 OR WO-2004074088-A1 OR CN-105775085-A OR FR-2532908-A1 OR CN-111661294-A).did. AND FTDB.dbnm.) OR ((US-3606579-A OR US-RE21634-E OR US-3306246-A).did. AND USOC.dbnm.)					
L37	37	L36 AND (torque thrust)	(US-PGPUB; USPAT;	OR	ON	ON	2022/03/16

			USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				02:10 PM
L38	0	L36 AND (tovolvo)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 02:40 PM
L39	9	L36 AND (volvo)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 02:40 PM
L40	4	"20070098559"	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 02:41 PM
L41	248	(B63H020/006 B63H5/10 B63H2005/103 B63H2005/106 B63H2020/006).cpc. AND volvo	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 02:57 PM
L42	0	L41 AND propeller NEAR3 (fornt forward rear aft) WITH (torque thrust load$4) NEAR3 (split proportion greater)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 02:58 PM
L43	0	L41 AND propeller NEAR3 (fornt forward rear aft) WITH (torque thrust load$4) NEAR3 (split$4 proportion greater)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 02:58 PM
L44	0	L41 AND propeller NEAR3 (front forward rear aft) WITH (torque thrust load$4) NEAR3 (split$4 proportion greater)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 02:58 PM
L45	11	L41 AND propeller NEAR3 (front forward rear aft) WITH (torque thrust load$4)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 02:59 PM
L46	3476	(B63H20/32 B63H2020/323 B63H2020/326 B63H20/34).cpc. OR (B63H21/26.cpc. B63H21/265.cpc. B63H21/28.cpc.)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 04:06 PM

L47	0	L46 AND seperation WITH (cavitation cavitate cavitating anti-cavitation)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 04:08 PM
L48	15	L46 AND separation WITH (cavitation cavitate cavitating anti-cavitation)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 04:08 PM
L49	33	L46 AND (trailing NEAR2 (end edge)) WITH (cavitation cavitate cavitating anti-cavitation)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 04:09 PM
L50	0	L46 AND (trailing NEAR2 (end edge)) WITH (cavitation cavitate cavitating anti-cavitation) AND (trailing NEAR2 (end edge)) NEAR4 (width thickness)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 04:11 PM
L51	3476	(B63H20/32 B63H2020/323 B63H2020/326 B63H20/34).cpc. OR (B63H21/26.cpc. B63H21/265.cpc. B63H21/28.cpc.)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 04:51 PM
L52	9	L46 AND (strut torpedo casing) WITH (cavitation cavitate cavitating anti-cavitation) WITH (width thickness)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 04:51 PM
L53	1977	(B63H20/24 B63H20/245 B63H20/26).cpc.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 05:05 PM
L54	349	L53 AND L51	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 05:05 PM
L55	18	L53 AND L51 AND (tractor traction)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 05:05 PM
L56	18	L36 AND exhaust	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT;	OR	ON	ON	2022/03/16 05:07 PM

			IBM_TDB)				
L57	18	("3745964" | "3788267" | "4636175" | "4767366" | "4871334" | "4897061" | "4911665" | "5085603" | "5219272" | "5277634" | "5344349").pn. OR ("5967866").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/03/16 05:48 PM
L58	5	(((US-20070098559-A1 OR US-20110315063-A1 OR US-20160090162-A1).did AND PGPB.dbnm) OR ((US-5967866-A OR US-8545280-B1 OR US-5009621-A OR US-6059618-A).did AND USPT.dbnm))	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/03/16 06:26 PM
L59	15	L23 AND (pitch camber)	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/03/16 06:30 PM
L60	11	(B63H020/006 B63H5/10 B63H2005/103 B63H2005/106 B63H2020/006).cpc. AND tip ADJ vortex	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 06:37 PM
L61	448	L46 AND cavitat$4	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 06:40 PM
L62	70	L46 AND cavitat$4 AND (mph knots kts m/s m/s m/h ft/s Re)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 06:42 PM
L63	10	L46 AND cavitat$4 SAME (mph knots kts m/s m/s m/h ft/s Re)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 06:42 PM
L64	140	L46 AND cavitat$4 SAME (mph knots kts m/s m/s m/h ft/s Re speed velocity)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 07:07 PM
L65	67	L46 AND cavitat$4 WITH (mph knots kts m/s m/s m/h ft/s Re speed velocity)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 07:08 PM
L66	66	L46 AND cavitat$4	(US-PGPUB; USPAT;	OR	ON	ON	2022/03/16

		WITH (speed velocity)	USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				07:22 PM
L67	40	L46 AND cavitat$4 WITH (speed velocity)	(US-PGPUB; USPAT)	OR	ON	ON	2022/03/16 07:22 PM
L68	70	(B63B$.cpc. B63H$.cpc.) AND strut WITH cavitation	(US-PGPUB; USPAT)	OR	ON	ON	2022/03/16 07:39 PM
L69	68	(B63B$.cpc. B63H$.cpc.) AND strut WITH cavitation AND ((tail trailing) (edge end))	(US-PGPUB; USPAT)	OR	ON	ON	2022/03/16 07:40 PM
L70	37	(B63B$.cpc. B63H$.cpc.) AND strut WITH cavitation SAME ((tail trailing) (edge end))	(US-PGPUB; USPAT)	OR	ON	ON	2022/03/16 07:40 PM
L71	4	("4810218" | "4832635" | "4898553").pn. OR ("5584734").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/03/16 07:44 PM
L72	10	("1890879" | "2021309" | "4636175").pn. OR ("4898553").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/03/16 07:45 PM
L73	13	("2082059" | "3434447" | "3745964" | "4897061" | "5299961" | "5759073" | "5807151" | "5954554" | "6010380" | "7387556" | "7762772").pn. OR ("9932099").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/03/16 11:23 PM
L74	6	(B63H020/006 B63H5/10 B63H2005/103 B63H2005/106 B63H2020/006).cpc. AND propeller ADJ tip	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/03/17 03:40 PM
L75	8	(B63H020/006 B63H5/10 B63H2005/103 B63H2005/106 B63H2020/006).cpc. AND ((propeller ADJ tip) OR ((wingtip bladetip tip) ADJ vortex))	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/03/17 03:41 PM
L76	3374	(B63H20/32 OR	(US-PGPUB; USPAT;	OR	ON	ON	2022/06/04

		B63H1/18 OR B63H20/26 OR B63H2001/145 OR B63H2020/323).cpc.	USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				08:08 PM
L77	6	((tractor traction front) WITH propeller AND (gearcase gear ADJ case) AND (wide width) WITH (pressure cavitat$4)).clm.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/06/04 08:18 PM
L78	18	("3745964" | "3788267" | "4636175" | "4767366" | "4871334" | "4897061" | "4911665" | "5085603" | "5219272" | "5277634" | "5344349").pn. OR ("5967866").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/06/04 08:29 PM
L79	80	("1821450" | "2062293" | "2064195" | "2085483" | "2170733" | "2672115" | "2765040" | "2987031" | "3087553" | "3356150" | "3478620" | "3646834" | "4118996" | "4540369" | "4604032" | "4619584" | "4642059" | "4741670" | "4792314").pn. OR ("5009621").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/06/04 08:29 PM
L80	3788	(B63H20/32 OR B63H1/18 OR B63H20/26 OR B63H2001/145 OR B63H2020/323 OR B63H2020/006).cpc.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/12/17 05:20 PM
L81	16	("10011341"|"20070098559"|"20110315063"|"20160090162"|"4636175"|"4781632"|"4792313"|"4898553"|"5009621"|"5916003"|"5954554"|"5967866"|"6059618"|"8545280"|"9359059"|"9932099").PN.	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/17 05:46 PM
L82	0	L81 AND vortex	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/17 05:46 PM
L83	9	"17000532"	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/12/17 05:55 PM
L84	43	(Artificial Intelligence)	(US-PGPUB; USPAT;	OR	ON	ON	2022/12/17

		More like doc: US-11459074-B1 Text: (US-10011341-B1 OR US-9932099-B1 OR US-9359059-B1 OR WO-8909163-A1 OR US-4792313-A OR CA-1320666-C OR US-8545280-B1 OR US-5766048-A OR US-5967866-A OR US-4911665-A OR US-4295835-A OR US-20110091328-A1 OR EP-2311726-B1 OR US-5857880-A OR GB-2279315-A OR US-4898553-A OR US-6010380-A OR US-4781632-A OR US-4636175-A OR GB-2303603-A).did.	USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				05:56 PM
L85	3592	(B63H20/32 OR B63H1/18 OR B63H20/26 OR B63H2001/145 OR B63H2020/323).cpc.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/03/24 11:01 PM
L86	3736	(B63H020/006 B63H5/10 B63H2005/103 B63H2005/106 B63H2020/006).cpc.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/03/24 11:03 PM
L87	118	B63H2001/145.cpc.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/03/24 11:03 PM
L88	28	L86 AND L87	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/03/24 11:04 PM
L89	18	("0529916" | "1386835" | "3528382" | "3885516" | "5423701" | "5522703" | "5759073" | "5766047" | "6062926" | "8444391" | "8459950" | "8585366" | "8641463" | "20080089786").pn. OR ("9868497").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/03/24 11:04 PM
L90	21	"880860".ap.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR,	OR	ON	ON	2023/03/24 11:05 PM

			WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L91	32	(Artificial Intelligence) Similar to: 17/880,860 with 0 CPC Selections and 0 Text Selections Text: (US-11459074-B1 OR US-10011341-B1 OR US-9932099-B1 OR CA-1199530-A OR GB-2116926-A OR CA-1329063-C OR US-5035663-A OR US-11572144-B1 OR DE-3305278-A1 OR US-11572145-B1 OR US-11198493-B2 OR US-4295835-A OR EP-1107906-B1 OR EP-1107906-A1 OR WO-0013966-A1 OR US-4317655-A OR EP-3967592-A1 OR US-20220081087-A1 OR US-8267732-B1 OR JP-2022047324-A OR GB-2294915-A OR GB-2301803-A OR US-11247761-B1 OR US-4959033-A OR US-4792313-A OR CA-1320666-C OR CA-1335770-C OR US-20150158570-A1 OR US-20170334536-A1 OR US-10106236-B2 OR US-4932907-A OR US-6062926-A OR WO-8909163-A1 OR KR-20030093068-A OR KR-20030092989-A OR US-20170334537-A1 OR KR-20030026785-A OR US-5902160-A OR US-9216805-B1 OR JP-2017206185-A OR US-9981729-B2 OR US-6840828-B1 OR US-6068529-A OR US-20160001867-A1 OR US-9296459-B2 OR SE-507789-C2 OR US-9403588-B1 OR US-10336429-B1 OR JP-	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO))	OR	ON	ON	2023/03/24 11:06 PM

		2016013733-A OR US-9227715-B1).did.					
L92	37	(Artificial Intelligence) More like doc: US-11459074-B1 Text: (WO-8909163-A1 OR US-4792313-A OR CA-1320666-C OR US-5967866-A OR US-6059618-A OR EP-2311726-B1 OR US-20110091328-A1 OR US-8636469-B2 OR US-20230043247-A1 OR US-4781632-A OR EP-4129816-A1 OR US-4898553-A OR WO-0058151-A1 OR EP-1169223-A1 OR US-4636175-A OR EP-1507701-A1 OR US-20070098559-A1 OR US-7407366-B2 OR US-6705907-B1 OR US-5009621-A).did.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/03/24 11:06 PM
L118	18022010	gb "882939"	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/02/28 02:47 PM
L119	56	"882939"	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/02/28 02:48 PM
L120	16	"882939" AND gb	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/02/28 02:48 PM
L121	2	"8829939" AND gb	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/02/28 02:48 PM
L122	7978	(B63H9/04 B63H9/06 B63H9/061 B63H9/0615 B63H9/0621 B63H9/0628 B63H9/0635 B63H9/065 B63H9/067 B63H9/0671 B63H9/0673 B63H9/0678	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/01 06:30 PM

		B63H9/068).cpc.					
L123	961	(B63H9/04 B63H9/06 B63H9/061 B63H9/0615 B63H9/0621 B63H9/0628 B63H9/0635 B63H9/065 B63H9/067 B63H9/0671 B63H9/0673 B63H9/0678 B63H9/068).cpc. AND (elasticity flexibility modulus elastic flexible stiffness stiff) AND sail WITH (fabric material composite)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/02 12:35 PM
L124	0	(B63H9/04 B63H9/06 B63H9/061 B63H9/0615 B63H9/0621 B63H9/0628 B63H9/0635 B63H9/065 B63H9/067 B63H9/0671 B63H9/0673 B63H9/0678 B63H9/068).cpc. AND (elasticity flexibility modulus elastic flexible stiffness stiff) AND sail WITH (fabric material composite) AND polyestster	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/02 01:24 PM
L125	242	(B63H9/04 B63H9/06 B63H9/061 B63H9/0615 B63H9/0621 B63H9/0628 B63H9/0635 B63H9/065 B63H9/067 B63H9/0671 B63H9/0673 B63H9/0678 B63H9/068).cpc. AND (elasticity flexibility modulus elastic flexible stiffness stiff) AND sail WITH (fabric material composite) AND polyester	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/02 01:24 PM
L126	262	(B63H9/04 B63H9/06 B63H9/061 B63H9/0615 B63H9/0621 B63H9/0628	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/02 01:27 PM

		B63H9/0635 B63H9/065 B63H9/067 B63H9/0671 B63H9/0673 B63H9/0678 B63H9/068).cpc. AND (elasticity flexibility modulus elastic flexible stiffness stiff stretch strain deform$4) AND sail WITH (fabric material composite) AND polyester					
L127	265	(B63H9/04 B63H9/06 B63H9/061 B63H9/0615 B63H9/0621 B63H9/0628 B63H9/0635 B63H9/065 B63H9/067 B63H9/0671 B63H9/0673 B63H9/0678 B63H9/068).cpc. AND (elasticity flexibility modulus elastic flexible stiffness stiff stretch strain deform$6) AND sail WITH (fabric material composite) AND polyester	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/02 01:27 PM
L128	78	(B63H9/04 B63H9/06 B63H9/061 B63H9/0615 B63H9/0621 B63H9/0628 B63H9/0635 B63H9/065 B63H9/067 B63H9/0671 B63H9/0673 B63H9/0678 B63H9/068).cpc. AND (elasticity flexibility modulus elastic flexible stiffness stiff stretch strain deform$6) AND sail WITH (second another) WITH (fabric material composite) AND polyester	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/02 01:27 PM
L129	30	(B63H9/04 B63H9/06 B63H9/061 B63H9/0615 B63H9/0621 B63H9/0628 B63H9/0635 B63H9/065 B63H9/067	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/05 12:45 AM

		B63H9/0671 B63H9/0673 B63H9/0678 B63H9/068).cpc. AND (elasticity flexibility modulus elastic flexible stiffness stiff stretch strain deform$6) AND sail WITH (second another) WITH (fabric material composite) AND polyester AND modulus					
L130	35	(Artificial Intelligence) More like doc: US-20230356820-A1 Text: (EP-4277841-A1 OR WO-2022130349-A1 OR US-4672907-A OR EP-0375111-A1 OR US-4815409-A OR US-4831953-A OR EP-0191216-B1 OR US-5315948-A OR US-5172647-A OR JP-S61247591-A OR JP-S6127798-A OR JP-S62116393-A OR US-4864954-A OR IE-841197-L OR CA-1216775-A OR US-5178086-A OR AU-2004279613-B2 OR US-4593639-A OR EP-0191216-A1 OR AU-2003207370-B2).did.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/05 01:25 AM
L131	199	(B63H9/04 B63H9/06 B63H9/061 B63H9/0615 B63H9/0621 B63H9/0628 B63H9/0635 B63H9/065 B63H9/067 B63H9/0671 B63H9/0673 B63H9/0678 B63H9/068).cpc. AND (young's OR modulus)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/08 05:47 PM
L132	200	(B63H9/04 B63H9/06 B63H9/061 B63H9/0615 B63H9/0621 B63H9/0628 B63H9/0635 B63H9/065 B63H9/067 B63H9/0671	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/08 05:48 PM

		B63H9/0673 B63H9/0678 B63H9/068).cpc. AND (young's OR modulus OR gpa)					
L133	0	(B63H9/04 B63H9/06 B63H9/061 B63H9/0615 B63H9/0621 B63H9/0628 B63H9/0635 B63H9/065 B63H9/067 B63H9/0671 B63H9/0673 B63H9/0678 B63H9/068).cpc. AND polyethelene ADJ film NEAR4 polyester NEAR2 (mesh woven weave thread)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/08 07:37 PM
L134	0	(B63H9/04 B63H9/06 B63H9/061 B63H9/0615 B63H9/0621 B63H9/0628 B63H9/0635 B63H9/065 B63H9/067 B63H9/0671 B63H9/0673 B63H9/0678 B63H9/068).cpc. AND polyethelene ADJ film SAME polyester NEAR2 (mesh woven weave thread)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/08 07:37 PM
L135	0	(B63H9/04 B63H9/06 B63H9/061 B63H9/0615 B63H9/0621 B63H9/0628 B63H9/0635 B63H9/065 B63H9/067 B63H9/0671 B63H9/0673 B63H9/0678 B63H9/068).cpc. AND polyethelene	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/08 07:37 PM
L136	0	(B63H9/04 B63H9/06 B63H9/061 B63H9/0615 B63H9/0621 B63H9/0628 B63H9/0635 B63H9/065 B63H9/067 B63H9/0671 B63H9/0673	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/08 07:37 PM

		B63H9/0678 B63H9/068).cpc. AND polyethylene ADJ film SAME polyester NEAR2 (mesh woven weave thread)					
L137	1	sail AND polyethylene ADJ film SAME polyester NEAR2 (mesh woven weave thread)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/08 07:38 PM
L138	192	sail AND polyethylene SAME polyester NEAR2 (mesh woven weave thread)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/08 07:39 PM
L139	117	L138 AND (young's OR modulus OR gpa OR tensile OR kg/mm$3 OR kg/cm$3)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/08 07:40 PM
L140	128	L122 AND dacron	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/08 09:40 PM
L141	30	L122 AND dacron AND elastic$4	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/08 09:40 PM
L142	54	L122 AND dacron AND (elastic$4 elasticity modulus)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/08 09:41 PM
L143	0	L122 AND (elastic$4 elasticity modulus) WITH (gsm)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/08 10:12 PM
L144	804	L122 AND (elastic$4 elasticity modulus)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/08 10:12 PM
L145	10	L122 AND (elastic$4 elasticity modulus) NEAR5 luff	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/08 10:12 PM
L146	33	(Artificial Intelligence) More like doc: US-20230356820-A1	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY,	OR	ON	ON	2024/03/08 10:13 PM

		Text: (EP-4277841-A1 OR WO-2022130349-A1 OR US-4672907-A OR EP-0375111-A1 OR US-4815409-A OR US-4831953-A OR EP-0191216-B1 OR US-5315948-A OR US-5172647-A OR JP-S61247591-A OR JP-S6127798-A OR JP-S62116393-A OR US-4864954-A OR IE-841197-L OR ES-288113-U OR US-5178086-A OR US-4593639-A OR EP-0191216-A1 OR US-20140102346-A1 OR AU-2004279613-A1).did.	CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L147	14	L122 AND (stretch extension strain) NEAR5 luff	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/08 10:16 PM
L148	37	L122 AND (stretch extension strain) NEAR5 polyester	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/08 10:29 PM
L149	25	L122 AND (stretch extension strain modulus) SAME mylar	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/08 10:33 PM
L150	0	L122 AND (denair deneir dn) AND (mylar dacron)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/08 10:36 PM
L151	0	L122 AND (denair deneir dn)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/08 10:36 PM
L152	0	L122 AND (denair deneir dn g/sqmdenair)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/08 10:37 PM
L153	0	L122 AND (deneir dn g/sqm)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO;	OR	ON	ON	2024/03/08 10:37 PM

			JPO; DERWENT; IBM_TDB)				
L154	140	L122 AND (denier dn g/sqm)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/08 10:38 PM
L155	46	L122 AND (denier dn g/sqm) SAME (modulus)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/08 10:40 PM
L156	0	L122 AND kg/mm$3	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/08 10:47 PM
L157	0	L122 AND kg/mm*3	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/08 10:47 PM
L158	0	L122 AND kg/mm$4	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/08 10:47 PM
L159	0	L122 AND kg/sqm	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/08 10:48 PM
L160	18	L122 AND gpa	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/08 10:48 PM
L161	172	dacron WITH polyester AND sail	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/09 05:30 PM
L162	100	dacron WITH polyester AND (weave woven) AND sail	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/09 05:30 PM
L163	49	dacron WITH polyester SAME (weave woven) AND sail	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/09 05:31 PM

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
N1	0	((tractor traction front) WITH propeller AND (gearcase gear ADJ case) AND (wide width) WITH (pressure cavitat$4)).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2022/06/04 08:18 PM
N2	978	(B63H20/32 OR B63H1/18 OR B63H20/26 OR B63H2001/145 OR B63H2020/323).cpc.	(US-PGPUB; USPAT)	OR	ON	ON	2023/03/24 11:01 PM

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Application	Document	Mailroom Date	Attorney Docket No.
18211036	CTFR	03/14/2024	3012490.000001.US20
18211036	EXIN	03/14/2024	3012490.000001.US20
18211036	892	03/14/2024	3012490.000001.US20

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If you have any questions, please contact the Patent Electronic Business Center (EBC) at ebc@uspto.gov or 866-217-9197 Monday – Friday, 6 a.m. to midnight ET.

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The Patent Center Team

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
18/211,036	06/16/2023	Stephen James COLLIE	3012490.000001.US20	2954

193853 7590 04/10/2024

Bryan Cave Leighton Paisner LLP (DC)
1155 F Street NW
Washington, DC 20004-1357

EXAMINER	
POLAY, ANDREW	

ART UNIT	PAPER NUMBER
3617	

NOTIFICATION DATE	DELIVERY MODE
04/10/2024	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):

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APPLICATION NO./ CONTROL NO.	FILING DATE	FIRST NAMED INVENTOR/ PATENT IN REEXAMINATION	ATTORNEY DOCKET NO.
18/211,036	06/16/2023	COLLIE, Stephen James	3012490.000001.US

	EXAMINER	
Bryan Cave Leighton Paisner LLP (DC) 1155 F Street NW Washington, DC 20004-1357		
	ART UNIT	PAPER
	3600	20240408

DATE MAILED: _____

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Commissioner for Patents

A third-party submission under 37 CFR 1.290 was filed on 03/12/2024 and is being entered in the above-identified application. Please allow a few days for the submission to be visible in the Patent Application Information Retrieval (PAIR) system. Note that the submission will be identified using the “Information Disclosure Statement Filed” Document Description. This Document Description is being used for internal purposes only. The Office does not consider the submission to be an Information Disclosure Statement under 37 CFR 1.97 and 1.98.

Any questions regarding this communication should be directed to Will Brandenburg at (571)270-5488.

/WILLIAM A BRANDENBURG/ Quality Assurance Specialist, TC 3600	/W.A.B/ Quality Assurance Specialist, TC 3600

TO: DCIPDocketing@bclplaw.com
FROM: noreply@uspto.gov
CC: patentcenter_eofficeaction@uspto.gov
SUBJECT: USPTO: Patent Electronic System - Correspondence Notification for Customer Number 193853

Thu Apr 11 05:32:40 EDT 2024

Dear Patent Center Customer:

Correspondence Address:

Bryan Cave Leighton Paisner LLP (DC)
1155 F Street NW
Washington,DISTRICT OF COLUMBIA,20004-1357
UNITED STATES

This is a courtesy notification regarding the following USPTO patent application(s) associated with your Customer Number, 193853, that have new outgoing correspondence. This correspondence is now available for viewing in Patent Center.

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Application	Document	Mailroom Date	Attorney Docket No.
18211036	M327	04/10/2024	3012490.000001.US20

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If you have any questions, please contact the Patent Electronic Business Center (EBC) at ebc@uspto.gov or 866-217-9197 Monday – Friday, 6 a.m. to midnight ET.

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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
18/211,036	**06/12/2024 06:36:36 PM Z ET**	**3012490.000001.US20**

Title of Invention

SAIL STRUCTURE

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	2954	FILED BY	Shana Stiles
PATENT CENTER #	65943034	FILING DATE	06/16/2023
CUSTOMER #	193853	FIRST NAMED INVENTOR	Stephen James COLLIE
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Scott Cummings

Documents

TOTAL DOCUMENTS: 1

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
001US20-ResponseFOA.pdf	7	Response After Final Action	180 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
001US20-ResponseFOA.pdf	E5A76660DBE6AECA119EE9484D2DD070C2AB3172A6B1276A 5279291A5BDBFA7CCFC6952804B4A0990AB1D0CCA57758414 778EAD5C67784C066DFA93BB4021499

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 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.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of: COLLIE, Stephen James	Customer No.: 193853
Application No.: 18/211,036	Confirmation No.: 2954
Filed: June 16, 2023	Art Unit: 3617
For: SAIL STRUCTURE	Examiner: Andrew Polay

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

AMENDMENT PURSUANT TO 37 C.F.R. § 1.116

In response to the office action dated March 14, 2024, please amend the application as follows and consider the remarks herein.

INTRODUCTORY COMMENTS

Listing of Claims begins on page 2 of this paper.

Remarks begin on page 7 of this paper.

LISTING OF CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application.

1. (Currently Amended) A sail comprising

a head,

a tack,

a luff extending between the head and the tack; and a luff region extending along the luff;

wherein the luff region has a higher degree of elasticity compared to a remainder of the sail,

wherein the luff region of the sail includes a first material and a remainder of the sail includes at least a second material,

wherein the first material and the second material are different, and

wherein an average stiffness of the second material is in a range of 2-20 times higher than an average stiffness of the first material.

2. (Canceled)

3. (Previously Presented) The sail of claim 1, wherein the sail is a mainsail.

4. (Previously Presented) The sail of claim 1, wherein the sail is a headsail.

5. (Currently Amended) The sail of claim ~~2~~1, wherein the first material has a failure strain of at least about 2.5% to about 30%.

6. (Currently Amended) The sail of claim ~~2~~1, wherein the first material has a failure strain of at least about 2 to about 10 times the failure strain of the second material.

7. (Currently Amended) The sail of claim ~~2~~1, wherein the first material has an average Young's Modulus of about 1 to about 60 GPa.

8. (Currently Amended) The sail of claim ~~2~~1, wherein the first material has an average elasticity that is at least about 100% to about 2400% higher than an average elasticity of the second material.

9. (Previously Presented) The sail of claim 1, wherein there is an absence of sail fibres, or sailcloth fibres, that extend in a direction parallel, or at least substantially parallel, to the luff in the luff region of the sail.

10. (Previously Presented) The sail of claim 7, wherein there are sail fibres, or sailcloth fibres, in the luff region of the sail, the sail fibres, or sailcloth fibres, extending in a line that leaves an angle of greater or equal than about 15 degrees free from fibres relative to a direction parallel to the luff of the sail.

11. (Currently Amended) The sail of claim ~~2~~1, wherein the first material extends at least 50% to about 95% of a distance between the head and tack of the sail.

12. (Currently Amended) The sail of claim ~~2~~1, wherein the first material extends up to about 10% to about 50% of a width of the sail towards a leech of the sail.

13. (Previously Presented) The sail of claim 10, wherein the first material extends towards a leech of the sail to a greater extent in the middle of the sail relative to a height of the sail compared to the luff regions towards the head and tack of the sail.

14. (Previously Presented) the sail of claim 1, wherein the sail includes a third region having an elasticity less than other regions of the sail, this third region extending along at least a portion of a margin of the luff region between the luff region and the remainder of the sail.

15. (Previously Presented) The sail of claim 14, wherein the third region extends from the head to the tack of the sail.

16. (Previously Presented) The sail of claim 14, wherein the third region comprises carbon.

17. (Currently Amended) The sail of claim ~~2~~1, wherein the first material comprises a gradient of reducing elasticity in a direction from luff to leech, as defined by its:

(i) failure strain, or

(ii) average Young's Modulus, or

(iii) both (i) and (ii).

18. (Original) The sail of claim 17, wherein the first material comprises polyester.

19. (Original) The sail of claim 17, wherein the first material comprises polyester in combination with one or more of aramid and UHMWPE.

20. (Previously Presented) The sail of claim 1, wherein a difference in elasticity is achieved by a lesser material thickness in the luff region compared with the remainder of the sail.

21. (Currently Amended) A sail comprising

a head,

a tack,

a luff extending between the head and the tack; and a luff region extending along the luff;

wherein the luff region has a higher degree of elasticity compared to a remainder of the sail, ~~The sail of claim 1,~~ wherein in a luff direction, a ratio of a stiffness of regions outside the luff region and the stiffness of the luff region is in a range of 2-25 times greater.

22. (Previously Presented) The sail of claim 1, wherein an orientation of a material in the luff region is different from an orientation of a material in the remainder of the sail, such that the luff region has a higher degree of elasticity compared to the remainder of the sail.

23. (Previously Presented) The sail of claim 1, wherein the luff region does not comprise any carbon fibres oriented within 15 degrees of parallel to the luff, and wherein the remainder of the sail does comprise carbon fibres oriented within 15 degrees of parallel to the luff.

24. (Previously Presented) The sail of claim 1, wherein the sail is a twin skin mainsail having two skins defining the sail,

wherein each skin has a luff region extending along the luff, and

wherein each luff region has a higher degree of elasticity compared to a remainder of the respective skin.

25. – 30. (Canceled)

REMARKS

Entry of the foregoing, re-examination reconsideration of the subject application are respectfully requested in light of the amendments above in the comments which follow.

As correctly noted in the Office Action Summary, prior to the present response claims 1-30 were pending. By the present response, claims 1, 5-8, 11-12, 17 and 21 have been amended, and claims 25-30 have been canceled. Thus, upon entry of the present response, claims one and 3-24 are pending and await further consideration on the merits.

Support for the foregoing amendments can be found in at least the following locations of the original description: the original claims.

Entry of the foregoing is appropriate pursuant to 37 CFR 1.116 for at least the following reasons: the foregoing amendments combine subject matter indicated as allowable from dependent claims into the independent claim from which they depend, thus raising no new issues and clearly serving to place the application in condition for allowance.

CLAIM REJECTIONS UNDER 35 USC §102 AND 35 USC §103

The office action rejects claims 1, 3, 25, 26 and 30 under 35 USC §102(a)(1) for allegedly being anticipated by EP Patent 0375111 (herein "Gaastra"). The office action also rejects, under 35 USC §103, claim 4 for allegedly being obvious over Gaastra.

As evident from the above, neither claim 2 nor 21 have been rejected on the above noted grounds. By the present response, claim 1 has been amended by incorporating the features of dependent claim two therein, and claim 21 has been rewritten in independent form. The remaining claims not dependent from amended claim 1 have been canceled. Thus, the amended claims are likewise distinguishable over Gaastra.

ALLOWABLE SUBJECT MATTER

Applicant thanks the Examiner for the indication of allowable subject matter. Specifically, the office action states that claims 2, 5-24 and 27-29 recite allowable subject matter. By the present response, claim 1 has been amended so as to incorporate the features of dependent claim 2 therein, and claim 21 has been rewritten in independent form.

CONCLUSION

The Application is in condition for allowance. Notice of same is earnestly solicited. If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is requested to call the undersigned attorney at (202) 508-6000 to discuss the steps necessary for placing the application in condition for allowance. All correspondence should continue to be sent to the below-listed address.

If these papers are not considered timely filed by the Patent and Trademark Office, then a petition is hereby made under 37 CFR §1.136, and any additional fees required under 37 CFR §1.136 for any necessary extension of time, or any other fees required to complete the filing of this response, may be charged to Deposit Account No. 02-4467. Please credit any overpayment to deposit Account No. 02-4467.

Dated: June 12, 2024

Respectfully submitted,

By: /Scott W. Cummings/
Scott W. Cummings
Registration No.: 41,567
Bryan Cave Leighton Paisner
1155 F Street, N.W.
Washington, DC 20004
(202) 508-6000
Attorneys for Applicants

PTO/SB/06 (09-11)
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 18/211,036	Filing Date 06/16/2023	☐ To be Mailed

ENTITY: ☑ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) 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 $100 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $480 =	
☐ 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	06/12/2024	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 23	Minus	** 30	= 0		x $100 =	0
	Independent (37 CFR 1.16(h))	* 2	Minus	*** 4	= 0		x $480 =	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		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ 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.	ADMIN
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	/KREIGHTON LAMBERT SR/
*** 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.	

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.**

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NOTICE OF ALLOWANCE AND FEE(S) DUE

193853 7590 07/08/2024

Bryan Cave Leighton Paisner LLP (DC)
1155 F Street NW
Washington, DC 20004-1357

EXAMINER
POLAY, ANDREW

ART UNIT	PAPER NUMBER
3617	

DATE MAILED: 07/08/2024

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
18/211,036	06/16/2023	Stephen James COLLIE	3012490.00001.US20(1)	2954

TITLE OF INVENTION: SAIL STRUCTURE

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1200	$0.00	$0.00	$1200	10/08/2024

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 40% the amount of undiscounted fees, and micro entity fees are 20% the amount of undiscounted 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. 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.

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193853 7590 07/08/2024
Bryan Cave Leighton Paisner LLP (DC)
1155 F Street NW
Washington, DC 20004-1357

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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 transmitted to the USPTO via the USPTO patent electronic filing system or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
18/211,036	06/16/2023	Stephen James COLLIE	3012490.00001.US20(1)	2954

TITLE OF INVENTION: SAIL STRUCTURE

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1200	$0.00	$0.00	$1200	10/08/2024

EXAMINER	ART UNIT	CLASS-SUBCLASS
POLAY, ANDREW	3617	114-102310

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/AIA/122 or PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or 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,
(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.

1 _____
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 must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). 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. Fees submitted: ❑ Issue Fee ❑ Publication Fee (if required)

4b. Method of Payment: *(Please first reapply any previously paid fee shown above)*

❑ Electronic Payment via the USPTO patent electronic filing system ❑ Enclosed check ❑ Non-electronic payment by credit card (Attach form PTO-2038)

❑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. _____

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

❑ Applicant certifying micro entity status. See 37 CFR 1.29

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.

❑ Applicant asserting small entity status. See 37 CFR 1.27

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.

❑ Applicant changing to regular undiscounted fee 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. _____

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
18/211,036	06/16/2023	Stephen James COLLIE	3012490.00001.US20(1)	2954

193853 7590 07/08/2024

Bryan Cave Leighton Paisner LLP (DC)
1155 F Street NW
Washington, DC 20004-1357

EXAMINER	
POLAY, ANDREW	
ART UNIT	PAPER NUMBER
3617	

DATE MAILED: 07/08/2024

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 30 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. The United States Patent and Trademark Office (USPTO) collects the information in this record under authority of 35 U.S.C. 2. The USPTO's system of records is used to manage all applicant and owner information including name, citizenship, residence, post office address, and other information with respect to inventors and their legal representatives pertaining to the applicant's/ owner's activities in connection with the invention for which a patent is sought or has been granted. The applicable Privacy Act System of Records Notice for the information collected in this form is COMMERCE/PAT-TM-7 Patent Application Files, available in the Federal Register at 78 FR 19243 (March 29, 2013).
https://www.govinfo.gov/content/pkg/FR-2013-03-29/pdf/2013-07341.pdf

Routine uses of the information in this record may include disclosure to:

1) law enforcement, in the event that the system of records indicates a violation or potential violation of law;
2) a federal, state, local, or international agency, in response to its request;
3) a contractor of the USPTO having need for the information in order to perform a contract;
4) the Department of Justice for determination of whether the Freedom of Information Act (FOIA) requires disclosure of the record;
5) a Member of Congress submitting a request involving an individual to whom the record pertains, when the individual has requested the Member's assistance with respect to the subject matter of the record;
6) a court, magistrate, or administrative tribunal, in the course of presenting evidence, including disclosures to opposing counsel in the course of settlement negotiations;
7) the Administrator, General Services Administration (GSA), or their designee, during an inspection of records conducted by GSA under authority of 44 U.S.C. 2904 and 2906, in accordance with the GSA regulations and any other relevant (i.e., GSA or Commerce) directive, where such disclosure shall not be used to make determinations about individuals;
8) 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));
9) the Office of Personnel Management (OPM) for personnel research purposes; and
10) the Office of Management and Budget (OMB) for legislative coordination and clearance.

If you do not furnish the information requested on this form, the USPTO may not be able to process and/or examine your submission, which may result in termination of proceedings, abandonment of the application, and/or expiration of the patent.

Notice of Allowability	Application No. 18/211,036	Applicant(s) COLLIE, Stephen James	
	Examiner ANDREW POLAY	Art Unit 3617	AIA (FITF) Status Yes

-- 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 12 June 2024.
   ☐ 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 and 3-24 . 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)
2. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____.
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date. _____.
5. ☐ Examiner's Amendment/Comment
6. ☐ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/ANDREW POLAY/
Primary Examiner, Art Unit 3617

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	18/211,036	COLLIE, Stephen James
	Examiner	**Art Unit**
	ANDREW POLAY	3617

CPC						
Symbol					**Type**	**Version**
B63H	/	9	/	068	F	2020-02-01
B63H	/	9	/	0678	I	2020-02-01

CPC Combination Sets							
Symbol					**Type**	**Set**	**Ranking**	**Version**
	/		/					

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	23	
/ANDREW POLAY/ Primary Examiner, Art Unit 3617	15 June 2024	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	2

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	18/211,036	COLLIE, Stephen James
	Examiner	**Art Unit**
	ANDREW POLAY	3617

INTERNATIONAL CLASSIFICATION					
CLAIMED					
B63H9/068	/	9	/	068	
B63H9/067	/	9	/	067	

NON-CLAIMED				
	/		/	

US ORIGINAL CLASSIFICATION	
CLASS	**SUBCLASS**

CROSS REFERENCES(S)						
CLASS	**SUBCLASS (ONE SUBCLASS PER BLOCK)**					

NONE (Assistant Examiner) (Date)	**Total Claims Allowed:** 23	
/ANDREW POLAY/ Primary Examiner, Art Unit 3617 (Primary Examiner) 15 June 2024 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 2

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	18/211,036	COLLIE, Stephen James
	Examiner	**Art Unit**
	ANDREW POLAY	3617

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1	9	10	18	19		28								
	2	10	11	19	20		29								
2	3	11	12	23	21		30								
3	4	12	13	20	22										
4	5	13	14	21	23										
5	6	14	15	22	24										
6	7	15	16		25										
7	8	16	17		26										
8	9	17	18		27										

NONE (Assistant Examiner)	(Date)	**Total Claims Allowed:** 23	
/ANDREW POLAY/ Primary Examiner, Art Unit 3617 (Primary Examiner)	15 June 2024 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 2

U.S. Patent and Trademark Office

Part of Paper No.: 20240615

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	18/211,036	COLLIE, Stephen James
	Examiner	**Art Unit**
	ANDREW POLAY	3617

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	09/07/2023	11/16/2023	03/09/2024	06/15/2024					
1	1	÷		✓	=					
	2	÷	✓	O	-					
2	3	÷	✓	✓	=					
3	4	÷	✓	✓	=					
4	5	÷	✓	O	=					
5	6	÷	✓	O	=					
6	7	÷	✓	O	=					
7	8	÷	✓	O	=					
8	9	÷	✓	O	=					
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10	11	÷	✓	O	=					
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	27	÷	✓	O	-					
	28	÷	✓	O	-					
	29	÷	✓	O	-					
	30	÷	✓	✓	-					

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	18/211,036	COLLIE, Stephen James
	Examiner	Art Unit
	ANDREW POLAY	3617

CPC - Searched*		
Symbol	Date	Examiner
B63H9/04 B63H9/06 B63H9/061 B63H9/0615 B63H9/0621 B63H9/0628 B63H9/0635 B63H9/065 B63H9/067 B63H9/0671 B63H9/0673 B63H9/0678 B63H9/068	06/15/2024	AP

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
Inventor, IDS, Seaerch Keyword (attached), fwd/back, similarity	06/15/2024	AP

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner
	*.clm.	06/15/2024	AP

/ANDREW POLAY/ Primary Examiner, Art Unit 3617	

OK TO ENTER: /A.P/

Docket No.: 3012490.000001.US20

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of: COLLIE, Stephen James	Customer No.: 193853
Application No.: 18/211,036	Confirmation No.: 2954
Filed: June 16, 2023	Art Unit: 3617
For: SAIL STRUCTURE	Examiner: Andrew Polay

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

AMENDMENT PURSUANT TO 37 C.F.R. § 1.116

In response to the office action dated March 14, 2024, please amend the application as follows and consider the remarks herein.

INTRODUCTORY COMMENTS

Listing of Claims begins on page 2 of this paper.

Remarks begin on page 7 of this paper.

Bibliographic Data

Application No: 18/211,036

Foreign Priority claimed: ○ Yes ◉ No

35 USC 119 (a-d) conditions met: ☐ Yes ☑ No ☐ Met After Allowance

Verified and Acknowledged: /ANDREW POLAY/ [ ]

Examiner's Signature | Initials

Title: SAIL STRUCTURE

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
06/16/2023	114	3617	312490.00001.US20(1)
RULE			

APPLICANTS

Team New Zealand Limited,

INVENTORS

Stephen James COLLIE, Auckland, NEW ZEALAND

CONTINUING DATA

This application is a CON of PCT/IB2021/061985 12/17/2021

PCT/IB2021/061985 has PRO of 63127127 12/17/2020

FOREIGN APPLICATIONS

IF REQUIRED, FOREIGN LICENSE GRANTED**

07/07/2023

STATE OR COUNTRY

NEW ZEALAND

ADDRESS

Bryan Cave Leighton Paisner LLP (DC)
1155 F Street NW
Washington, DC 20004-1357
UNITED STATES

FILING FEE RECEIVED

$7,640

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L1	5	"18211036"	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/09/07 06:38 PM
L1	26	"000532".ap.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/15 03:34 PM
L2	10	("10011341"|"4636175"|"4781632"|"4792313"|"4898553"|"5916003"|"5967866"|"8545280"|"9359059"|"9932099").PN.	(US-PGPUB; USPAT)	OR	ON	ON	2022/03/15 04:12 PM
L2	24	"211036".ap.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/09/07 06:38 PM
L3	16	(US-0375111-$ | US-1073250-$ | US-2585324-$ | US-3320321-$ | US-4672907-$ | US-4854255-$ | US-5315948-$ | US-6843194-$).DID.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/11/16 05:37 PM
L3	533	(B63H020/006 B63H5/10 B63H2005/103 B63H2005/106 B63H2020/006).cpc.	(US-PGPUB; USPAT)	OR	ON	ON	2022/03/15 04:29 PM
L4	8	(US-0375111-$ | US-1073250-$ | US-2585324-$ | US-3320321-$ | US-4672907-$ | US-4854255-$ | US-5315948-$ | US-6843194-$).DID.	(US-PGPUB; USPAT)	OR	ON	ON	2023/11/16 05:37 PM
L4	3579	(B63H020/006 B63H5/10 B63H2005/103 B63H2005/106 B63H2020/006).cpc.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/15 04:29 PM
L5	12	(EP-0375111-$ | ES-1073250-$ | FR-2585324-$ | BI-36843194-$ | DE-	(FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/11/16 05:42 PM

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L5	100	(B63H2001/145).cpc.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/15 04:30 PM
L6	15	"8506739"	(FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/11/16 05:48 PM
L6	25	L4 AND L5	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/15 04:30 PM
L7	25	"2194499"	(FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/11/16 05:51 PM
L7	11	L5 AND CAVITATION	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/15 04:32 PM
L8	34	"8506739"	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/11/16 05:51 PM
L8	3526	B63H$.cpc. AND (tractor traction)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/15 04:37 PM
L9	34	"2194499"	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/11/16 05:53 PM
L9	671	B63H$.cpc. AND ((tractor traction) NEAR4 (propeller drive))	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/15 04:38 PM
L10	2246	B63H$.cpc. AND sail WITH (elastic flexible flexibility elasticity)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/11/16 06:50 PM
L10	131	((("SCHERER") near3 ("John")) OR (("KOEPSEL") near3 ("Roger")) OR (("GUNDERSON") near3 ("Andrew"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2022/03/15 04:50 PM
L11	2363	((("BRUNSWICK")	(USPAT)	OR	ON	ON	2022/03/15

		near3 ("CORPORATION"))).AS,AANM.					04:52 PM
L11	130	(B63H9/04 B63H9/06 B63H9/061 B63H9/0615 B63H9/0621 B63H9/0628 B63H9/0635 B63H9/065 B63H9/067 B63H9/0671 B63H9/0673 B63H9/0678 B63H9/068).cpc. AND (elastic flexible flexibility elasticity) WITH (luff leach leech roach)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/11/16 06:51 PM
L12	533	(B63H020/006 B63H5/10 B63H2005/103 B63H2005/106 B63H2020/006).cpc.	(US-PGPUB; USPAT)	OR	ON	ON	2022/03/15 05:10 PM
L12	416	(B63H9/04 B63H9/06 B63H9/061 B63H9/0615 B63H9/0621 B63H9/0628 B63H9/0635 B63H9/065 B63H9/067 B63H9/0671 B63H9/0673 B63H9/0678 B63H9/068).cpc. AND (elastic flexible flexibility elasticity) AND composite	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/11/16 09:26 PM
L13	431	(B63H9/04 B63H9/06 B63H9/061 B63H9/0615 B63H9/0621 B63H9/0628 B63H9/0635 B63H9/065 B63H9/067 B63H9/0671 B63H9/0673 B63H9/0678 B63H9/068).cpc. AND (elastic flexible flexibility elasticity stiffness plasticity) AND composite	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/11/16 09:26 PM
L13	3579	(B63H020/006 B63H5/10 B63H2005/103 B63H2005/106 B63H2020/006).cpc.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/15 05:10 PM

L14	316	(B63H9/04 B63H9/06 B63H9/061 B63H9/0615 B63H9/0621 B63H9/0628 B63H9/0635 B63H9/065 B63H9/067 B63H9/0671 B63H9/0673 B63H9/0678 B63H9/068).cpc. AND (elastic flexible flexibility elasticity stiffness plasticity) SAME (fabric material) AND composite	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/11/16 09:29 PM
L14	290	L13 AND (cavitate cavitation anti-cavitation)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/15 05:10 PM
L15	97	(B63H9/04 B63H9/06 B63H9/061 B63H9/0615 B63H9/0621 B63H9/0628 B63H9/0635 B63H9/065 B63H9/067 B63H9/0671 B63H9/0673 B63H9/0678 B63H9/068).cpc. AND (elastic flexible flexibility elasticity stiffness plasticity) SAME (fabric material) SAME (leech luff roach edge) AND composite	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/11/16 09:29 PM
L15	5	L13 AND (cavitate cavitation anti-cavitation) WITH (gearcase (gear ADJ case) torpedo)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/15 05:42 PM
L16	16	L13 AND (cavitate cavitation anti-cavitation) WITH (strut gearcase (gear ADJ case) torpedo)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/15 05:43 PM
L16	36	("3954076" | "4444822" | "4593639" | "4624205" | "4679519" | "4702190" | "4708080").pn. OR ("4945848").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/11/16 09:32 PM
L17	4	"18211036"	(US-PGPUB; USPAT;	OR	ON	ON	2023/11/16

			USOCR)				09:46 PM
L17	2811	(B63H20/32 B63H2020/323 B63H2020/326 B63H20/34).cpc. OR (B63H21/26.cpc. B63H21/265.cpc. B63H21/28.cpc.) AND (cavitate cavitation anti-cavitation) WITH (strut gearcase (gear ADJ case) torpedo)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/15 06:30 PM
L18	30	(Artificial Intelligence) Similar to: 18/211,036 with 0 CPC Selections and 0 Text Selections Text: (FR-2516045-A1 OR EP-0126614-A1 OR WO-03011684-A2 OR US-20080127873-A1 OR US-20040244665-A1 OR US-6953000-B2 OR WO-2012094731-A1 OR US-4672907-A OR US-4831953-A OR US-20010037756-A1 OR US-4283943-A OR EP-0013059-A1 OR US-RE33044-E OR US-4799443-A OR CA-1279529-C OR AU-599916-B2 OR IE-55443-B1 OR EP-0126614-B1 OR EP-2487101-A1 OR US-4886008-A OR US-20070034132-A1 OR EP-0229780-A1 OR EP-0229780-A4 OR WO-8607327-A1 OR US-4945848-A OR EP-1436192-B1 OR WO-03024779-A2 OR EP-1436192-A4 OR EP-1436192-A2 OR US-4465010-A OR EP-0191216-B1 OR DE-10035469-A1 OR FR-3117087-A1 OR AU-2002327672-B2 OR US-5038700-A OR US-4476799-A OR WO-2022123161-A1 OR WO-2006019306-A1 OR DE-2807954-A1 OR	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO))	OR	ON	ON	2023/11/16 09:46 PM

		US-6311633-B1 OR US-5996519-A OR EP-1927542-A1 OR US-3356059-A OR US-5097783-A OR EP-0249427-B1 OR WO-2004050475-A1 OR AU-594837-B2 OR DE-1807659-A1 OR US-4503796-A OR GB-2342907-A).did.					
L18	72	((B63H20/32 B63H2020/323 B63H2020/326 B63H20/34).cpc. OR (B63H21/26.cpc. B63H21/265.cpc. B63H21/28.cpc.)) AND (cavitate cavitation anti-cavitation) WITH (strut gearcase (gear ADJ case) torpedo)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/15 06:31 PM
L19	7664	(B63H5/125 B63H5/1252 B63H2005/1254 B63H2005/1256 B63H2005/1258).cpc.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/15 06:33 PM
L19	12	("3903826").pn. OR ("4476799").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/11/16 09:52 PM
L20	22	(B63H9/04 B63H9/06 B63H9/061 B63H9/0615 B63H9/0621 B63H9/0628 B63H9/0635 B63H9/065 B63H9/067 B63H9/0671 B63H9/0673 B63H9/0678 B63H9/068).cpc. AND (elastic flexible flexibility elasticity) WITH (tensile ADJ modulus)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/11/16 10:01 PM
L20	195	L19 AND (tractor traction)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/15 06:33 PM
L21	65	(B63H9/04 B63H9/06 B63H9/061 B63H9/0615 B63H9/0621 B63H9/0628 B63H9/0635	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/11/16 10:02 PM

		B63H9/065 B63H9/067 B63H9/0671 B63H9/0673 B63H9/0678 B63H9/068).cpc. AND (elastic flexible flexibility elasticity) WITH ((tensile elastic young's) ADJ modulus)					
L21	1	L20 AND (cavitate cavitation anti-cavitation) WITH (strut gearcase (gear ADJ case) torpedo)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/15 06:34 PM
L22	105	"909142"	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/11/16 11:27 PM
L22	33	((B63H20/32 B63H2020/323 B63H2020/326 B63H20/34).cpc. OR (B63H21/26.cpc. B63H21/265.cpc. B63H21/28.cpc.)) AND (cavitate cavitation anti-cavitation) WITH (trailing NEAR3(end edge))	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/15 07:34 PM
L23	49	((US-9932099-B1 OR US-9359059-B1 OR US-8545280-B1 OR US-5967866-A OR US-5916003-A OR US-4898553-A OR US-4792313-A OR US-4781632-A OR US-4636175-A OR US-11111849-B1 OR US-6705907-B1 OR US-6623320-B1 OR US-5759073-A OR US-5632658-A OR US-5343823-A OR US-4741670-A OR US-5820425-A OR US-5807151-A OR US-6059618-A).did. AND USPT.dbnm.) OR ((US-20150367920-A1 OR WO-2004074089-A1 OR EP-1336561-A1 OR US-20030114052-A1 OR US-20170334537-A1).did. AND	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 02:35 AM

		DWPI.dbnm.) OR ((DE-227725-C OR CN-107472490-A OR DE-58562-C).did. AND FPRS.dbnm.) OR ((US-20210354801-A1 OR US-20170334537-A1 OR US-20160090162-A1 OR US-20150360760-A1 OR US-20150239540-A1 OR US-20140364265-A1 OR US-20110226173-A1 OR US-20110130056-A1 OR US-20080171479-A1 OR US-20070098559-A1 OR US-20020185050-A1 OR US-20100285708-A1).did. AND PGPB.dbnm.) OR ((CN-111132899-A OR WO-2021058388-A1 OR CN-110316345-A OR WO-2012007709-A1 OR WO-2004074088-A1 OR CN-105775085-A OR FR-2532908-A1).did. AND FTDB.dbnm.) OR ((US-3606579-A OR US-RE21634-E OR US-3306246-A).did. AND USOC.dbnm.)					
L23	9	"909142".pn.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/11/16 11:28 PM
L24	24	L23 AND thrust	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 02:41 AM
L24	3	"0909142".pn.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/11/16 11:28 PM
L25	23	"2909142".pn.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/11/16 11:28 PM
L25	6	L23 AND thrust WITH	(US-PGPUB; USPAT;	OR	ON	ON	2022/03/16

		(cavitatation cavitat$4)	USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				02:42 AM
L26	238	(B63H020/006 B63H5/10 B63H2005/103 B63H2005/106 B63H2020/006).cpc. AND (thrust torque) WITH (fraction$2 proportion$3 more)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 10:32 AM
L27	240	(B63H020/006 B63H5/10 B63H2005/103 B63H2005/106 B63H2020/006).cpc. AND (thrust torque) WITH (fraction$2 proportion$3 (more greater NEAR3(forward front)))	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 10:32 AM
L28	81	(B63H020/006 B63H5/10 B63H2005/103 B63H2005/106 B63H2020/006).cpc. AND (thrust torque) WITH (fraction$2 proportion$3 (more greater NEAR3(forward front))) NEAR4 propeller	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 10:34 AM
L29	3	(B63H020/006 B63H5/10 B63H2005/103 B63H2005/106 B63H2020/006).cpc. AND (thrust torque) WITH (fraction$2 proportion$3 (more greater NEAR3(forward front))) NEAR4 propeller SAME (cavitation cavitat$4)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 10:35 AM
L30	35	(B63H020/006 B63H5/10 B63H2005/103 B63H2005/106 B63H2020/006).cpc. AND (thrust torque) WITH (fraction$2 proportion$3 (more greater NEAR3(forward front))) NEAR4 propeller AND	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 10:38 AM

		(cavitation cavitat$4)					
L31	64	"5009621"	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 10:39 AM
L32	404	(B63H020/006 B63H5/10 B63H2005/103 B63H2005/106 B63H2020/006).cpc. AND ((thrust torque) WITH ((forward front first) NEAR4 propeller))	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 10:45 AM
L33	80	(B63H020/006 B63H5/10 B63H2005/103 B63H2005/106 B63H2020/006).cpc. AND ((thrust torque) WITH ((forward front first) NEAR4 propeller) WITH (more fraction$3 propoportion$4))	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 10:45 AM
L34	89	(B63H020/006 B63H5/10 B63H2005/103 B63H2005/106 B63H2020/006).cpc. AND ((thrust torque) WITH ((forward front first) NEAR4 propeller) WITH (greater more fraction$3 propoportion$4))	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 10:46 AM
L35	60	(B63H020/006 B63H5/10 B63H2005/103 B63H2005/106 B63H2020/006).cpc. AND ((thrust torque) WITH (split$4))	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 10:53 AM
L36	57	((US-9932099-B1 OR US-9359059-B1 OR US-8545280-B1 OR US-5967866-A OR US-5916003-A OR US-4898553-A OR US-4792313-A OR US-4781632-A OR US-4636175-A OR US-11111849-B1 OR US-6705907-B1 OR US-6623320-B1 OR US-5759073-A OR US-5632658-A OR US-	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 02:10 PM

		5343823-A OR US-4741670-A OR US-5820425-A OR US-5807151-A OR US-6059618-A OR US-5009621-A OR US-9248898-B1 OR US-3646834-A).did. AND USPT.dbnm.) OR ((US-20150367920-A1 OR WO-2004074089-A1 OR EP-1336561-A1 OR US-20030114052-A1 OR US-20170334537-A1 OR US-5009621-A).did. AND DWPI.dbnm.) OR ((DE-227725-C OR CN-107472490-A OR DE-58562-C).did. AND FPRS.dbnm.) OR ((US-20210354801-A1 OR US-20170334537-A1 OR US-20160090162-A1 OR US-20150360760-A1 OR US-20150239540-A1 OR US-20140364265-A1 OR US-20110226173-A1 OR US-20110130056-A1 OR US-20080171479-A1 OR US-20070098559-A1 OR US-20020185050-A1 OR US-20100285708-A1 OR US-20090053944-A1 OR US-20200130794-A1 OR US-20150225053-A1).did. AND PGPB.dbnm.) OR ((CN-111132899-A OR WO-2021058388-A1 OR CN-110316345-A OR WO-2012007709-A1 OR WO-2004074088-A1 OR CN-105775085-A OR FR-2532908-A1 OR CN-111661294-A).did. AND FTDB.dbnm.) OR ((US-3606579-A OR US-RE21634-E OR US-3306246-A).did. AND USOC.dbnm.)					
L37	37	L36 AND (torque thrust)	(US-PGPUB; USPAT;	OR	ON	ON	2022/03/16

			USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				02:10 PM
L38	0	L36 AND (tovolvo)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 02:40 PM
L39	9	L36 AND (volvo)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 02:40 PM
L40	4	"20070098559"	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 02:41 PM
L41	248	(B63H020/006 B63H5/10 B63H2005/103 B63H2005/106 B63H2020/006).cpc. AND volvo	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 02:57 PM
L42	0	L41 AND propeller NEAR3 (fornt forward rear aft) WITH (torque thrust load$4) NEAR3 (split proportion greater)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 02:58 PM
L43	0	L41 AND propeller NEAR3 (fornt forward rear aft) WITH (torque thrust load$4) NEAR3 (split$4 proportion greater)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 02:58 PM
L44	0	L41 AND propeller NEAR3 (front forward rear aft) WITH (torque thrust load$4) NEAR3 (split$4 proportion greater)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 02:58 PM
L45	11	L41 AND propeller NEAR3 (front forward rear aft) WITH (torque thrust load$4)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 02:59 PM
L46	3476	(B63H20/32 B63H2020/323 B63H2020/326 B63H20/34).cpc. OR (B63H21/26.cpc. B63H21/265.cpc. B63H21/28.cpc.)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 04:06 PM

L47	0	L46 AND seperation WITH (cavitation cavitate cavitating anti-cavitation)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 04:08 PM
L48	15	L46 AND separation WITH (cavitation cavitate cavitating anti-cavitation)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 04:08 PM
L49	33	L46 AND (trailing NEAR2 (end edge)) WITH (cavitation cavitate cavitating anti-cavitation)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 04:09 PM
L50	0	L46 AND (trailing NEAR2 (end edge)) WITH (cavitation cavitate cavitating anti-cavitation) AND (trailing NEAR2 (end edge)) NEAR4 (width thickness)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 04:11 PM
L51	3476	(B63H20/32 B63H2020/323 B63H2020/326 B63H20/34).cpc. OR (B63H21/26.cpc. B63H21/265.cpc. B63H21/28.cpc.)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 04:51 PM
L52	9	L46 AND (strut torpedo casing) WITH (cavitation cavitate cavitating anti-cavitation) WITH (width thickness)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 04:51 PM
L53	1977	(B63H20/24 B63H20/245 B63H20/26).cpc.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 05:05 PM
L54	349	L53 AND L51	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 05:05 PM
L55	18	L53 AND L51 AND (tractor traction)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 05:05 PM
L56	18	L36 AND exhaust	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT;	OR	ON	ON	2022/03/16 05:07 PM

			IBM_TDB)				
L57	18	("3745964" | "3788267" | "4636175" | "4767366" | "4871334" | "4897061" | "4911665" | "5085603" | "5219272" | "5277634" | "5344349").pn. OR ("5967866").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/03/16 05:48 PM
L58	5	(((US-20070098559-A1 OR US-20110315063-A1 OR US-20160090162-A1).did AND PGPB.dbnm) OR ((US-8545280-B1 OR US-5009621-A OR US-6059618-A OR US-5967866-A).did AND USPT.dbnm))	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/03/16 06:26 PM
L59	15	L23 AND (pitch camber)	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/03/16 06:30 PM
L60	11	(B63H020/006 B63H5/10 B63H2005/103 B63H2005/106 B63H2020/006).cpc. AND tip ADJ vortex	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 06:37 PM
L61	448	L46 AND cavitat$4	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 06:40 PM
L62	70	L46 AND cavitat$4 AND (mph knots kts m/s m/s m/h ft/s Re)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 06:42 PM
L63	10	L46 AND cavitat$4 SAME (mph knots kts m/s m/s m/h ft/s Re)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 06:42 PM
L64	140	L46 AND cavitat$4 SAME (mph knots kts m/s m/s m/h ft/s Re speed velocity)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 07:07 PM
L65	67	L46 AND cavitat$4 WITH (mph knots kts m/s m/s m/h ft/s Re speed velocity)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/16 07:08 PM
L66	66	L46 AND cavitat$4	(US-PGPUB; USPAT;	OR	ON	ON	2022/03/16

		WITH (speed velocity)	USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				07:22 PM
L67	40	L46 AND cavitat$4 WITH (speed velocity)	(US-PGPUB; USPAT)	OR	ON	ON	2022/03/16 07:22 PM
L68	70	(B63B$.cpc. B63H$.cpc.) AND strut WITH cavitation	(US-PGPUB; USPAT)	OR	ON	ON	2022/03/16 07:39 PM
L69	68	(B63B$.cpc. B63H$.cpc.) AND strut WITH cavitation AND ((tail trailing) (edge end))	(US-PGPUB; USPAT)	OR	ON	ON	2022/03/16 07:40 PM
L70	37	(B63B$.cpc. B63H$.cpc.) AND strut WITH cavitation SAME ((tail trailing) (edge end))	(US-PGPUB; USPAT)	OR	ON	ON	2022/03/16 07:40 PM
L71	4	("4810218" | "4832635" | "4898553").pn. OR ("5584734").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/03/16 07:44 PM
L72	10	("1890879" | "2021309" | "4636175").pn. OR ("4898553").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/03/16 07:45 PM
L73	13	("2082059" | "3434447" | "3745964" | "4897061" | "5299961" | "5759073" | "5807151" | "5954554" | "6010380" | "7387556" | "7762772").pn. OR ("9932099").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/03/16 11:23 PM
L74	6	(B63H020/006 B63H5/10 B63H2005/103 B63H2005/106 B63H2020/006).cpc. AND propeller ADJ tip	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/03/17 03:40 PM
L75	8	(B63H020/006 B63H5/10 B63H2005/103 B63H2005/106 B63H2020/006).cpc. AND ((propeller ADJ tip) OR ((wingtip bladetip tip) ADJ vortex))	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/03/17 03:41 PM
L76	3374	(B63H20/32 OR	(US-PGPUB; USPAT;	OR	ON	ON	2022/06/04

		B63H1/18 OR B63H20/26 OR B63H2001/145 OR B63H2020/323).cpc.	USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				08:08 PM
L77	6	((tractor traction front) WITH propeller AND (gearcase gear ADJ case) AND (wide width) WITH (pressure cavitat$4)).clm.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/06/04 08:18 PM
L78	18	("3745964" | "3788267" | "4636175" | "4767366" | "4871334" | "4897061" | "4911665" | "5085603" | "5219272" | "5277634" | "5344349").pn. OR ("5967866").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/06/04 08:29 PM
L79	80	("1821450" | "2062293" | "2064195" | "2085483" | "2170733" | "2672115" | "2765040" | "2987031" | "3087553" | "3356150" | "3478620" | "3646834" | "4118996" | "4540369" | "4604032" | "4619584" | "4642059" | "4741670" | "4792314").pn. OR ("5009621").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/06/04 08:29 PM
L80	3788	(B63H20/32 OR B63H1/18 OR B63H20/26 OR B63H2001/145 OR B63H2020/323 OR B63H2020/006).cpc.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/12/17 05:20 PM
L81	16	("10011341"|"20070098559"|"20110315063"|"20160090162"|"4636175"|"4781632"|"4792313"|"4898553"|"5009621"|"5916003"|"5954554"|"5967866"|"6059618"|"8545280"|"9359059"|"9932099").PN.	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/17 05:46 PM
L82	0	L81 AND vortex	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/17 05:46 PM
L83	9	"17000532"	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/12/17 05:55 PM
L84	43	(Artificial Intelligence)	(US-PGPUB; USPAT;	OR	ON	ON	2022/12/17

		More like doc: US-11459074-B1 Text: (US-10011341-B1 OR US-9932099-B1 OR US-9359059-B1 OR WO-8909163-A1 OR US-4792313-A OR CA-1320666-C OR US-8545280-B1 OR US-5766048-A OR US-5967866-A OR US-4911665-A OR US-4295835-A OR US-20110091328-A1 OR EP-2311726-B1 OR US-5857880-A OR GB-2279315-A OR US-4898553-A OR US-6010380-A OR US-4781632-A OR US-4636175-A OR GB-2303603-A).did.	USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				05:56 PM
L85	3592	(B63H20/32 OR B63H1/18 OR B63H20/26 OR B63H2001/145 OR B63H2020/323).cpc.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/03/24 11:01 PM
L86	3736	(B63H020/006 B63H5/10 B63H2005/103 B63H2005/106 B63H2020/006).cpc.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/03/24 11:03 PM
L87	118	B63H2001/145.cpc.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/03/24 11:03 PM
L88	28	L86 AND L87	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/03/24 11:04 PM
L89	18	("0529916" | "1386835" | "3528382" | "3885516" | "5423701" | "5522703" | "5759073" | "5766047" | "6062926" | "8444391" | "8459950" | "8585366" | "8641463" | "20080089786").pn. OR ("9868497").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/03/24 11:04 PM
L90	21	"880860".ap.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR,	OR	ON	ON	2023/03/24 11:05 PM

			WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L91	32	(Artificial Intelligence) Similar to: 17/880,860 with 0 CPC Selections and 0 Text Selections Text: (US-11459074-B1 OR US-10011341-B1 OR US-9932099-B1 OR CA-1199530-A OR GB-2116926-A OR CA-1329063-C OR US-5035663-A OR US-11572144-B1 OR DE-3305278-A1 OR US-11572145-B1 OR US-11198493-B2 OR US-4295835-A OR EP-1107906-B1 OR EP-1107906-A1 OR WO-0013966-A1 OR US-4317655-A OR EP-3967592-A1 OR US-20220081087-A1 OR US-8267732-B1 OR JP-2022047324-A OR GB-2294915-A OR GB-2301803-A OR US-11247761-B1 OR US-4959033-A OR US-4792313-A OR CA-1320666-C OR CA-1335770-C OR US-20150158570-A1 OR US-20170334536-A1 OR US-10106236-B2 OR US-4932907-A OR US-6062926-A OR WO-8909163-A1 OR KR-20030093068-A OR KR-20030092989-A OR US-20170334537-A1 OR KR-20030026785-A OR US-5902160-A OR US-9216805-B1 OR JP-2017206185-A OR US-9981729-B2 OR US-6840828-B1 OR US-6068529-A OR US-20160001867-A1 OR US-9296459-B2 OR SE-507789-C2 OR US-9403588-B1 OR US-10336429-B1 OR JP-	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO))	OR	ON	ON	2023/03/24 11:06 PM

		2016013733-A OR US-9227715-B1).did.					
L92	37	(Artificial Intelligence) More like doc: US-11459074-B1 Text: (WO-8909163-A1 OR US-4792313-A OR CA-1320666-C OR US-5967866-A OR US-6059618-A OR EP-2311726-B1 OR US-20110091328-A1 OR US-8636469-B2 OR US-20230043247-A1 OR US-4781632-A OR EP-4129816-A1 OR US-4898553-A OR WO-0058151-A1 OR EP-1169223-A1 OR US-4636175-A OR EP-1507701-A1 OR US-20070098559-A1 OR US-7407366-B2 OR US-6705907-B1 OR US-5009621-A).did.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/03/24 11:06 PM
L118	18022010	gb "882939"	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/02/28 02:47 PM
L119	56	"882939"	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/02/28 02:48 PM
L120	16	"882939" AND gb	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/02/28 02:48 PM
L121	2	"8829939" AND gb	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/02/28 02:48 PM
L122	7978	(B63H9/04 B63H9/06 B63H9/061 B63H9/0615 B63H9/0621 B63H9/0628 B63H9/0635 B63H9/065 B63H9/067 B63H9/0671 B63H9/0673 B63H9/0678	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/01 06:30 PM

		B63H9/068).cpc.					
L123	961	(B63H9/04 B63H9/06 B63H9/061 B63H9/0615 B63H9/0621 B63H9/0628 B63H9/0635 B63H9/065 B63H9/067 B63H9/0671 B63H9/0673 B63H9/0678 B63H9/068).cpc. AND (elasticity flexibility modulus elastic flexible stiffness stiff) AND sail WITH (fabric material composite)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/02 12:35 PM
L124	0	(B63H9/04 B63H9/06 B63H9/061 B63H9/0615 B63H9/0621 B63H9/0628 B63H9/0635 B63H9/065 B63H9/067 B63H9/0671 B63H9/0673 B63H9/0678 B63H9/068).cpc. AND (elasticity flexibility modulus elastic flexible stiffness stiff) AND sail WITH (fabric material composite) AND polyestster	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/02 01:24 PM
L125	242	(B63H9/04 B63H9/06 B63H9/061 B63H9/0615 B63H9/0621 B63H9/0628 B63H9/0635 B63H9/065 B63H9/067 B63H9/0671 B63H9/0673 B63H9/0678 B63H9/068).cpc. AND (elasticity flexibility modulus elastic flexible stiffness stiff) AND sail WITH (fabric material composite) AND polyester	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/02 01:24 PM
L126	262	(B63H9/04 B63H9/06 B63H9/061 B63H9/0615 B63H9/0621 B63H9/0628	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/02 01:27 PM

		B63H9/0635 B63H9/065 B63H9/067 B63H9/0671 B63H9/0673 B63H9/0678 B63H9/068).cpc. AND (elasticity flexibility modulus elastic flexible stiffness stiff stretch strain deform$4) AND sail WITH (fabric material composite) AND polyester					
L127	265	(B63H9/04 B63H9/06 B63H9/061 B63H9/0615 B63H9/0621 B63H9/0628 B63H9/0635 B63H9/065 B63H9/067 B63H9/0671 B63H9/0673 B63H9/0678 B63H9/068).cpc. AND (elasticity flexibility modulus elastic flexible stiffness stiff stretch strain deform$6) AND sail WITH (fabric material composite) AND polyester	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/02 01:27 PM
L128	78	(B63H9/04 B63H9/06 B63H9/061 B63H9/0615 B63H9/0621 B63H9/0628 B63H9/0635 B63H9/065 B63H9/067 B63H9/0671 B63H9/0673 B63H9/0678 B63H9/068).cpc. AND (elasticity flexibility modulus elastic flexible stiffness stiff stretch strain deform$6) AND sail WITH (second another) WITH (fabric material composite) AND polyester	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/02 01:27 PM
L129	30	(B63H9/04 B63H9/06 B63H9/061 B63H9/0615 B63H9/0621 B63H9/0628 B63H9/0635 B63H9/065 B63H9/067	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/05 12:45 AM

		B63H9/0671 B63H9/0673 B63H9/0678 B63H9/068).cpc. AND (elasticity flexibility modulus elastic flexible stiffness stiff stretch strain deform$6) AND sail WITH (second another) WITH (fabric material composite) AND polyester AND modulus					
L130	35	(Artificial Intelligence) More like doc: US-20230356820-A1 Text: (EP-4277841-A1 OR WO-2022130349-A1 OR US-4672907-A OR EP-0375111-A1 OR US-4815409-A OR US-4831953-A OR EP-0191216-B1 OR US-5315948-A OR US-5172647-A OR JP-S61247591-A OR JP-S6127798-A OR JP-S62116393-A OR US-4864954-A OR IE-841197-L OR CA-1216775-A OR US-5178086-A OR AU-2004279613-B2 OR US-4593639-A OR EP-0191216-A1 OR AU-2003207370-B2).did.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/05 01:25 AM
L131	199	(B63H9/04 B63H9/06 B63H9/061 B63H9/0615 B63H9/0621 B63H9/0628 B63H9/0635 B63H9/065 B63H9/067 B63H9/0671 B63H9/0673 B63H9/0678 B63H9/068).cpc. AND (young's OR modulus)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/08 05:47 PM
L132	200	(B63H9/04 B63H9/06 B63H9/061 B63H9/0615 B63H9/0621 B63H9/0628 B63H9/0635 B63H9/065 B63H9/067 B63H9/0671	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/08 05:48 PM

		B63H9/0673 B63H9/0678 B63H9/068).cpc. AND (young's OR modulus OR gpa)					
L133	0	(B63H9/04 B63H9/06 B63H9/061 B63H9/0615 B63H9/0621 B63H9/0628 B63H9/0635 B63H9/065 B63H9/067 B63H9/0671 B63H9/0673 B63H9/0678 B63H9/068).cpc. AND polyethelene ADJ film NEAR4 polyester NEAR2 (mesh woven weave thread)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/08 07:37 PM
L134	0	(B63H9/04 B63H9/06 B63H9/061 B63H9/0615 B63H9/0621 B63H9/0628 B63H9/0635 B63H9/065 B63H9/067 B63H9/0671 B63H9/0673 B63H9/0678 B63H9/068).cpc. AND polyethelene ADJ film SAME polyester NEAR2 (mesh woven weave thread)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/08 07:37 PM
L135	0	(B63H9/04 B63H9/06 B63H9/061 B63H9/0615 B63H9/0621 B63H9/0628 B63H9/0635 B63H9/065 B63H9/067 B63H9/0671 B63H9/0673 B63H9/0678 B63H9/068).cpc. AND polyethelene	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/08 07:37 PM
L136	0	(B63H9/04 B63H9/06 B63H9/061 B63H9/0615 B63H9/0621 B63H9/0628 B63H9/0635 B63H9/065 B63H9/067 B63H9/0671 B63H9/0673	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/08 07:37 PM

		B63H9/0678 B63H9/068).cpc. AND polyethylene ADJ film SAME polyester NEAR2 (mesh woven weave thread)					
L137	1	sail AND polyethylene ADJ film SAME polyester NEAR2 (mesh woven weave thread)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/08 07:38 PM
L138	192	sail AND polyethylene SAME polyester NEAR2 (mesh woven weave thread)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/08 07:39 PM
L139	117	L138 AND (young's OR modulus OR gpa OR tensile OR kg/mm$3 OR kg/cm$3)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/08 07:40 PM
L140	128	L122 AND dacron	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/08 09:40 PM
L141	30	L122 AND dacron AND elastic$4	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/08 09:40 PM
L142	54	L122 AND dacron AND (elastic$4 elasticity modulus)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/08 09:41 PM
L143	0	L122 AND (elastic$4 elasticity modulus) WITH (gsm)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/08 10:12 PM
L144	804	L122 AND (elastic$4 elasticity modulus)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/08 10:12 PM
L145	10	L122 AND (elastic$4 elasticity modulus) NEAR5 luff	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/08 10:12 PM
L146	33	(Artificial Intelligence) More like doc: US-20230356820-A1	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY,	OR	ON	ON	2024/03/08 10:13 PM

		Text: (EP-4277841-A1 OR WO-2022130349-A1 OR US-4672907-A OR EP-0375111-A1 OR US-4815409-A OR US-4831953-A OR EP-0191216-B1 OR US-5315948-A OR US-5172647-A OR JP-S61247591-A OR JP-S6127798-A OR JP-S62116393-A OR US-4864954-A OR IE-841197-L OR ES-288113-U OR US-5178086-A OR US-4593639-A OR EP-0191216-A1 OR US-20140102346-A1 OR AU-2004279613-A1).did.	CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L147	14	L122 AND (stretch extension strain) NEAR5 luff	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/08 10:16 PM
L148	37	L122 AND (stretch extension strain) NEAR5 polyester	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/08 10:29 PM
L149	25	L122 AND (stretch extension strain modulus) SAME mylar	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/08 10:33 PM
L150	0	L122 AND (denair deneir dn) AND (mylar dacron)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/08 10:36 PM
L151	0	L122 AND (denair deneir dn)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/08 10:36 PM
L152	0	L122 AND (denair deneir dn g/sqmdenair)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/08 10:37 PM
L153	0	L122 AND (deneir dn g/sqm)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO;	OR	ON	ON	2024/03/08 10:37 PM

			JPO; DERWENT; IBM_TDB)				
L154	140	L122 AND (denier dn g/sqm)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/08 10:38 PM
L155	46	L122 AND (denier dn g/sqm) SAME (modulus)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/08 10:40 PM
L156	0	L122 AND kg/mm$3	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/08 10:47 PM
L157	0	L122 AND kg/mm*3	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/08 10:47 PM
L158	0	L122 AND kg/mm$4	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/08 10:47 PM
L159	0	L122 AND kg/sqm	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/08 10:48 PM
L160	18	L122 AND gpa	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/08 10:48 PM
L161	172	dacron WITH polyester AND sail	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/09 05:30 PM
L162	100	dacron WITH polyester AND (weave woven) AND sail	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/09 05:30 PM
L163	49	dacron WITH polyester SAME (weave woven) AND sail	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/03/09 05:31 PM
L164	2553	(B63H9/068 OR B63H9/0678 OR	(US-PGPUB; USPAT; USOCR; FIT (CN, FR,	OR	ON	ON	2024/06/15 09:10 PM

		B63H9/065 OR B63H9/067).cpc.	WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L165	6	"18211036"	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/06/15 09:13 PM
L166	8072	(B63H9/04 B63H9/06 B63H9/061 B63H9/0615 B63H9/0621 B63H9/0628 B63H9/0635 B63H9/065 B63H9/067 B63H9/0671 B63H9/0673 B63H9/0678 B63H9/068).cpc.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/06/15 09:14 PM
L167	36	(B63H9/04 B63H9/06 B63H9/061 B63H9/0615 B63H9/0621 B63H9/0628 B63H9/0635 B63H9/065 B63H9/067 B63H9/0671 B63H9/0673 B63H9/0678 B63H9/068).cpc. AND luff WITH (elastic stiff$4)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/06/15 09:14 PM
L168	70	(sail AND luff WITH (elastic stiff$4 modulus flexibl$4)).clm.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/06/15 09:18 PM
L169	1	(sail AND tack NEAR4 luff WITH (elastic stiff$4 modulus flexibl$4)).clm.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/06/15 09:18 PM
L170	32	(Artificial Intelligence) Similar to: 18/211,036 with 0 CPC Selections and 0 Text Selections Text: (US-20230356820-A1 OR WO-2022130349-A1 OR GB-2194499-A OR WO-2004078583-A1 OR AU-2011340315-A1 OR US-4702190-A OR US-4602585-A OR AU-	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO))	OR	ON	ON	2024/06/15 09:19 PM

		2014331535-B2 OR FR-2799723-A1 OR US-4535825-A OR US-4815409-A OR US-5172647-A OR US-3974791-A OR FR-2834964-A1 OR EP-0271215-A1 OR US-4838192-A OR WO-2012076852-A1 OR GB-2233949-A OR DE-3737659-A1 OR EP-1590237-B1 OR WO-9916665-A1 OR US-5315948-A OR US-6371037-B1 OR WO-2022064195-A1 OR WO-2004031032-A1 OR FR-2845063-A1 OR EP-0404504-A1 OR US-4624205-A OR EP-0446615-A1 OR EP-0126614-B1 OR WO-9426587-A1 OR US-3602180-A OR GB-2216086-A OR EP-2039603-A1 OR EP-0375111-A1 OR US-6148753-A OR US-20100282151-A1 OR GB-2177667-A OR EP-0249427-B1 OR US-4526122-A OR EP-1927542-A1 OR US-4476799-A OR DE-4235202-A1 OR EP-0126614-A1 OR US-4503796-A OR WO-8203054-A1 OR WO-2010034839-A2 OR WO-2010034839-A9 OR US-20190270498-A1 OR US-20070034132-A1).did.					
L171	1	((("TEAM") near3 ("NEW") near3 ("ZEALAND") near3 ("LIMITED"))).AS,AANM.	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/15 09:29 PM
L172	1	((("COLLIE") near3 ("Stephen"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2024/06/15 09:29 PM
L173	37	(Artificial Intelligence) More like doc: US-20230356820-A1 Text: (EP-4277841-A1 OR	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA,	OR	ON	ON	2024/06/15 09:29 PM

		WO-2022130349-A1 OR US-4672907-A OR EP-0375111-A1 OR US-4815409-A OR US-4831953-A OR EP-0191216-B1 OR US-5315948-A OR US-5172647-A OR JP-S61247591-A OR JP-S6127798-A OR JP-S62116393-A OR US-4864954-A OR CA-1216775-A OR US-5178086-A OR US-4593639-A OR EP-1670681-B1 OR EP-0191216-A1 OR EP-0114050-A2 OR AU-2003207370-B2).did.	EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				

PE2E SEARCH - Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
N3	1	(sail AND tack NEAR4 luff WITH (elastic stiff$4 modulus flexibl$4)).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/15 09:20 PM

TO: DCIPDocketing@bclplaw.com
FROM: noreply@uspto.gov
CC: patentcenter_eofficeaction@uspto.gov
SUBJECT: USPTO: Patent Electronic System - Correspondence Notification for Customer Number 193853

Mon Jul 08 05:00:52 EDT 2024

Dear Patent Center Customer:

Correspondence Address:

Bryan Cave Leighton Paisner LLP (DC)
1155 F Street NW
Washington,DISTRICT OF COLUMBIA,20004-1357
UNITED STATES

This is a courtesy notification regarding the following USPTO patent application(s) associated with your Customer Number, 193853, that have new outgoing correspondence. This correspondence is now available for viewing in Patent Center.

The official date of notification of the outgoing correspondence will be indicated on the form (e.g., PTOL-90) accompanying the correspondence.

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Application	Document	Mailroom Date	Attorney Docket No.
18211036	NOA	07/08/2024	3012490.00001.US20(1)

To view your correspondence online, please sign in to Patent Center and then select Workbench/View correspondence. To update your email address(es), select Manage/Manage customer numbers.

If you have any questions, please contact the Patent Electronic Business Center (EBC) at ebc@uspto.gov or 866-217-9197 Monday – Friday, 6 a.m. to midnight ET.

Please do not reply to this email as it was sent from an unmonitored mailbox.

Sincerely,

The Patent Center Team

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.
18/211,036	06/16/2023	Stephen James COLLIE	3012490.00001.US20(1)	2954

7590 07/15/2024

Bryan Cave Leighton Paisner LLP (DC)
1155 F Street NW
Washington, DC 20004-1357

EXAMINER	
POLAY, ANDREW	
ART UNIT	PAPER NUMBER
3617	
NOTIFICATION DATE	DELIVERY MODE
07/15/2024	ELECTRONIC

NOTICE REQUIRING INVENTOR'S OATH OR DECLARATION

☑ An inventor's oath or declaration in compliance with 37 CFR 1.63 or substitute statement in compliance with 37 CFR 1.64 executed by or with respect to each inventor has not yet been submitted.

The inventor's oath or declaration or substitute statement dated _____ is defective. The inventor's oath or declaration does not comply with 37 CFR 1.63 or the substitute statement does not comply with 37 CFR 1.64 because it:

❑ does not include a statement that the person executing the oath or declaration or substitute statement believes the named inventor or joint inventor to be the original inventor or an original joint inventor of a claimed invention in the application for which the oath or declaration is being submitted.

❑ does not state that the application was made or was authorized to be made by the person executing the oath or declaration or substitute statement.

❑ does not acknowledge that any willful false statement made in such oath or declaration or substitute statement is punishable under section 1001 of title 18 by fine or imprisonment of not more than 5 years, or both.

❑ does not identify the person executing the oath or declaration or substitute statement by his or her legal name.

❑ does not identify the application to which the oath or declaration or substitute statement is directed.

❑ Other: _____

The substitute statement dated _____does not comply with 37 CFR 1.64 because it:

❑ does not identify the inventor with respect to whom the statement applies.

❑ does not identify the relationship to the non-signing inventor.

❑ does not identify the circumstances permitting execution of the statement.

❑ was signed by someone other than the applicant.

❑ Other: _____

An oath or declaration in compliance with 37 CFR 1.63, or a substitute statement in compliance with 37 CFR 1.64, executed by or with respect to each inventor MUST be filed **no later than the date on which the issue fee is paid.** See 35 U.S.C. 115(f). Failure to timely comply will result in ABANDONMENT of this application. This period for reply is not extendable under 37 CFR 1.136(a).

Questions relating to this Notice should be directed to the Application Assistance Unit at 571-272-4200.

PRINTER RUSH
(PTO ASSISTANCE)

Application: 18211036	**Examiner:** Polay	**GAU:** 3617
From:	**Location:** IDC	**Creation Date:** 07/11/2024

Week Date: 7/1/2024

DOC CODE	DOC DATE	MISCELLANEOUS
☐ 1449		☐ Continuing Data
☐ IDS		☒ Foreign Priority
☐ CLM		☐ Document Legibility
☐ IIFW/FWCLM		☐ Fees
☐ SRFW		☐ Petition (TC)
☐ DRW		☐ Other
☐ OATH		
☐ 312		
☐ SPEC		

[RUSH] Message:

Please consult with your SPE or TQAS. The applicant has not made a foreign priority claim but CTNF 11/22/2023 acknowledges a claim to foreign priority. Please confirm that no foreign priority claim was made and that the acknowledgment was erroneous.

***Thank you**

[XRUSH] Response:

Initials: _____

Examiner: PUBS contact - James Leija, (703) 756-1197
NOTE: This form will be included as part of the official USPTO record with the response document coded as XRUSH.
REV: AUG 16

PRINTER RUSH
(PTO ASSISTANCE)

Application: 18211036	**Examiner:** Polay	**GAU:** 3617
From:	**Location:** IDC	**Creation Date:** 07/11/2024

Week Date: 7/1/2024

DOC CODE	DOC DATE	MISCELLANEOUS
☐ 1449		☐ Continuing Data
☐ IDS		☒ Foreign Priority
☐ CLM		☐ Document Legibility
☐ IIFW/FWCLM		☐ Fees
☐ SRFW		☐ Petition (TC)
☐ DRW		☐ Other
☐ OATH		
☐ 312		
☐ SPEC		

[RUSH] Message:

Please consult with your SPE or TQAS. The applicant has not made a foreign priority claim but CTNF 11/22/2023 acknowledges a claim to foreign priority. Please confirm that no foreign priority claim was made and that the acknowledgment was erroneous.

***Thank you**

[XRUSH] Response:

Conferred with SPE. No foreign priority claimed. CTNF acknowledgment dated 22 Nov was erroneous.

Initials: /A.P/

Examiner: PUBS contact - James Leija, (703) 756-1197
NOTE: This form will be included as part of the official USPTO record with the response document coded as XRUSH.
REV: AUG 16

PTO/AIA/01 (06-12)
Approved for use through 05/31/2024. OMB 0651-0032
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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.

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

Title of Invention	SAIL STRUCTURE

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 PCT/IB2021/061985 filed on 17 DEC 2021.

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.

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

WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

LEGAL NAME OF INVENTOR

Inventor: Stephen James COLLIE Date (Optional) :

Signature:

Note: An application data sheet (PTO/AIA/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
18/211,036	**08/11/2024 09:34:49 PM Z ET**	**3012490.00001.US20(1)**

Title of Invention

SAIL STRUCTURE

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	2954	FILED BY	Shana Stiles
PATENT CENTER #	66739909	FILING DATE	06/16/2023
CUSTOMER #	193853	FIRST NAMED INVENTOR	Stephen James COLLIE
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Scott Cummings

Documents

TOTAL DOCUMENTS: 1

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
18211036-DEC.pdf	1	Oath or Declaration filed	855 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
18211036-DEC.pdf	81BCB4340BC686A5E32DED0FBDEA8A7807FB0821098D1126EFDD3B1425D1FB52EE68410FAAFA2A807EBFF670FB83A348E50E67F264B3FF5CB3BBC4F336072B10

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 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.

Document Code: IMIS

Notice of Fee Due

Application Number: 18211036 Date: 3-13-24

Fees are due for the application or document dated 3-12-24_The payment was not collectable for the reason indicated below.

Note: If the fee due is for any of the filing fees, the surcharge for late payment of the filing fees is now due as well.

- ☐ Insufficient payment by check or money order. Wire Terfer money
- ☐ No authorization to charge a deposit account.
- ☐ Invalid deposit account number.
- ☒ User name not listed in deposit account. 194880 at 12:45 PM (time).
- ☐ Insufficient funds in deposit account _ at__ (time).
- ☐ Insufficient payment by credit card.
- ☐ Declined credit car _____ (time).

Fee code(s) to be applied:	1818	$ 180
		$
		$
		$
	Partial	$
	1506	$
Amount in holding fee code:	1622/2622	$
	1206/2206	$
	1999	$
Total remaining due from applicant:		$
		$ 180

1. RAM Operator ***HIEU LE***

Rev. 04/10/2013

Deposit Account Number *

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General Authorization

Available Balance

Account Status

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
18/211,036	06/16/2023	Stephen James COLLIE	3012490.00001.US20(1)	2954

193853 7590 08/22/2024

Bryan Cave Leighton Paisner LLP (DC)
1155 F Street NW
Washington, DC 20004-1357

EXAMINER
POLAY, ANDREW

ART UNIT	PAPER NUMBER
3617	

NOTIFICATION DATE	DELIVERY MODE
08/22/2024	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):

DCIPDocketing@bclplaw.com

UNITED STATES DEPARTMENT OF COMMERCE
U.S. Patent and Trademark Office
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APPLICATION NO./ CONTROL NO.	FILING DATE	FIRST NAMED INVENTOR/ PATENT IN REEXAMINATION	ATTORNEY DOCKET NO.
18/211,036	06/16/2023	COLLIE, Stephen James	3012490.00001.US2

	EXAMINER	
Bryan Cave Leighton Paisner LLP (DC) 1155 F Street NW Washington, DC 20004-1357		
	ART UNIT	PAPER
	3600	20240821

DATE MAILED: _____

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

Commissioner for Patents

The purpose of this communication is to notify applicant the previous "Miscellaneous Communication to Applicant" mailed on 04/10/2024 (i.e., re a third-party submission filed under 37 CFR 1.290) was done in error. This third-party submission filed on 03/12/2024 was actually improper, and all papers associated with the submission will be removed from the instant application file wrapper.

Any questions regarding this communication should be directed to Will Brandenburg, Quality Assurance Specialist, at 571 -270-5488.

/WILLIAM A BRANDENBURG/ Quality Assurance Specialist, TC 3600	/W.A.B/ Quality Assurance Specialist, TC 3600

TO: DCIPDocketing@bclplaw.com
FROM: noreply@uspto.gov
CC: patentcenter_eofficeaction@uspto.gov
SUBJECT: USPTO: Patent Electronic System - Correspondence Notification for Customer Number 193853

Fri Aug 23 05:02:54 EDT 2024

Dear Patent Center Customer:

Correspondence Address:

Bryan Cave Leighton Paisner LLP (DC)
1155 F Street NW
Washington,DISTRICT OF COLUMBIA,20004-1357
UNITED STATES

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Application	Document	Mailroom Date	Attorney Docket No.
18211036	M327	08/22/2024	3012490.00001.US20(1)

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Sincerely,

The Patent Center Team

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via the USPTO patent electronic filing system.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (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 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. **Because electronic patent issuance may occur shortly after issue fee payment, any desired continuing application should preferably be filed prior to payment of this issue fee in order not to jeopardize copendency.**

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

193853 7590 07/08/2024
Bryan Cave Leighton Paisner LLP (DC)
1155 F Street NW
Washington, DC 20004-1357

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.

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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 transmitted to the USPTO via the USPTO patent electronic filing system or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
18/211,036	06/16/2023	Stephen James COLLIE	3012490.00001.US20(1)	2954

TITLE OF INVENTION: SAIL STRUCTURE

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1200	$0.00	$0.00	$1200	10/08/2024

EXAMINER	ART UNIT	CLASS-SUBCLASS
POLAY, ANDREW	3617	114-102310

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/AIA/122 or PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or 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,
(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.

1 BRYAN CAVE LEIGHTON PAISNER LLP
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 must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE: TEAM NEW ZEALAND LIMITED

(B) RESIDENCE: (CITY and STATE OR COUNTRY): AUCKLAND, NEW ZEALAND

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

4a. Fees submitted: ☒ Issue Fee ❑ Publication Fee (if required)

4b. Method of Payment: *(Please first reapply any previously paid fee shown above)*

☒ Electronic Payment via the USPTO patent electronic filing system ❑ Enclosed check ❑ Non-electronic payment by credit card (Attach form PTO-2038)

☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. 02-4467

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

❑ Applicant certifying micro entity status. See 37 CFR 1.29

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.

❑ Applicant asserting small entity status. See 37 CFR 1.27

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.

❑ Applicant changing to regular undiscounted fee 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 /Scott W, Cummings/ Date September 4, 2024

Typed or printed name Scott W. Cummings Registration No. 41,567

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ELECTRONIC PAYMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
18/211,036	**09/04/2024 05:53:07 PM Z ET**	**3012490.00001.US20(1)**

Title of Invention

SAIL STRUCTURE

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	2954	FILED BY	Shana Stiles
PATENT CENTER #	67043946	AUTHORIZED BY	Scott Cummings
CUSTOMER #	193853	FILING DATE	06/16/2023
CORRESPONDENCE ADDRESS	-	FIRST NAMED INVENTOR	Stephen James COLLIE

Payment Information

PAYMENT METHOD	PAYMENT TRANSACTION ID	PAYMENT AUTHORIZED BY
DA / 024467	**E202494H55266912**	**Shana Stiles**

PRE-AUTHORIZED ACCOUNT	PRE-AUTHORIZED CATEGORY
024467	**37 CFR 1.16 (National application filing, search, and examination fees); 37 CFR 1.17 (Patent application and reexamination processing fees); 37 CFR 1.19 (Document supply fees); 37 CFR 1.20 (Post Issuance fees); 37 CFR 1.21 (Miscellaneous fees and charges)**

FEE CODE	DESCRIPTION	ITEM PRICE($)	QUANTITY	ITEM TOTAL($)
1501	UTILITY ISSUE FEE	1200.00	1	1200.00
			TOTAL AMOUNT:	**$1,200.00**

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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for 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

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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
18/211,036	**09/04/2024 05:53:07 PM Z ET**	**3012490.00001.US20(1)**

Title of Invention

SAIL STRUCTURE

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APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
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PATENT CENTER #	67043946	FILING DATE	06/16/2023
CUSTOMER #	193853	FIRST NAMED INVENTOR	Stephen James COLLIE
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Scott Cummings

Documents

TOTAL DOCUMENTS: 1

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
001US20-IssueFee.pdf	1	Issue Fee Payment (PTO-85B)	124 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
001US20-IssueFee.pdf	04F898C9CF244C0471D69FA27060706509866316360B0C2C71 8A37BF79D796BE177C6BFE202F13FF81B6FEB601F2697F51B 09AC4EF0ECE637DD4E34C3B710157

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New International Application Filed with the USPTO as a Receiving Office

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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
18/211,036	10/08/2024	12110089	3012490.00001.US20(1)	2954

193853 7590 09/18/2024

Bryan Cave Leighton Paisner LLP (DC)
1155 F Street NW
Washington, DC 20004-1357

ISSUE NOTIFICATION

The projected patent number and issue date are specified above. The patent will issue electronically. The electronically issued patent is the official patent grant pursuant to 35 U.S.C. § 153. The patent may be accessed on or after the issue date through Patent Center at https://patentcenter.uspto.gov/. The patent will be available in both the public and the private sides of Patent Center. Further assistance in electronically accessing the patent, or about Patent Center, is available by calling the Patent Electronic Business Center at 1-888-217-9197.

The USPTO is implementing electronic patent issuance with a transition period, during which period the USPTO will mail a ceremonial paper copy of the electronic patent grant to the correspondence address of record. Additional copies of the patent (i.e., certified and presentation copies) may be ordered for a fee from the USPTO's Certified Copy Center at https://certifiedcopycenter.uspto.gov/index.html. The Certified Copy Center may be reached at (800)972-6382.

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 0 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 Center (https://patentcenter.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 Patents Stakeholder Experience (OPSE), Stakeholder Support Division (SSD) at (571)-272-4200.

INVENTOR(s) (Please see PATENT CENTER site https://patentcenter.uspto.gov for additional inventors):

Stephen James COLLIE, Auckland, NEW ZEALAND;

APPLICANT(s) (Please see PATENT CENTER site https://patentcenter.uspto.gov for additional applicants):

Team New Zealand Limited, Auckland, NEW ZEALAND;

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TO: DCIPDocketing@bclplaw.com
FROM: noreply@uspto.gov
CC: patentcenter_eofficeaction@uspto.gov
SUBJECT: USPTO: Patent Electronic System - Correspondence Notification for Customer Number 193853

Wed Sep 18 23:01:52 EDT 2024

Dear Patent Center Customer:

Correspondence Address:

Bryan Cave Leighton Paisner LLP (DC)
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Washington,DISTRICT OF COLUMBIA,20004-1357
UNITED STATES

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Application	Document	Mailroom Date	Attorney Docket No.
18211036	ISSUE.NTF	09/18/2024	3012490.00001.US20(1)

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
18/211,036	06/16/2023	Stephen James COLLIE	3012490.00001.US20(1)	2954

193853 7590 10/08/2024

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EXAMINER	
POLAY, ANDREW	

ART UNIT	PAPER NUMBER
3617	

NOTIFICATION DATE	DELIVERY MODE
10/08/2024	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):

DCIPDocketing@bclplaw.com

APPLICATION NO.	ISSUE DATE	PATENT NO.
18/211,036	08-Oct-2024	12110089

Bryan Cave Leighton Paisner LLP (DC)
1155 F Street NW
Washington, DC 20004-1357

EGRANT NOTIFICATION

Your electronic patent grant (eGrant) is now available, which can be accessed via Patent Center at https://patentcenter.uspto.gov

The electronic patent grant is the official patent grant under 35 U.S.C. 153. For more information, please visit https://www.uspto.gov/electronicgrants

TO: DCIPDocketing@bclplaw.com
FROM: noreply@uspto.gov
CC: patentcenter_eofficeaction@uspto.gov
SUBJECT: USPTO: Patent Electronic System - eGrant Notification for Customer Number 193853

Tue Oct 08 06:01:39 EDT 2024

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