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Tra. 11 PATENTEIYII Eve. 378 FASENACIONALI
Act. 457 PROCEDIPPH Folios: 63

Industria y Comercio
SUPERINTENDENCIA

DIRECCIÓN DE NUEVAS CREACIONES

Procedimiento acelerado de exámenes de patente (PPH)

1	NÚMERO DE SOLICITUD ANTE LA SIC	14 122505
2	OFICINA DE PRIMERA PRESENTACIÓN (OPP)	ESTADOS UNIDOS
3	NÚMERO(S) DE SOLICITUD O PUBLICACIÓN DE LA(S) SOLICITUD(ES) (OPP):	1.13/315,354 2. 3

4	☐ REPRESENTANTE LEGAL ☒ APODERADO		
APELLIDOS CASTELLANOS ABONDANO		NOMBRES MARGARITA	IDENTIFICACIÓN C.C. 39'779.654 T.P. 70819
DIRECCIÓN	CALLE 94A No. 7A- 19		No. TELÉFONO 7560770
CIUDAD	BOGOTÁ		CORREO ELECTRÓNICO sic@castellanosyco.co
PAÍS	COLOMBIA		No. RADICACIÓN O PROTOCOLO DE PODER GENERAL

5 CONDICIONES PARA ACCEDER A ESTE PROCESO:

5.1.	DATOS DE PRIORIDAD ☒ SI ☐ NO			
	(33) PAÍS DE ORIGEN 1 ESTADOS UNIDOS 2.	CÓDIGO PAÍS US	(31) NÚMERO 13/315,354	(32) FECHA (AAAA/MM/DD) 2011/12/09

5.2.	DATOS SOLICITUD INTERNACIONAL PCT ☒ SI ☐ NO			
	Solicitud Internacional No.	PCT/IB2012/056597	Fecha	21/11/2012
	Publicación Internacional No.	WO2013/084099	Fecha	13/06/2013

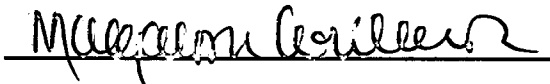
El solicitante presenta una copia de la(s) reivindicación(es) patentable(s) u otorgable(s) de la solicitud de la Oficina de Primera Presentación que profirió el examen de patentabilidad, junto con una traducción al castellano. ☒ SI ☐ NO

REQUISITOS PARA EL RECONOCIMIENTO DE LOS RESULTADOS DE EXÁMENES DE PATENTABILIDAD EFECTUADOS A SOLICITUDES EXTRANJERAS

Para que la Superintendencia de Industria y Comercio pueda reconocer los resultados de exámenes de patentabilidad producidos por otras Oficinas de Propiedad Industrial se debe cumplir con las siguientes condiciones:

- (a) Al momento de solicitar el examen de patentabilidad, si el solicitante pide que se reconozcan exámenes de patentabilidad de otras oficinas extranjeras, deberá aportar junto con el pago de la tasa correspondiente, los siguientes anexos:
- (i) Copia de las resoluciones, fallos o decisiones que han sido relevantes para la determinación de la patentabilidad de la(s) solicitud(es) en la Oficina que haya proferido el examen de patentabilidad que contienen reivindicaciones patentables u otorgables que son la base de la petición, y si es del caso, su traducción al castellano. ☒ SI ☐ NO
- (ii) Copia de todas las reivindicaciones determinadas como patentables u otorgables en la Oficina que profirió el examen de patentabilidad y, si es del caso, su traducción al castellano. ☒ SI ☐ NO
- (iii) Copia de los antecedentes, información o documentos citados por el examinador de la Oficina de Primera Presentación del examen de patentabilidad, en las resoluciones, fallos o decisiones correspondientes, incluyendo la literatura no patente. Los documentos de patente deberán presentarse siempre y cuando no estén disponibles para la Superintendencia de Industria y Comercio mediante el simple acceso a bases de datos gratuitas. ☒ SI ☐ NO
- (iv) Una tabla de correspondencias de las reivindicaciones que han sido determinadas como patentables u otorgables en la solicitud de la Oficina que haya proferido el examen de patentabilidad. ☒ SI

7	FIRMA DEL SOLICITANTE, DEL APODERADO O DEL REPRESENTANTE LEGAL Junto a cada firma, indicar el nombre del firmante y su calidad (si tal calidad no es obvia al leer el petitorio)
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6. TABLA DE CORRESPONDENCIA DE REIVINDICACIONES		
Reivindicaciones en la solicitud en Colombia	Reivindicaciones otorgables en la solicitud internacional	Explicación sobre la suficiente correspondencia ó Comentarios que explican la correspondencia
1.	1.	Se presenta de conformidad con la reivindicación otorgada en Estados Unidos.
2.	2.	Se presenta de conformidad con la reivindicación otorgada en Estados Unidos.
3.	3.	Se presenta de conformidad con la reivindicación otorgada en Estados Unidos.
4.	4.	Se presenta de conformidad con la reivindicación otorgada en Estados Unidos.
5.	5.	Se presenta de conformidad con la reivindicación otorgada en Estados Unidos.
6.	6.	Se presenta de conformidad con la reivindicación otorgada en Estados Unidos.
7.	7.	Se presenta de conformidad con la reivindicación otorgada en Estados Unidos.
8.	8.	Se presenta de conformidad con la reivindicación otorgada en Estados Unidos.
9.	9.	Se presenta de conformidad con la reivindicación otorgada en Estados Unidos.
10.	10.	Se presenta de conformidad con la reivindicación otorgada en Estados Unidos.
11.	11.	Se presenta de conformidad con la reivindicación otorgada en Estados Unidos.
12.	12.	Se presenta de conformidad con la reivindicación otorgada en Estados Unidos.
13.	13.	Se presenta de conformidad con la reivindicación otorgada en Estados Unidos.
14.	14.	Se presenta de conformidad con la reivindicación otorgada en Estados Unidos.
15.	15.	Se presenta de conformidad con la reivindicación otorgada en Estados Unidos.
16.	16.	Se presenta de conformidad con la reivindicación otorgada en Estados Unidos.
17.	17.	Se presenta de conformidad con la reivindicación otorgada en Estados Unidos.
18.	18.	Se presenta de conformidad con la reivindicación otorgada en Estados Unidos.
19.	19.	Se presenta de conformidad con la reivindicación otorgada en Estados Unidos.
20.	20.	Se presenta de conformidad con la reivindicación otorgada en Estados Unidos.
21.	21.	Se presenta de conformidad con la reivindicación otorgada en Estados Unidos.
22.	22.	Se presenta de conformidad con la reivindicación otorgada en Estados Unidos.
23.	23.	Se presenta de conformidad con la reivindicación otorgada en Estados Unidos.
24.	24.	Se presenta de conformidad con la reivindicación otorgada en Estados Unidos.
25.	25.	Se presenta de conformidad con la reivindicación otorgada en Estados Unidos.
26.	26.	Se presenta de conformidad con la reivindicación otorgada en Estados Unidos.
27.	27.	Se presenta de conformidad con la reivindicación otorgada en Estados Unidos.

28.	28.	Se presenta de conformidad con la reivindicación otorgada en Estados Unidos.
29.	29.	Se presenta de conformidad con la reivindicación otorgada en Estados Unidos.
30.	30.	Se presenta de conformidad con la reivindicación otorgada en Estados Unidos.
31.	31.	Se presenta de conformidad con la reivindicación otorgada en Estados Unidos.

NOTA: POR FAVOR TENER EN CUENTA QUE LAS REIVINDICACIONES COMO FUERON PERMITIDAS EN LA NOTIFICACION DE CONCESIÓN (NOTICE OF ALLOWANCE) FUERON MODIFICADAS POSTERIORMENTE POR EL SOLICITANTE, DEBIDO A LOS ERRORES SEÑALADOS (VER TRADUCCION DE LAS MODIFICACIONES). LAS REIVINDICACIONES MODIFICADAS CORRESPONDEN A LAS REIVINDICACIONES FINALMENTE OTORGADAS, COMO CONSTA EN LA COPIA DE LA PATENTE YA PUBLICADA US 8,668,232 B2.



UNITED STATES PATENT AND TRADEMARK OFFICE

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

NOTICE OF ALLOWANCE AND FEE(S) DUE

26231 7590 10/23/2013
FISH & RICHARDSON P.C. (DA)
P.O. BOX 1022
MINNEAPOLIS, MN 55440-1022

EXAMINER	
BOCHNA, DAVID	
ART UNIT	PAPER NUMBER

3679

DATE MAILED: 10/23/2013

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/315,354	12/09/2011	Gastón Mauro Mazzaferto	24692-0013001	1045
TITLE OF INVENTION: THREADED CONNECTION WITH IMPROVED ROOT THREAD PROFILE				

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$1780	\$300	\$0	\$2080	01/23/2014

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

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

HOW TO REPLY TO THIS NOTICE:

- I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.
If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.
If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".
For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

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

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

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

PART B - FEE(S) TRANSMITTAL

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

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

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

26231 7590 10/23/2013
FISH & RICHARDSON P.C. (DA)
P.O. BOX 1022
MINNEAPOLIS, MN 55440-1022

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.

Certificate of Mailing or Transmission

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

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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/315,354	12/09/2011	Gastón Mauro Mazzaferro	24692-0013001	1045

TITLE OF INVENTION: THREADED CONNECTION WITH IMPROVED ROOT THREAD PROFILE

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$1780	\$300	\$0	\$2080	01/23/2014

EXAMINER	ART UNIT	CLASS-SUBCLASS
BOCHNA, DAVID	3679	285-334000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

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

2. For printing on the patent front page, list

- (1) the names of up to 3 registered patent attorneys or agents OR, alternatively,
(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 has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

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

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

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

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

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

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

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

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

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

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

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____

Date _____

Typed or printed name _____

Registration No. _____

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/315,354	12/09/2011	Gastón Mauro Mazzaferro	24692-0013001	1045
26231 7590 10/23/2013 FISH & RICHARDSON P.C. (DA) P.O. BOX 1022 MINNEAPOLIS, MN 55440-1022			EXAMINER BOCHNA, DAVID	
			ART UNIT 3679	PAPER NUMBER

DATE MAILED: 10/23/2013

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

The Patent Term Adjustment to date is 150 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 150 day(s).

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

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

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

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.

**Notices of Allowance and Fee(s) Due mailed between October 1, 2013 and
December 31, 2013**

(Addendum to PTOL-85)

If the "Notice of Allowance and Fee(s) Due" has a mailing date on or after October 1, 2013 and before January 1, 2014, the following information is applicable to this application.

If the issue fee is being timely paid on or after January 1, 2014, the amount due is the issue fee and publication fee in effect January 1, 2014. On January 1, 2014, the issue fees set forth in 37 CFR 1.18 decrease significantly and the publication fee set forth in 37 CFR 1.18(d)(1) decreases to \$0.

If an issue fee or publication fee has been previously paid in this application, applicant is not entitled to a refund of the difference between the amount paid and the amount in effect on January 1, 2014.

Notice of Allowability	Application No. 13/315,354	Applicant(s) MAZZAFERRO ET AL.	
	Examiner DAVID E. BOCHNA	Art Unit 3679	AIA (First Inventor to File) Status No

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

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

1. ☒ This communication is responsive to the response filed on 7/11/13 and the interview held on 10/11/13.
☐ 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 1-31. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

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

Certified copies:

a) ☐ All b) ☐ Some *c) ☐ None of the:

1. ☐ Certified copies of the priority documents have been received.

2. ☐ Certified copies of the priority documents have been received in Application No. _____.

3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has **THREE MONTHS FROM THE "MAILING DATE"** of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in **ABANDONMENT** of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ **CORRECTED DRAWINGS** (as "replacement sheets") must be submitted.
☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ **DEPOSIT OF and/or INFORMATION** about the deposit of **BIOLOGICAL MATERIAL** must be submitted. Note the attached Examiner's comment regarding **REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL**.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)	5. ☒ Examiner's Amendment/Comment
2. ☒ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____	6. ☐ Examiner's Statement of Reasons for Allowance
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material	7. ☐ Other _____
4. ☒ Interview Summary (PTO-413), Paper No./Mail Date <u>10/11/13</u> .	

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

EXAMINER’S AMENDMENT

2. An examiner’s amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner’s amendment was given in a telephone interview with Russell Rippamonti on 10/11/13.

The application has been amended as follows:

Specification, paragraph 17, line 4 – changed “convex” to --concave--.

Specification, paragraph 17, line 6 – changed “concave” to --convex--.

Specification, paragraph 25, line 9 – changed “convex” to --concave--.

Specification, paragraph 25, line 10 – changed “concave” to --convex--.

Specification, paragraph 26, line 7 – changed “convex” to --concave--.

Specification, paragraph 26, line 8 – changed “concave” to --convex--.

Specification, paragraph 44, line 1 – changed “convex” to --concave--.

Specification, paragraph 44, line 3 – changed “concave” to --convex--.

Specification, paragraph 54, line 6 – changed “convex” to --concave--.

Specification, paragraph 54, line 7 – changed “concave” to --convex--.

Specification, paragraph 64, line 1 – changed “convex” to --concave--.

Specification, paragraph 64, line 3 – changed “concave” to --convex--.

Application/Control Number: 13/315,354

Page 3

Art Unit: 3679

Specification, paragraph 72, line 6 – changed “convex” to --concave--.

Specification, paragraph 72, line 8 – changed “concave” to --convex--.

Claim 1, line 5 - changed “convex” to --concave--.

Claim 1, line 7 - changed “convex” to --concave--.

Claim 6, line 2 – changed “the major axis” to --a major axis--.

Claim 8, lines 3-4 – changed “the major axis” to --a major axis--.

Claim 1, line 10 - changed “convex” to --concave--.

Claim 1, line 12 - changed “convex” to --concave--.

Claim 22, line 2 – changed “the major axis” to --a major axis--.

Claim 24, line 4 – changed “the major axis” to --a major axis--.

Cancelled claims 32-61.

Conclusion

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Roussie, Williamson et al., Kessler, Verdillon, Galle et al., Enderle et al., Harle, Yousef et al., Chuang, Saunders et al. and Slator et al. all disclose similar couplings that are common and well known in the art.

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to DAVID E. BOCHNA whose telephone number is (571)272-7078. The examiner can normally be reached on 8-5:30 Tuesday-Friday and every other Monday.

Application/Control Number: 13/315,354
Art Unit: 3679

Page 4

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Daniel P. Stodola can be reached on (571) 272-7087. 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.

/DAVID E BOCHNA/
Primary Examiner, Art Unit 3679

Attorney Docket No.: 24692-0013001

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant :	Gastón Mauro Mazzaferro et al.	Art Unit :	3679
Serial No. :	13/315,354	Examiner :	David Bochna
Filed :	December 9, 2011	Confirmation No.:	1045
		Notice of Allowance Date:	October 23, 2013
Title :	THREADED CONNECTION WITH IMPROVED ROOT THREAD PROFILE		

MAIL STOP ISSUE FEE

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

AMENDMENT AFTER ALLOWANCE
PURSUANT TO 37 C.F.R. §1.312

Please amend the application as indicated on the following pages.

Applicant : Gastón Mauro Mazzaferro et al.
Serial No. : 13/315,354
Filed : December 9, 2011
Page : 2

Attorney's Docket No. 24692-0013001

Amendments to the Claims:

This listing of claims replaces all prior versions and listings of claims in the application:

Listing of Claims:

1. (Currently Amended) A tubular element having a male threading disposed on an end of said tubular element, said male threading comprising:

a tapered root surface having a first angle of taper (β) measured between the tapered root surface and a longitudinal axis (aa) of the threading, said tapered root surface being joined tangentially at a first end by a concave curved surface of a constant radius of curvature to a stabbing flank, said tapered root surface being joined at a second end by a ~~concave~~ convex curved surface of constant radius of curvature to a root groove;

said root groove extending from the tapered root surface to a load flank, said root groove including:

a first portion comprising a first elliptical surface having a variable radius of curvature, said first elliptical surface being part of an ellipse, and

said root groove further including a second portion comprising a second elliptical surface having a variable radius of curvature, said second elliptical surface being part of a second ellipse, said second elliptical surface being joined tangentially at a first end to the first elliptical surface, and said second elliptical surface being joined tangentially at a second end to the load flank.

2. (Original) The tubular element of claim 1 wherein the first angle of taper (β) is 0 degrees, such that the tapered root surface is parallel to the axis of threading (aa).

3. (Original) The tubular element of claim 1 wherein the first angle of taper (β) is less than the measured value of an angle measured between a stabbing flank of the male threading and the axis of threading (aa).

Applicant : Gastón Mauro Mazzaferro et al.
Serial No. : 13/315,354
Filed : December 9, 2011
Page : 3

Attorney's Docket No. 24692-0013001

4. (Original) The tubular element of claim 1 wherein an angle theta measured between the axis of threading (aa) and the longitudinal axis (dd) of the sidewall of the tubular element is between 1.5 degrees and 12 degrees.
5. (Original) The tubular element of claim 1 wherein a major axis (cc) of the second ellipse is disposed perpendicular to the load flank.
6. (Previously Presented) The tubular element of claim 1 wherein a major axis (bb) of the first ellipse is perpendicular to a major axis (cc) of the second ellipse.
7. (Original) The tubular element of claim 1 wherein a major axis (bb) of the first ellipse is aligned with a minor axis of the second ellipse.
8. (Previously Presented) The tubular element of claim 1 wherein the first ellipse has a first predetermined diameter (D1) along a major axis (bb), and a second predetermined diameter (D2) along a minor axis; and wherein the second ellipse has a predetermined diameter (D3) along a major axis (cc) that is equal to the diameter (D1) along a major axis (bb) of the first ellipse, and the second ellipse has a second diameter (D4) along a minor axis that is equal to the diameter (D2) along the minor axis of the first ellipse.
9. (Original) The tubular element of claim 1 wherein the first ellipse has a first predetermined diameter (D1) along a major axis (bb), and a second predetermined diameter (D2) along a minor axis; and wherein the second ellipse has a predetermined diameter (D3) along a major axis (cc) that is equal to the diameter (D1) along the major axis (bb) of the first ellipse, and the second ellipse has a second diameter (D4) along a minor axis that is greater than the diameter (D2) along the minor axis of the first ellipse.
10. (Original) The tubular element of claim 1 wherein the first ellipse has a first predetermined diameter (D1) along a major axis (bb), and a second predetermined diameter (D2) along a

Applicant : Gastón Mauro Mazzaferro et al.
Serial No. : 13/315,354
Filed : December 9, 2011
Page : 4

Attorney's Docket No. 24692-0013001

minor axis; and wherein the second ellipse has a predetermined diameter (D3) along a major axis (cc) and has a second diameter (D4) along a minor axis that is greater than the diameter (D2) along the minor axis of the first ellipse.

11. (Original) The tubular element of claim 1 wherein the first ellipse has a first predetermined diameter (D1) along a major axis (bb), and a second predetermined diameter (D2) along a minor axis; and wherein the second ellipse has a predetermined diameter (D3) along a major axis (cc) and has a second diameter (D4) along a minor axis that is less than the diameter (D2) along the minor axis of the first ellipse.
12. (Original) The tubular element of claim 1 wherein the first ellipse has a first predetermined diameter (D1) along a major axis (bb), and a second predetermined diameter (D2) along a minor axis; and wherein the second ellipse has a predetermined diameter (D3) along a major axis (cc) and has a second diameter (D4) along a minor axis; and wherein the diameter (D3) along the major axis (cc) of the second ellipse is less than the diameter D1 along the major axis (bb) of the first ellipse.
13. (Original) The tubular element of claim 1 wherein the first ellipse has a first predetermined diameter (D1) along a major axis (bb), and a second predetermined diameter (D2) along a minor axis; and wherein the second ellipse has a predetermined diameter (D3) along a major axis (cc) and has a second diameter (D4) along a minor axis; and wherein the diameter (D3) along the major axis (cc) of the second ellipse is greater than the diameter (D1) along the major axis (bb) of the first ellipse.
14. (Original) The tubular element of claim 1 wherein the load flank is disposed in relation to an angle measured between the load flank and a line perpendicular to an axis of the threading (aa), wherein said angle ranges from -9 to 5 degrees.

Applicant : Gastón Mauro Mazzaferro et al.
 Serial No. : 13/315,354
 Filed : December 9, 2011
 Page : 5

Attorney's Docket No. 24692-0013001

15. (Original) The tubular element of claim 1 wherein the second elliptical surface is joined tangentially at a first end to the first elliptical surface at a junction point that defines the bottom of the root groove.

16. (Original) The tubular element of claim 15 wherein the bottom of the groove is disposed in the sidewall of the tubular element below the level of the tapered root surface.

17. (Currently Amended) A threaded tubular connection, comprising:

a male tubular element including a tapered male threading having an axis of taper (aa),
 and

a female tubular element including a tapered female threading having an axis of taper (aa), said female threading cooperates with the male threading when the threaded connection is made up;

wherein the root surface in at least one of the tapered male threading and the tapered female threading comprises: a tapered root surface having a first angle of taper (β) measured between the tapered root surface and a longitudinal axis (aa) of the threading, said tapered root surface being joined tangentially at a first end by a concave curved surface of a constant radius of curvature to a stabbing flank, said tapered root surface being joined at a second end by a ~~concave~~ convex curved surface of constant radius of curvature to a root groove;

said root groove extending from the tapered root surface to a load flank, said root groove including:

a first portion comprising a first elliptical surface having a variable radius of curvature, said first elliptical surface being part of an ellipse, and

said root groove further including a second portion comprising a second elliptical surface having a variable radius of curvature, said second elliptical surface being part of a second ellipse, said second elliptical surface being joined tangentially at a first end to the first elliptical surface, and said second elliptical surface being joined tangentially at a second end to the load flank.

Applicant : Gastón Mauro Mazzaferro et al.
Serial No. : 13/315,354
Filed : December 9, 2011
Page : 6

Attorney's Docket No. 24692-0013001

18. (Original) The threaded tubular connection of claim 17 wherein the first angle of taper (β) is 0 degrees, such that the tapered root surface is parallel to the axis of threading (aa).
19. (Original) The threaded tubular connection of claim 17 wherein the first angle of taper (β) is less than the measured value of an angle measured between a stabbing flank of the male threading and the axis of threading (aa).
20. (Original) The threaded tubular connection of claim 17 wherein an angle theta measured between the axis of threading (aa) and the longitudinal axis (dd) of the sidewall of the tubular element is between 1.5 degrees and 12 degrees.
21. (Original) The threaded tubular connection of claim 17 wherein a major axis (cc) of the second ellipse is disposed perpendicular to the load flank.
22. (Previously Presented) The threaded tubular connection of claim 17 wherein a major axis (bb) of the first ellipse is perpendicular to a major axis (cc) of the second ellipse.
23. (Original) The threaded tubular connection of claim 17 wherein a major axis (bb) of the first ellipse is aligned with a minor axis of the second ellipse.
24. (Previously Presented) The threaded tubular connection of claim 17 wherein the first ellipse has a first predetermined diameter (D1) along a major axis (bb), and a second predetermined diameter (D2) along a minor axis; and wherein the second ellipse has a predetermined diameter (D3) along the major axis (cc) that is equal to the diameter (D1) along a major axis (bb) of the first ellipse, and the second ellipse has a second diameter (D4) along a minor axis that is equal to the diameter (D2) along the minor axis of the first ellipse.
25. (Original) The threaded tubular connection of claim 17 wherein the first ellipse has a first predetermined diameter (D1) along a major axis (bb), and a second predetermined diameter

Applicant : Gastón Mauro Mazzaferro et al.
Serial No. : 13/315,354
Filed : December 9, 2011
Page : 7

Attorney's Docket No. 24692-0013001

- (D2) along a minor axis; and wherein the second ellipse has a predetermined diameter (D3) along a major axis (cc) that is equal to the diameter (D1) along the major axis (bb) of the first ellipse, and the second ellipse has a second diameter (D4) along a minor axis that is greater than the diameter (D2) along the minor axis of the first ellipse.
26. (Original) The threaded tubular connection of claim 17 wherein the first ellipse has a first predetermined diameter (D1) along a major axis (bb), and a second predetermined diameter (D2) along a minor axis; and wherein the second ellipse has a predetermined diameter (D3) along a major axis (cc) and has a second diameter (D4) along a minor axis that is greater than the diameter (D2) along the minor axis of the first ellipse (207).
27. (Original) The threaded tubular connection of claim 17 wherein the first ellipse has a first predetermined diameter (D1) along a major axis (bb), and a second predetermined diameter (D2) along a minor axis; and wherein the second ellipse has a predetermined diameter (D3) along a major axis (cc) and has a second diameter (D4) along a minor axis that is less than the diameter (D2) along the minor axis of the first ellipse.
28. (Original) The threaded tubular connection of claim 17 wherein the first ellipse has a first predetermined diameter (D1) along a major axis (bb), and a second predetermined diameter (D2) along a minor axis; and wherein the second ellipse has a predetermined diameter (D3) along a major axis (cc) and has a second diameter (D4) along a minor axis; and wherein the diameter (D3) along the major axis (cc) of the second ellipse is less than the diameter D1 along the major axis (bb) of the first ellipse.
29. (Original) The threaded tubular connection of claim 17 wherein the first ellipse has a first predetermined diameter (D1) along a major axis (bb), and a second predetermined diameter (D2) along a minor axis; and wherein the second ellipse has a predetermined diameter (D3) along a major axis (cc) and has a second diameter (D4) along a minor axis; and wherein the

Applicant : Gastón Mauro Mazzaferro et al.
Serial No. : 13/315,354
Filed : December 9, 2011
Page : 8

Attorney's Docket No. 24692-0013001

diameter (D3) along the major axis (cc) of the second ellipse is greater than the diameter (D1) along the major axis (bb) of the first ellipse.

30. (Original) The threaded tubular connection of claim 17 wherein the load flank is disposed in relation to an angle measured between the load flank and a line perpendicular to an axis of the threading (aa), wherein said angle ranges from -9 to 5 degrees.
31. (Original) The threaded tubular connection of claim 17 wherein the second elliptical surface is joined tangentially at a first end to the first elliptical surface at a junction point that defines the bottom of the root groove.
32. -61. (Cancelled)

Applicant : Gastón Mauro Mazzaferro et al.
Serial No. : 13/315,354
Filed : December 9, 2011
Page : 9

Attorney's Docket No. 24692-0013001

REMARKS

The Examiner by Examiner's Amendment of October 23, 2013 mistakenly tried to amend claim 1, line 7 from "convex" to - - concave - -. However, the term "convex" is not in that line. The term "concave" is in that line. In accordance with previous conversations with the examiner, Applicant is submitting the above request to amend claim 1, line 6 (line numbering as presented in this Amendment) from the term "concave" to - - convex - -.

The Examiner further mistakenly tried to amend claim 17, line 12 from "convex" to - - concave - -. The term "convex" is not in that line as well. Therefore for the same reasons as noted above, Applicant has submitted the above request to amend claim 17, line 10 (line numbering as presented in this Amendment) from "concave" to - - convex - -.

Applicant asserts that no new matter has been added by these amendments. As noted in the Examiner's Interview Summary dated October 11, 2013, the changes in the specification and claims from "concave" to --convex-- and "convex" to --concave-- have been made in the Examiner's Amendment and clarified in this Rule 312 Amendment to reflect the thread profile as described from the exterior of the thread surface. Applicant asks that all claims be allowed in view of the amendment to the claims. No fees are believed to be due with this submission. However, if Applicant is incorrect, please apply any necessary charges or credits to Deposit Account 06-1050, referencing the above attorney docket number.

Applicant : Gastón Mauro Mazzaferro et al.
Serial No. : 13/315,354
Filed : December 9, 2011
Page : 10

Attorney's Docket No. 24692-0013001

Respectfully submitted,

Date: December, 4, 2013

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	Examiner DAVID E. BOCHNA	Art Unit 3679	Page 1 of 1

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	Q					
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	S					
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*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.



US008668232B2

(12) **United States Patent**
Mazzaferro et al.

(10) **Patent No.:** **US 8,668,232 B2**
(45) **Date of Patent:** **Mar. 11, 2014**

(54) **THREADED CONNECTION WITH IMPROVED ROOT THREAD PROFILE**
(75) Inventors: **Gastón Mauro Mazzaferro**, Buenos Aires (AR); **Tommaso Coppola**, Rome (IT); **Stefano Amato**, Rome (IT); **Ramón Alberto Aguilar Armendariz**, Veracruz (MX); **Philippe Pierre Darcis**, Veracruz (MX)
(73) Assignee: **Tenaris Connections Limited**, Kingstown (VC)
(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 88 days.

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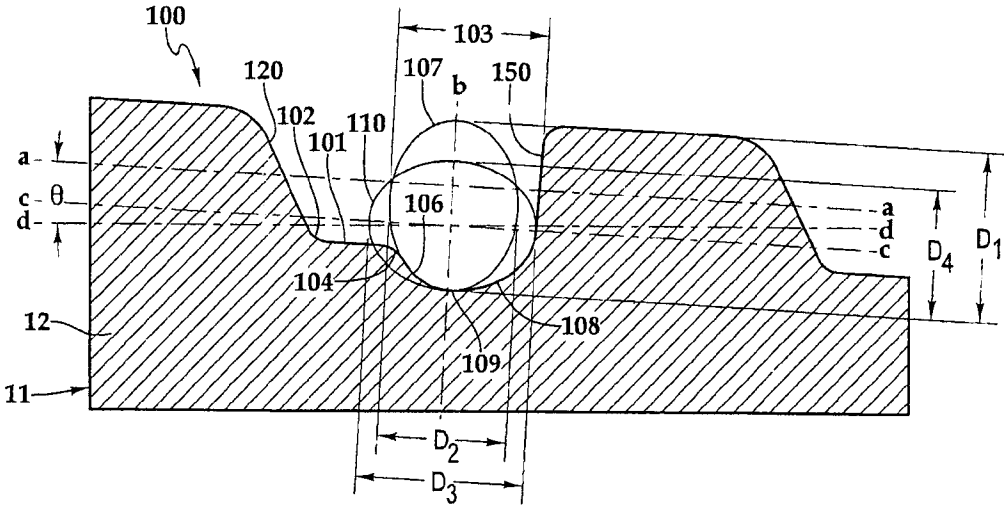
* cited by examiner
Primary Examiner — David E Bochna
(74) *Attorney, Agent, or Firm* — Fish & Richardson P.C.; Russell N. Rippamonti

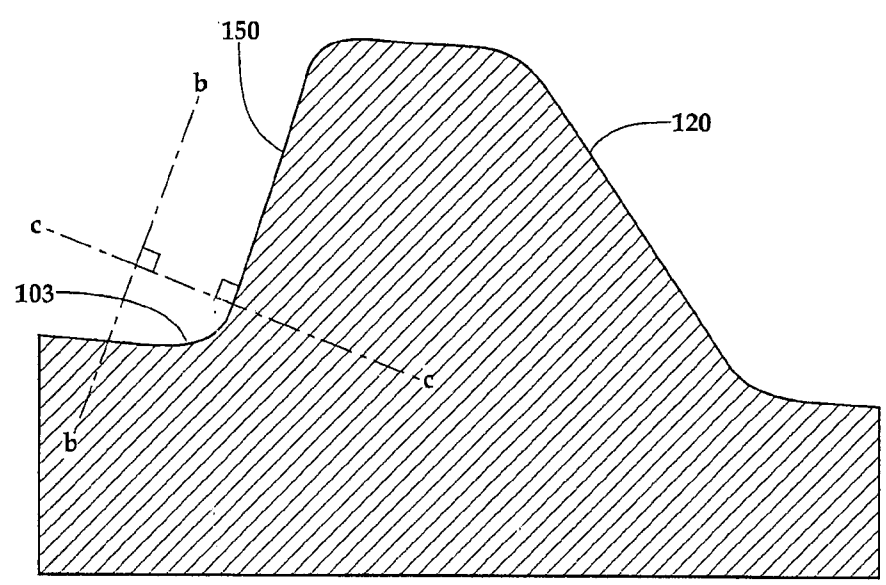
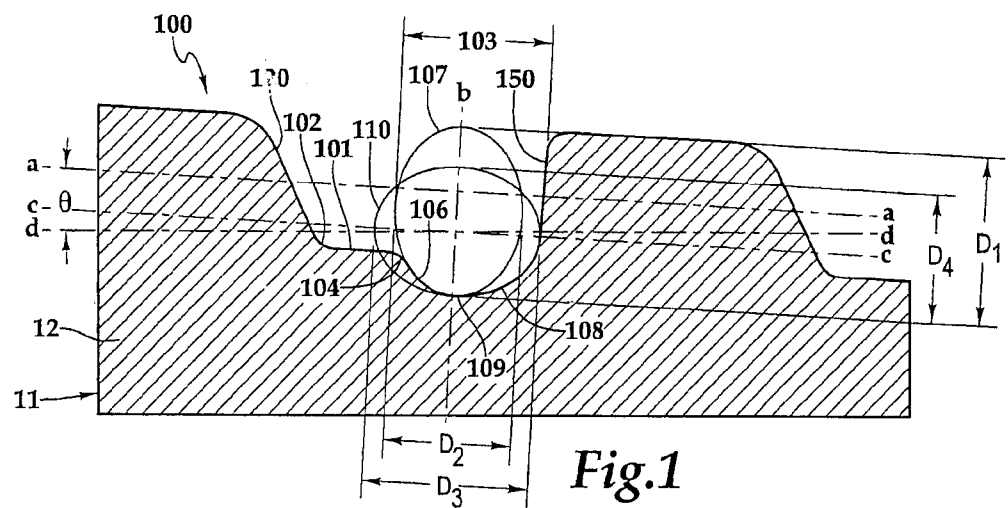
(21) Appl. No.: **13/315,354**
(22) Filed: **Dec. 9, 2011**
(65) **Prior Publication Data**
US 2013/0147191 A1 **Jul. 12, 2013**
(51) **Int. Cl.**
F16L 25/00 (2006.01)
(52) **U.S. Cl.**
USPC **285/334; 285/333**
(58) **Field of Classification Search**
USPC **285/333, 334**
See application file for complete search history.

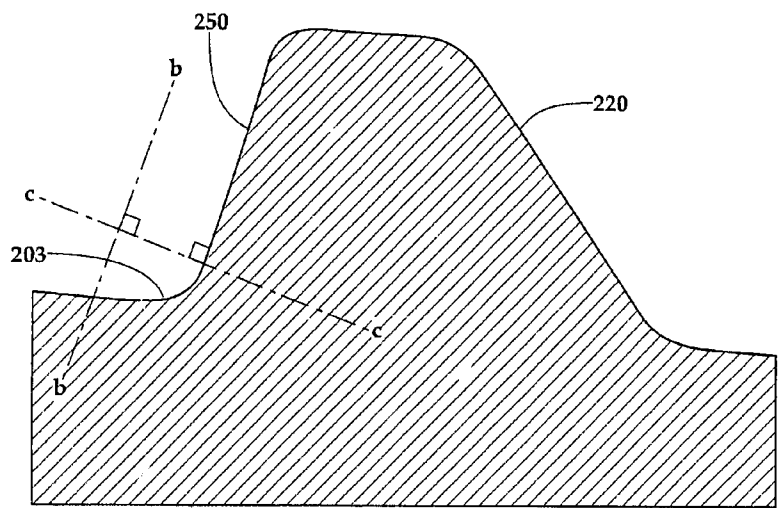
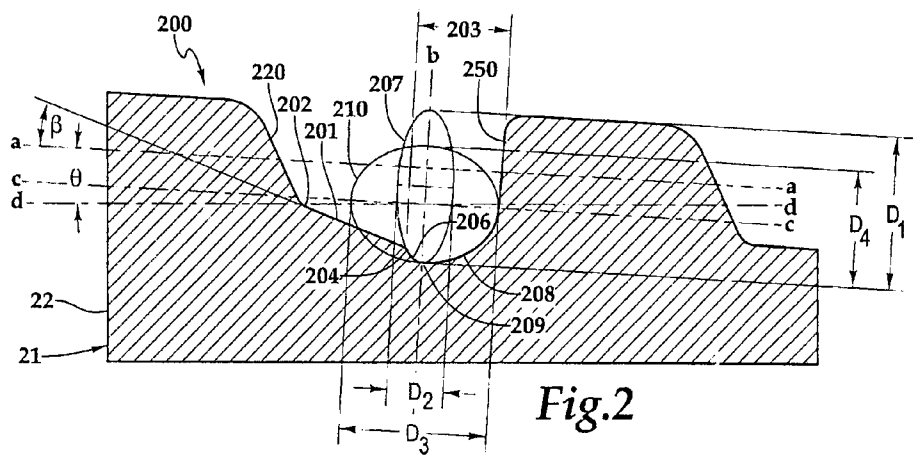
(57) **ABSTRACT**
A threaded connection design having a double ellipse in the thread root for reducing stress fatigue is illustrated in this disclosure. The root groove includes a first portion comprising a first elliptical surface being part of a first ellipse. The root groove further includes a second portion comprising a second elliptical surface, being part of a second ellipse, and the second elliptical surface being joined tangentially at a first end to the first elliptical surface at a junction point that defines the bottom of the root groove. The second elliptical surface is joined tangentially at a second end to the load flank.

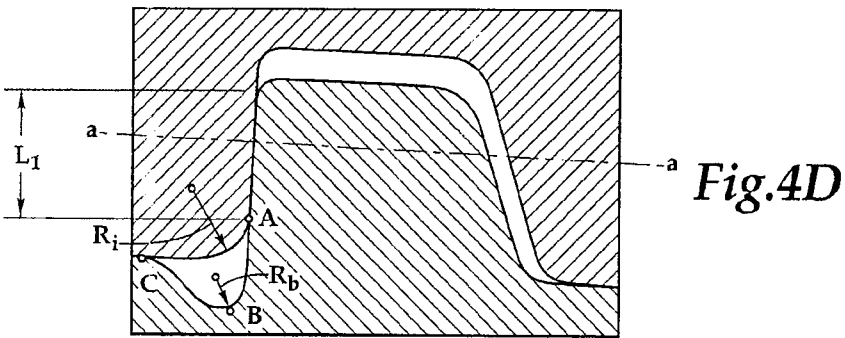
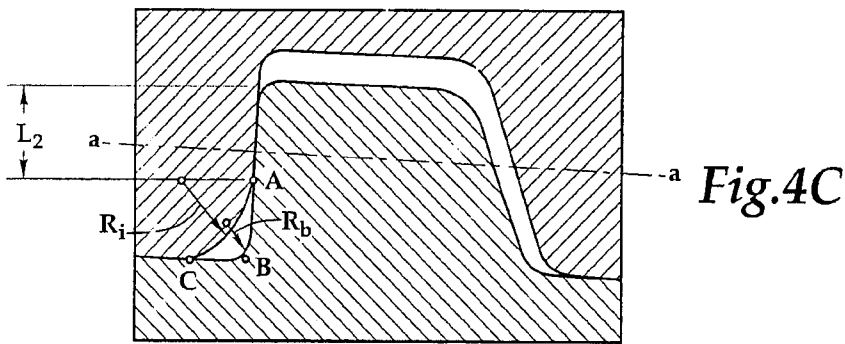
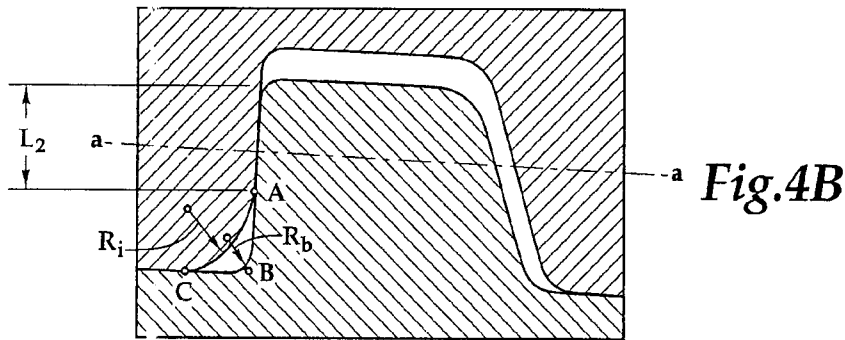
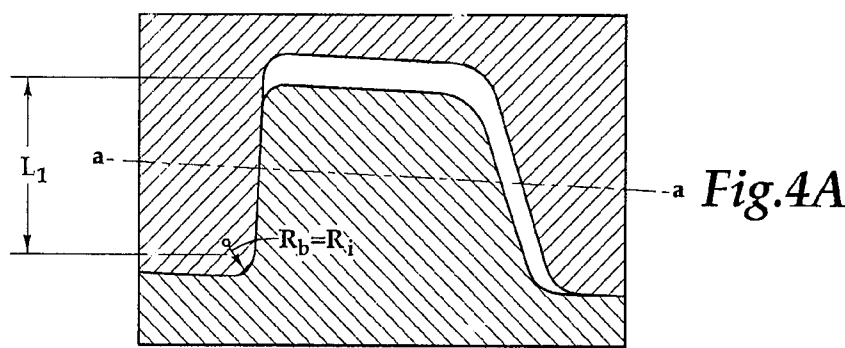
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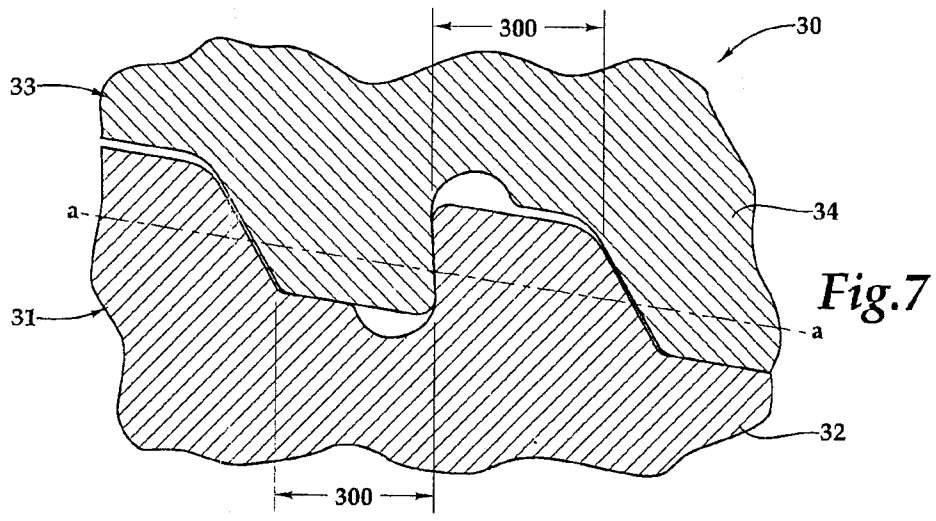
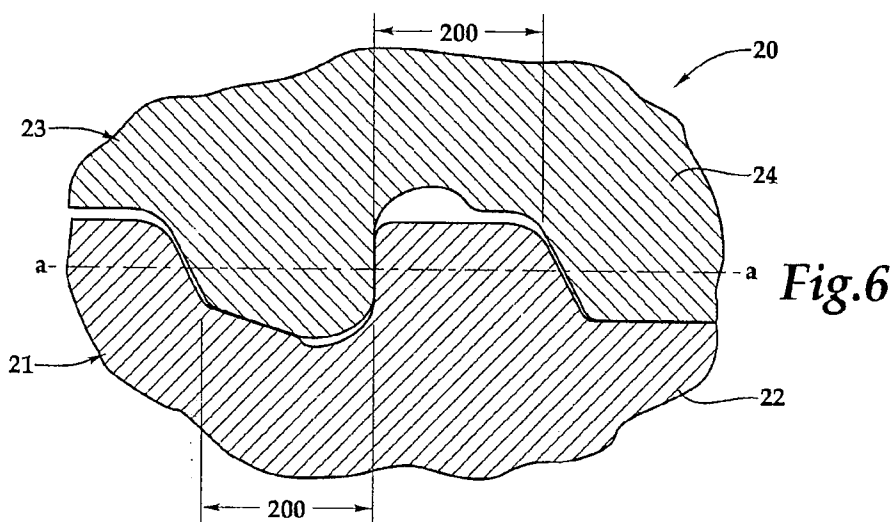
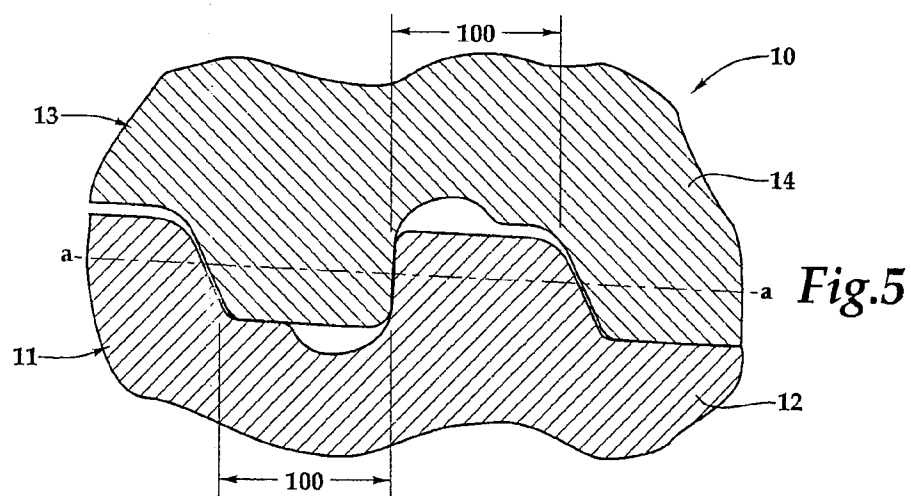
31 Claims, 9 Drawing Sheets

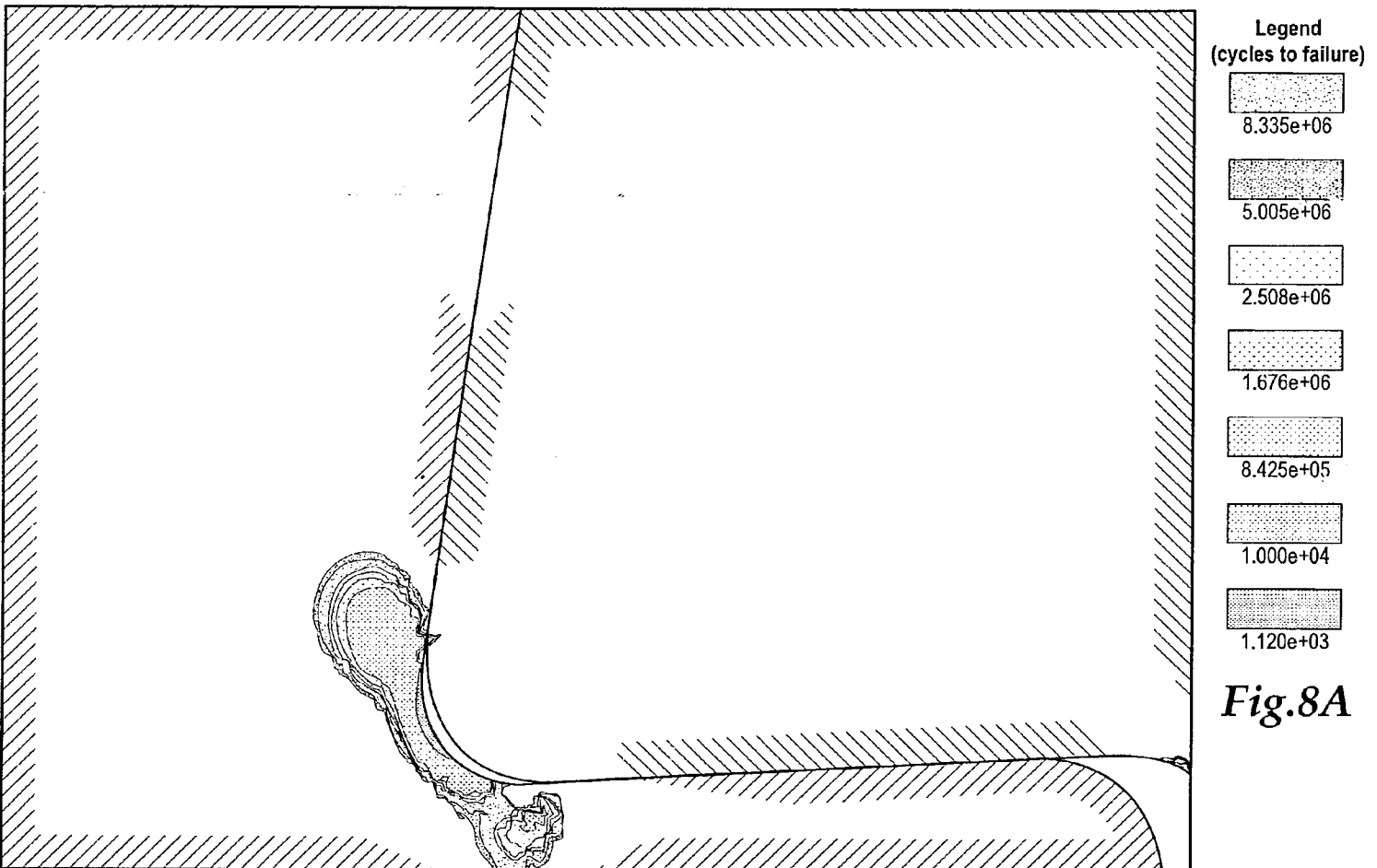


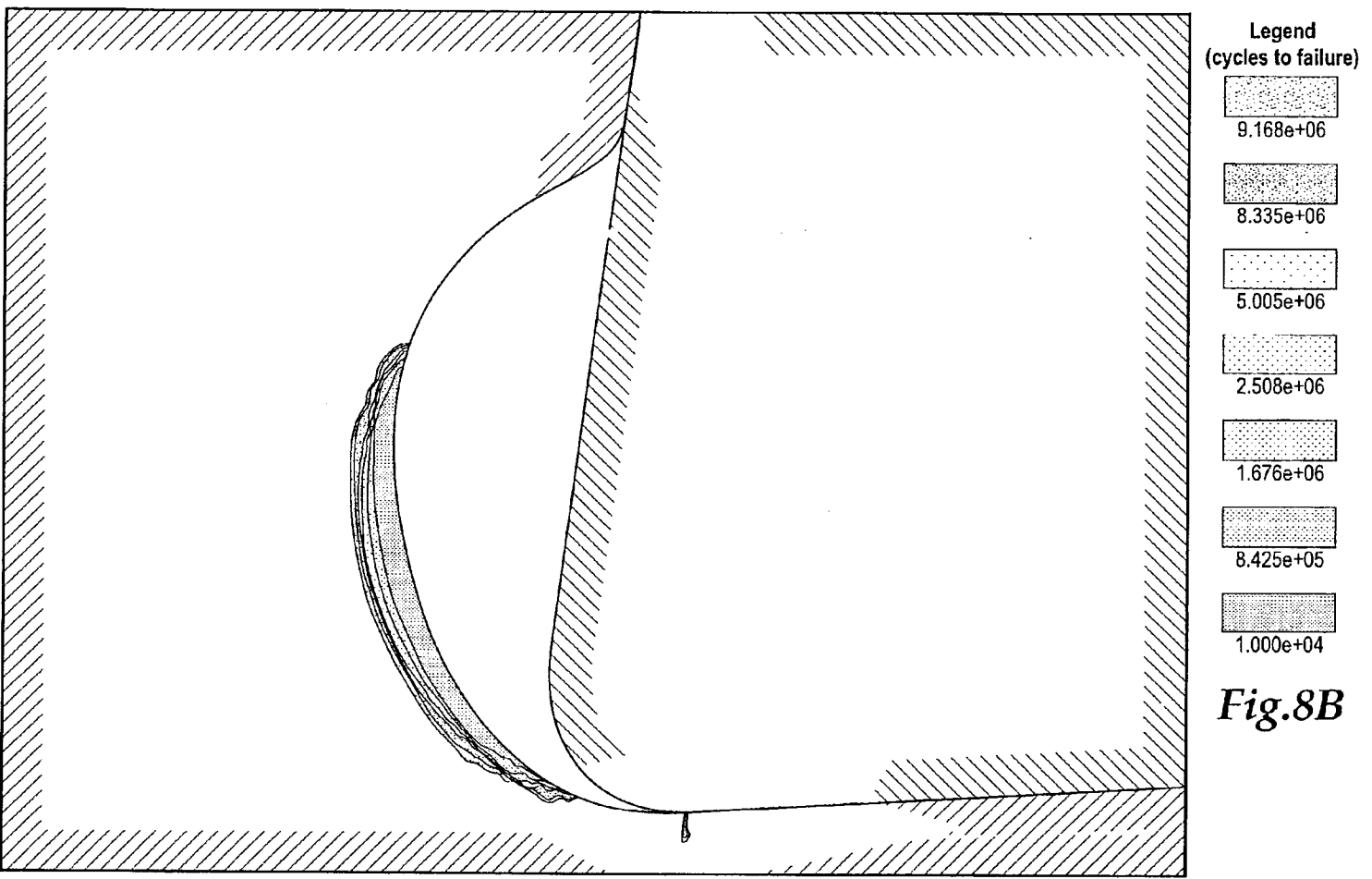


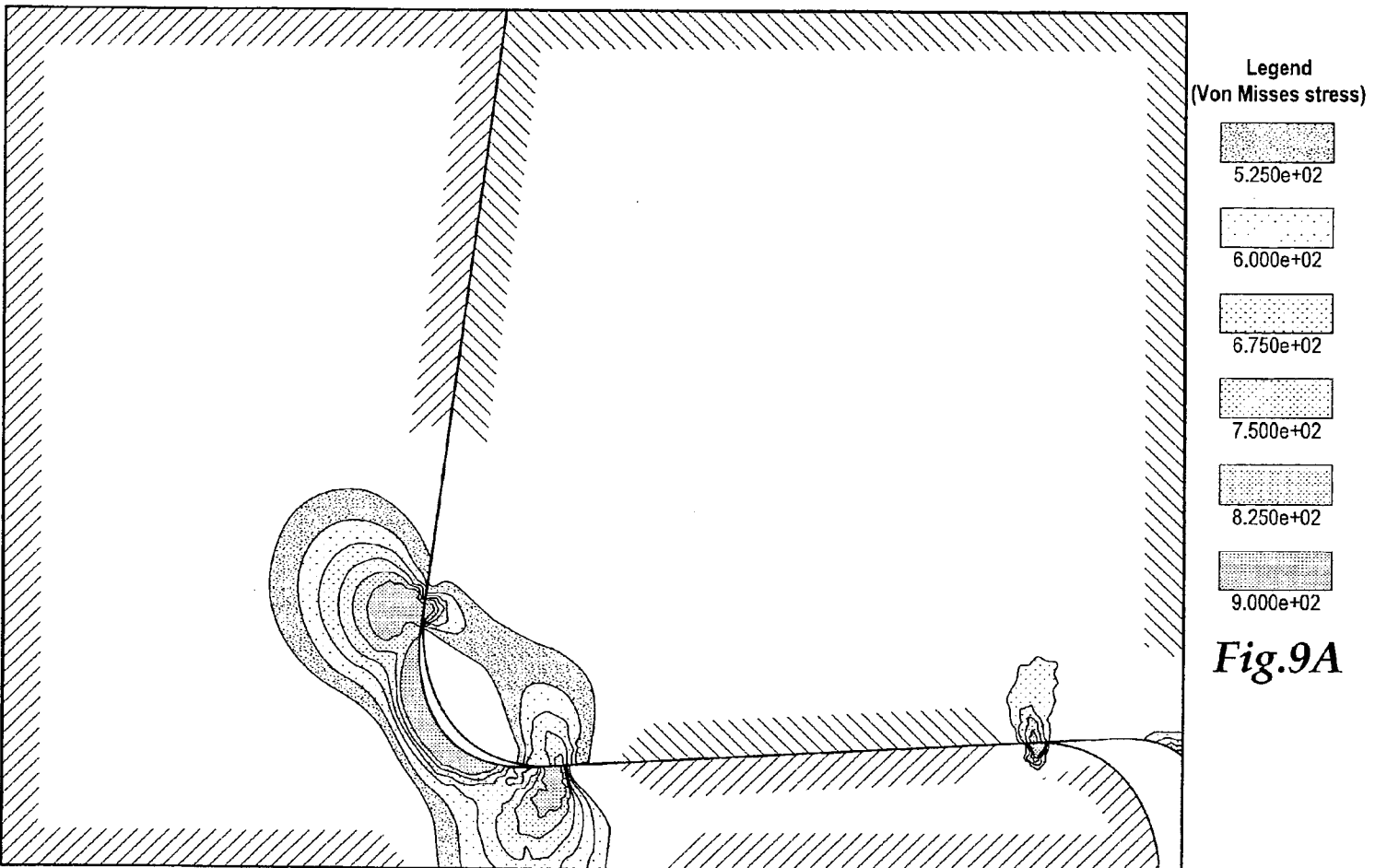


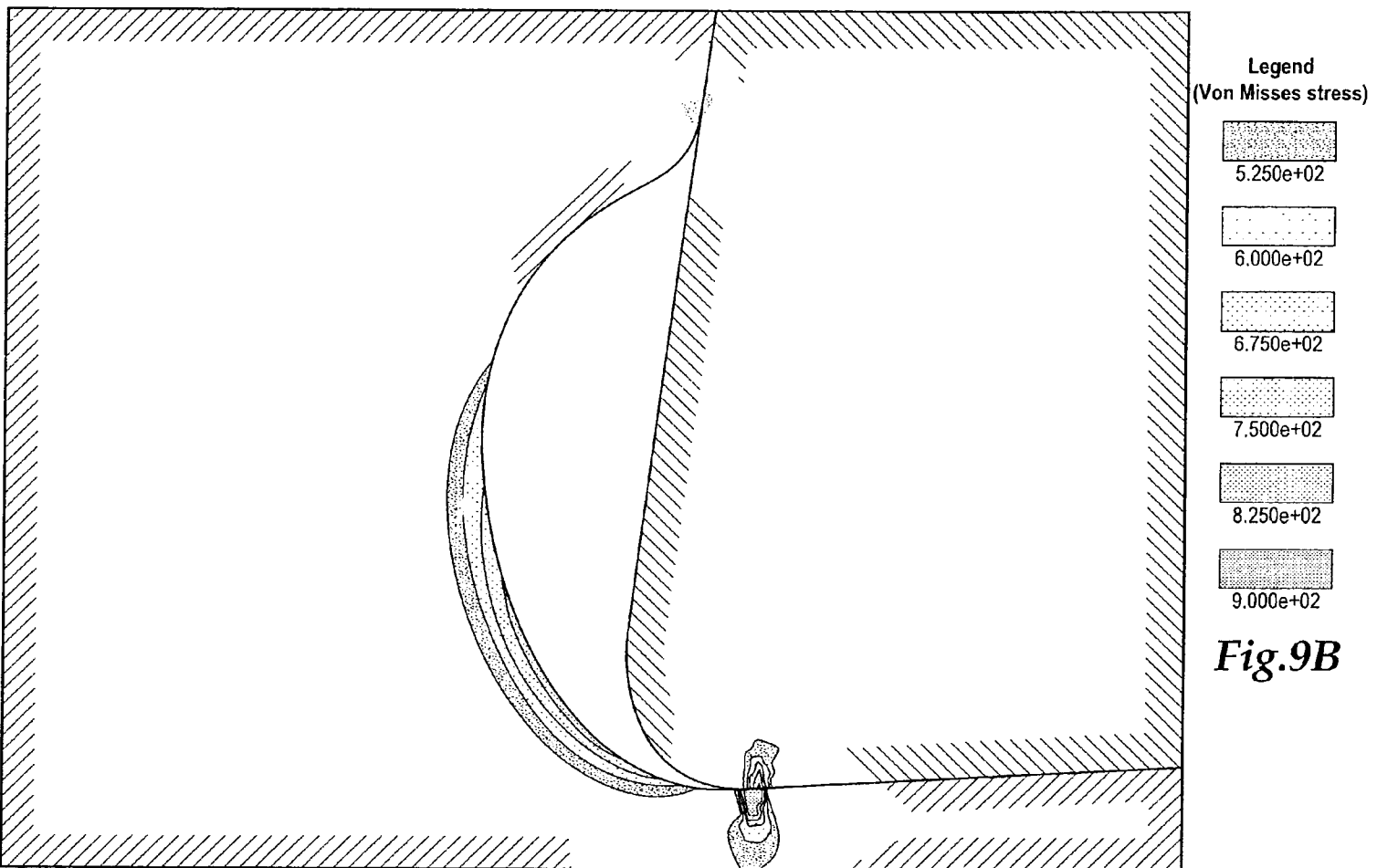












THREADED CONNECTION WITH
IMPROVED ROOT THREAD PROFILE

FIELD OF INVENTION

This invention relates in general to pipe connections, and in particular to a threaded connection having an improved root thread profile design that improves fatigue resistance.

BACKGROUND

Searching for oil or more generally hydrocarbons is becoming more demanding in terms of hardware and devices in recent years because oil and gas fields (reservoirs) are located deeper in the earth or in places difficult to reach.

Numerous onshore drilling and production activities require tubular connections having high levels of fatigue resistance; for example, drilling applications and thermal applications.

Additionally, exploring and producing hydrocarbon fields in deep water environments (offshore applications) has increased and necessitates tubular connections which are more resistant to environmental challenges such as fatigue and corrosion.

Off-shore platforms have production facilities located above the sea surface. These facilities are frequently used for exploitation of hydrocarbon fields lying below the sea floor. These platforms are anchored to the sea bottom and tubular strings are used to deliver the hydrocarbons from wells drilled into reservoirs below the sea bed. The tubular strings are sometimes referred to in the art as "risers."

These riser strings are immersed in the sea and are subject to movements caused by sea currents and surface wave movements. Because of continuous and periodical movements of the sea, the tubular strings do not remain immobile, but are subject to lateral movements of small magnitude which can produce deformations in certain parts of the tubular connections. These riser strings must withstand loads which induce fatigue stresses in the tubes and the tubular connections, in particular with respect to the zone of the threaded connection. These stresses tend to cause rupture in the tube and/or connection in the vicinity of the thread and there is a need to improve the fatigue resistance of the threaded connections.

Some prior art patents, for example U.S. Pat. Nos. 7,780,202 and 6,609,735 disclose flank-to-flank ("FtF") engagement type connections which are subject to fatigue, including riser connectors.

Other prior art conventional interference fit threaded connections (including API buttress-style thread forms), have profiles in which the threads engage along only one thread flank upon make up. This type of connection must completely unload the contacting flank, undergo relative movement between the pin and the coupling until the opposite flanks contact, and then transfer load to the newly contacting flank. Repeated, cyclical side loading and load transfers make these connection types especially susceptible to fatigue failures.

In flank-to-flank (FtF) threads, upon make up, contact is made between both stabbing and load flanks. Clearance exists between crests and roots. The thread is designed with the thread teeth of one member being wider than the mating teeth of the other member (e.g., flank to flank interference). Due to the inclination of the flanks, contact forces (normal to the surface of the flank) have the main component placed in an axial direction, pressing the material that forms the thread teeth. To achieve the flank to flank interference, contact forces work mainly on the elasticity of the teeth. The elasticity of the

teeth is very low so high contact pressures are reached during make up. This explains why FtF threads have high galling tendency during make up.

Additional drawbacks of FtF threads are present for very sloping angles of the lead-in flank of the thread, measured compared to a perpendicular surface to the pipe's axis. The compression action of the connection is unsatisfactory because this type of solution aids the onset of the phenomenon defined as "jump-in," when the compression forces exceed certain limits. Jump-in occurs when the male pipe segment slides into the female segment, exceeding the resistance given by the threading of the two pieces. This phenomenon occurs more frequently the more inclined the angle of thread lead-in.

Other drawbacks of the FtF type of thread is that it is subject to high risk of seizure of the joint with the consequent risk of not ensuring the airtight seal of the fluids inside the tube. Due to the seizure effect, torque varies greatly as the screwing operation (make up) of the joint proceeds. This type of joint typically has more turns. This introduces difficulties in making the joint and creates the possibility of imprecision in applying the correct make up torque.

In Crest-to-Root (CtR) Threads (which are used in the threaded connection of the present disclosure), upon make up, contact is made between a pair of mating flanks (load flanks for tension or stabbing flank for compression) and also contact between crest and roots. The CtR thread is designed with interference between crest and roots. In this case the main component of the contact forces (normal to the surface of the crest/root) are placed in a radial direction, and so the interference is achieved taking advantage of the elasticity of a tubular body by deforming geometrically the pipe. Only a minor part of the interference is achieved by the elasticity of the thread teeth, so contact pressures achieved on the teeth are lower than in the case of FtF threads, and so the galling tendency during make up is diminished.

The CtR design of the present disclosure has an optimum fatigue performance and also a very low galling tendency during make up. Therefore, the presence of micro cracks (due to such galling) is minimized.

The present disclosure can be used in integral connections, threaded and coupled connections and in big outside diameter ("OD") threaded connectors, for offshore and onshore applications. There are two major types of big OD threaded connectors used for production risers. The first type is referred to in the art as a "welded" type; the pin and box are machined separately from heavy-wall material and then welded to the pipe. In the second type, referred to in the art as "threaded-and-coupled" type, the pin is typically machined directly onto the pipe ends. The box is machined into each end of a coupling that is used to join the pipe ends together.

Moreover, the design of the present disclosure can be combined with internal and/or external and/or intermediate metal to metal seal configurations, internal and external elastomeric seals, intermediate metal to metal seals and two step threads. For big diameter connectors, stabbing guides and anti-rotation devices can also be used together with the thread profile of this disclosure.

SUMMARY

A threaded connection design having a double ellipse in the thread root for reducing fatigue stress is disclosed herein. In the design of the present disclosure the radius of the stress concentrator (located in the joint between the root and the load flank) is increased using a double ellipse configuration (curved surface having variable radius, not an arc of a circle

3

which has a constant radius). This configuration allows maximizing the radius of the stress concentrator but also minimizes the loss of contact between load flanks, and also minimizes the section of the connection in which the "critical section" is diminished. Another benefit of this profile is that the stress concentrator is put away from the contact points between pin and box so the tensional state on the stress concentrator is more beneficial to the fatigue behavior of the joint. In the new design disclosed herein, maximized contact between load flanks and crest and roots is assured so the relative movement between parts of the connection is minimized. In general, the profile of the root surface in the present disclosure is composed by a linear portion and a curved portion having a double elliptical profile.

In particular, a design for a male or female threading, which is disposed on an end of a tubular element, is disclosed. The male or female threading includes: a tapered root surface having a first angle of taper (β) measured from a longitudinal axis (aa) of the threading, said tapered root surface being joined tangentially at a first end by a concave curved surface of a constant radius of curvature to a stabbing flank, said tapered root surface being joined at a second end by a convex curved surface of constant radius of curvature to a root groove. The root groove extends from the tapered root surface to a load flank.

The root groove includes: a first portion comprising a first elliptical surface having a variable radius of curvature, said first elliptical surface being part of an ellipse, and said root groove further including a second portion comprising a second elliptical surface having a variable radius of curvature, said second elliptical surface being part of a second ellipse, said second elliptical surface being joined tangentially at a first end to the first elliptical surface at a junction point that defines the bottom of the root groove; and said second elliptical surface being joined tangentially at a second end to the load flank. The bottom of the root groove is disposed in the sidewall of the tubular element below the level of the tapered root surface.

The tapered root surface (101) includes a first angle of taper (β) measured between the tapered root surface 101 and a longitudinal axis (aa) of the threading. In some implementations the first angle of taper (β) is 0 degrees, such that the tapered root surface (101, 301) is parallel to the axis of threading (aa). In other implementations the first angle of taper (β) greater than 0 but less than the measured value of an angle measured between a stabbing flank 220 of the male threading and the axis of threading (aa).

In some implementations an angle theta measured between the axis of threading (aa) and the longitudinal axis (dd) of the sidewall of the tubular element (11) is between 1.5 degrees and 12 degrees.

In the present disclosure, a major axis (cc) of the second ellipse is disposed perpendicular to the load flank; and the major axis (bb) of the first ellipse is perpendicular to the major axis (cc) of the second ellipse. The major axis (bb) of the first ellipse is concurrent with a minor axis of the second ellipse.

In some implementations the first ellipse and the second ellipse are the same size. For example, the first ellipse has a first predetermined diameter (D1) along a major axis (bb), and a second predetermined diameter (D2) along a minor axis; and wherein the second ellipse has a predetermined diameter (D3) along the major axis (cc) that is equal to the diameter (D1) along the major axis (bb) of the first ellipse, and the second ellipse has a second diameter (D4) along a minor axis that is equal to the diameter (D2) along the minor axis of the first ellipse.

4

In other implementations the ellipses may have differing shapes. For example, the first ellipse has a first predetermined diameter (D1) along a major axis (bb), and a second predetermined diameter (D2) along a minor axis; and wherein the second ellipse has a predetermined diameter (D3) along a major axis (cc) that is equal to the diameter (D1) along the major axis (bb) of the first ellipse, and the second ellipse has a second diameter (D4) along a minor axis that is greater than the diameter (D2) along the minor axis of the first ellipse. In other implementations, the second diameter (D4) along a minor axis of the second ellipse is greater than the diameter (D2) along the minor axis of the first ellipse, but the diameter of D1 may not necessarily be equal to the diameter of D3. In other implementations the second diameter (D4) along a minor axis is less than the diameter (D2) along the minor axis of the first ellipse. In other implementations the diameter (D3) along the major axis (cc) of the second ellipse is less than the diameter D1 along the major axis (bb) of the first ellipse. In other implementations, the diameter (D3) along the major axis (cc) of the second ellipse may be greater than the diameter (D1) along the major axis (bb) of the first ellipse. It will be understood and is expressly disclosed that any combination of one or more of the above ellipse diameter configurations may be combined in the implementation of this invention.

In some implementations, the load flank slopes away from the root groove and an angle measured between the load flank and a line perpendicular to an axis of the threading (aa) is in the range of 0 to 5 degrees. This is referred to in the art as a trapezoidal thread. In other implementations, the load flank slopes toward the root groove and an angle measured between the load flank and a line perpendicular to an axis of the threading (aa) is in the range of 0 to -9 degrees. This is referred to in the art as a hook thread.

The various implementations of the double ellipse root profile of the present invention may be used in a thread connection having a male tubular element including a tapered male threading having an axis of taper (aa), and a female tubular element including a tapered female threading having an axis of taper (aa), said female threading cooperates with the male threading when the threaded connection is made up. The root surface in at least one of the male threading and female threadings includes a tapered root surface having a first angle of taper (β) measured between the tapered root surface 101 and a longitudinal axis (aa) of the threading, said tapered root surface being joined tangentially at a first end by a concave curved surface of a constant radius of curvature to a stabbing flank, said tapered root surface being joined at a second end by a convex curved surface of constant radius of curvature to a root groove. The root groove extends from the tapered root surface to a load flank. The root groove includes: a first portion comprising a first elliptical surface having a variable radius of curvature, said first elliptical surface being part of an ellipse, and said root groove further including a second portion comprising a second elliptical surface having a variable radius of curvature, said second elliptical surface being part of a second ellipse, said second elliptical surface being joined tangentially at a first end to the first elliptical surface at a junction point that defines the bottom of the root groove; and said second elliptical surface being joined tangentially at a second end to the load flank. The bottom of the root groove is disposed in the sidewall of the tubular element below the level of the tapered root surface.

A method is disclosed for cutting a tapered male or female threading of the double ellipse root profile of the present invention. The method includes: providing a tubular element; cutting a tapered male or female threading on an end of said

5

tubular element wherein said tapered male or female threading includes a tapered root surface having a first angle of taper (β) measured between the tapered root surface 101 and a longitudinal axis (aa) of the threading, said tapered root surface being joined tangentially at a first end by a concave curved surface of a constant radius of curvature to a stabbing flank, said tapered root surface being joined at a second end by a convex curved surface of constant radius of curvature to a root groove. The root groove extends from the tapered root surface to a load flank. The root groove includes: a first portion comprising a first elliptical surface having a variable radius of curvature, said first elliptical surface being part of an ellipse, and said root groove further including a second portion comprising a second elliptical surface having a variable radius of curvature, said second elliptical surface being part of a second ellipse, said second elliptical surface being joined tangentially at a first end to the first elliptical surface at a junction point that defines the bottom of the root groove; and said second elliptical surface being joined tangentially at a second end to the load flank. The bottom of the root groove is disposed in the sidewall of the tubular element below the level of the tapered root surface.

The details of one or more implementations of the invention are set forth in the accompanying drawings and the description below. Other features, objects, and advantages of the invention will be apparent from the description and drawings, and from the claims.

DESCRIPTION OF DRAWINGS

FIG. 1 is a partial cross-section of a first implementation of a threaded connection design having a double ellipse in the thread root for reducing fatigue stress;

FIG. 1A is an enlarged portion of the cross-section of FIG. 1, wherein the angle of thread taper is further enlarged for illustrative purposes;

FIG. 2 is a partial cross-section of a second implementation of a threaded connection design having a double ellipse in the thread root for reducing fatigue stress;

FIG. 2A is an enlarged portion of the cross-section of FIG. 2, wherein the angle of thread taper is further enlarged for illustrative purposes;

FIG. 3 is a partial cross-section of a third implementation of a threaded connection design having a double ellipse in the thread root for reducing fatigue stress;

FIG. 3A is an enlarged portion of the cross-section of FIG. 3, wherein the angle of thread taper is further enlarged for illustrative purposes;

FIGS. 4A to 4D are partial cross-sections illustrating different root profiles of a Crest-to-Root ("CtR") thread;

FIG. 5 is a partial cross-section of a tubular connection with a threading profile of FIG. 1;

FIG. 6 is a partial cross-section of a tubular connection with a threading profile of FIG. 2;

FIG. 7 is a partial cross-section of a tubular connection with a threading profile of FIG. 3;

FIG. 8A is a graphical illustration of finite element analysis generated data showing estimated cycles to fatigue failure for a standard prior art CtR thread;

FIG. 8B is a graphical illustration of finite element analysis generated data showing estimated cycles to fatigue failure for a double elliptical thread of the present disclosure;

FIG. 9A is a graphical illustration of finite element analysis generated data showing stress distribution for a standard prior art CtR thread; and

6

FIG. 9B is a graphical illustration of finite element analysis generated data showing stress distribution for a double elliptical thread of the present disclosure;

Like reference symbols in the various drawings indicate like elements.

DETAILED DESCRIPTION

Referring to FIG. 1 where therein is illustrated a first implementation of a threaded connection design having a double ellipse in the thread root for reducing fatigue stress. A tubular element has a male threading 100 disposed on a pin end 12 of the tubular element 11. The male threading 100 includes a tapered root surface 101. In the first implementation illustrated in FIG. 1, the tapered root surface 101 is parallel to the axis of threading (aa). The axis of threading (aa) forms an angle θ of approximately 2.4 degrees with a longitudinal axis (dd) of the wall of the tube 11. The range for theta in this implementation may range from about 1.5 degrees to 12 degrees, and more preferably from 1.5 to 4.5 degrees. It will be understood that in this embodiment, since the tapered root surface 101 is parallel to the axis aa of the threading an angle β between the root tapered root surface 101 and the axis of threading (aa) will be equal to 0 degrees. However, in a modification of this embodiment, the angle β may have other values (e.g., see FIG. 2).

The tapered root surface 101 is joined tangentially at a first end by a concave curved surface 102 of a constant radius of curvature to a stabbing flank 120 and the tapered root surface 101 is joined at a second end by a convex curved surface 104 of constant radius of curvature to a root groove 103. The root groove 103 extends from the tapered root surface 101 to a load flank 150.

The root groove 103 includes a first portion comprising a first elliptical surface 106 having a variable radius of curvature. The first elliptical surface 106 is part of an ellipse 107. The root groove 103 further includes a second portion having a second elliptical surface 108 with variable radius of curvature. The second elliptical surface is part of a second ellipse 110. The second elliptical surface 108 is joined tangentially at a first end to the first elliptical surface 106 at a junction point 109 that defines the bottom of the root groove 103. The second elliptical surface is joined tangentially at a second end to the load flank 150.

The bottom of the groove 103 is placed below the level of the tapered root surface 101.

The major axis (bb) of the first ellipse 107 is disposed perpendicular to the major axis (cc) of the second ellipse 110, and the major axis (bb) of the first ellipse 107 is concurrent with (aligned with and overlaying) a minor axis of the second ellipse 110. This configuration ensures that ellipses 107 and 110 join tangentially at the junction point 109.

In the first implementation illustrated in FIG. 1, the major axis (cc) of the second ellipse 110 is disposed perpendicular to the load flank 150. This configuration ensures that the second ellipse 110 is joined tangentially to the load flank 150.

In the first implementation illustrated in FIG. 1, the first ellipse 107 has a first predetermined diameter (D1) along the major axis (bb), and a second predetermined diameter (D2) along a minor axis; and wherein the second ellipse 110 has a predetermined diameter (D3) along the major axis (cc) that is equal to the diameter (D1) along the major axis (bb) of the first ellipse 107, and the second ellipse 110 has a second diameter (D4) along a minor axis that is equal to the diameter (D2) along the minor axis of the first ellipse 107. In this configuration the first ellipse 107 and the second ellipse 110 are identically shaped. Alternatively, it will be understood

that in the design of threading 100, the first ellipse 107 and the second ellipse 110 may have different relative diameters. For example, the first ellipse 107 may be longer and narrower than the implementation illustrated in FIG. 1 (e.g., the ellipse may be shaped similar to the ellipse 207 illustrated in FIG. 2).

It will be understood that a female box connection may have the same elements and profile as the male threading 100 illustrated and discussed above.

Referring now to FIG. 5 wherein is illustrated a tubular connection 10 having a first tube 11 with a male pin end 12 with the tapered male threading 100 (as illustrated in FIG. 1) made up to a female box end 14 of a second tube 13. The female box end 14 is illustrated with the same threading profile 100 as the male threading 100. As discussed herein-

after it will be understood that the male threading and the female threading do not have to be identical and either the male threading or the female threading may have modifications as discussed hereinafter. In the first implementation illustrated in FIGS. 1, 1A and 5, the load flank 150 is sloped positively away from the root groove 103. (You will note that FIG. 1A has the angle of the load flank 150 exaggerated for illustrative purposes.) Such a thread configuration is referred to in the art as a trapezoidal thread. The angle of the load flank measured with a line perpendicular to the axis (aa) of the threading is generally in the range of 0 to 5 degrees and more preferably from 1.5 to 5 degrees and preferably about 3 degrees. Moreover, angles from 0° (that is to say load flank perpendicular to the axis (aa) of the threading can also be used. In addition, negative flank angles from -9° to 0 (e.g. see FIG. 3a) may also be used for variations of this embodiment. That is to say, the range angle of the load flank may range from -9° to 5° and a preferred range for this embodiment is 1.5° to 5° and the preferred value is 3°.

Referring to FIG. 2 where there is illustrated a second implementation of a threaded connection design having a double ellipse in the thread root for reducing fatigue stress. An axis of threading (aa) forms a preferred angle theta of approximately 2.4 degrees with a longitudinal axis (dd) of the wall of the tube 21. The range for theta in this implementation may range from about 1.5 degrees to 12 degrees, and more preferably from 1.5 to 4.5 degrees.

In the second implementation, a tapered threading 200 includes a tapered root surface 201 disposed at an angle of taper (β) measured between the root surface 201 and the axis of taper (aa) of the threading. The angle of taper (β) measured from the axis of taper (aa) of the threading is less than a measured angle between the stabbing flank (220) and the axis aa of the threading. The tapered root surface 201 is joined tangentially at a first end by a concave curved surface 202 of a constant radius of curvature to a stabbing flank 220 and the tapered root surface 201 is joined at a second end by a convex curved surface 204 of constant radius of curvature to a root groove 203. The root groove 203 extends from the tapered root surface 201 to a load flank 250.

The root groove 203 includes a first portion having a first elliptical surface 206 with a variable radius of curvature. The first elliptical surface 206 is part of an ellipse 207. The root groove 203 further includes a second portion having a second elliptical surface 208 with a variable radius of curvature. The second elliptical surface is part of a second ellipse 210. The second elliptical surface 208 is joined tangentially at a first end to the first elliptical surface 206 at a junction point 209 that defines the bottom of the root groove 203. The second elliptical surface is joined tangentially at a second end to the load flank 250. The bottom of the groove 203 is placed below the level of the tapered root surface 201.

The major axis (bb) of the first ellipse 207 is disposed perpendicular to the major axis (cc) of the second ellipse 210, and the major axis (bb) of the first ellipse 207 is concurrent with (aligned with and overlaying) a minor axis of the second ellipse 210. This configuration ensures that ellipses 207 and 210 join tangentially at the junction point 209.

In the second implementation illustrated in FIG. 2, the major axis (cc) of the second ellipse 210 is disposed perpendicular to the load flank 250. This configuration ensures that the second ellipse 210 is joined tangentially to the load flank 250.

In the second implementation, the first ellipse 207 has a first predetermined diameter (D1) along a major axis (bb), and a second predetermined diameter (D2) along a minor axis; and wherein the second ellipse 210 has a predetermined diameter (D3) along a major axis (cc) that is equal to the diameter (D1) along the major axis (bb) of the first ellipse 207, and the second ellipse 210 has a second diameter (D4) along a minor axis that is greater than the diameter (D2) along the minor axis of the first ellipse 207. Alternatively, it will be understood that in the design of threading 200, the first ellipse 207 and the second ellipse 210 may have different relative diameters. For example, the second ellipse 210 may have a first diameter (D3) along a major axis that may be greater than the diameter (D1) along the major axis of the first ellipse.

It will be understood that a female box connection may have the same elements and profile as the male threading 200 illustrated and discussed above.

Referring now to FIG. 6 wherein is illustrated a tubular connection 20 having a first tube 21 with a male pin end 22 with the tapered male threading 200 (as illustrated in FIG. 2) made up to a female box end 24 of a second tube 23. The female box end 24 is illustrated with a modified threading profile 100 (as illustrated in FIG. 3). It will be understood that the male threading and the female threading do not have to be identical as illustrated in FIG. 6, as long as the surfaces are designed to mate properly. It will also be understood that the male threading and female threading may be identical as previously discussed herein with regard to FIGS. 1 and 5.

In the second implementation (see FIGS. 2, 2A and 6), the load flank 250 is sloped positively away from the root groove 203. (You will note that FIG. 2A has the angle of the load flank 150 exaggerated for illustrative purposes). Such a thread configuration is referred to in the art as a trapezoidal thread. The angle of the load flank 250 measured between a line perpendicular to the pipe axis (aa) of the threading is generally in the range of 0 to 5 degrees and more preferably from 1.5 to 5 degrees and preferably about 3 degrees. In variations of this embodiment and angle of 0° (that is to say load flank perpendicular to the axis (aa) can also be used. In addition, negative flank angles from -9° to 0 (e.g. see FIG. 3) may also be used for this embodiment. That is to say, the angle of the load flank may range from -9° to 5° with a preferred range for this embodiment of 1.5° to 5° and the preferred value being 3°.

Referring to FIG. 3 where there is illustrated a third implementation of a threaded connection design 300 having a double ellipse in the thread root for reducing fatigue stress. The tapered male threading 300 includes a tapered root surface 301. The axis of the threading (aa) forms a preferred angle theta with the longitudinal axis of the tube (dd) of approximately 8 degrees. The range for theta in this implementation may range from about 1.5° to 12 degrees and more preferably from 4.5 degrees to 12 degrees.

In the third implementation illustrated in FIG. 3, the tapered root surface 301 is parallel to the axis of threading (aa) as in the implementation of FIG. 1. It will be understood that in this embodiment, since the tapered root surface 301 is

parallel to the axis aa of the threading an angle β between the root tapered root surface 301 and the axis of threading (aa) will be equal to 0 degrees. However, in a modification of this embodiment, the angle β may have other values (e.g. see FIG. 2).

The tapered root surface 301 is joined tangentially at a first end by a concave curved surface 302 of a constant radius of curvature to a stabbing flank 320 and the tapered root surface 301 is joined at a second end by a convex curved surface 304 of constant radius of curvature to a root groove 303. The root groove 303 extends from the tapered root surface 301 to a load flank 350.

The root groove 303 includes a first portion having a first elliptical surface 306 with a variable radius of curvature. The first elliptical surface 306 being part of an ellipse 307. The second elliptical surface is part of a second ellipse 310. The root groove 303 further includes a second portion having a second elliptical surface 308 with a variable radius of curvature. The second elliptical surface 308 is joined tangentially at a first end to the first elliptical surface 306 at a junction point 309 that defines the bottom of the root groove 303. The second elliptical surface is joined tangentially at a second end to the load flank 350. The bottom of the groove 303 is placed below the level of the tapered root surface 301.

In the third implementation illustrated in FIG. 3, the first ellipse 307 has a first predetermined diameter (D1) along the major axis (bb), and a second predetermined diameter (D2) along a minor axis; and wherein the second ellipse 310 has a predetermined diameter (D3) along the major axis (cc) that is equal to the diameter (D1) along the major axis (bb) of the first ellipse 307, and the second ellipse 310 has a second diameter (D4) along a minor axis that is equal to the diameter (D2) along the minor axis of the first ellipse 307. Alternatively, it will be understood that in the design of threading 300, the first ellipse 307 and the second ellipse 310 may have different relative diameters. For example, the first ellipse 307 may be longer and narrower than the implementation illustrated in FIG. 3 (e.g., the ellipse may be shaped similar to the ellipse 207 illustrated in FIG. 2).

The major axis (bb) of the first ellipse 307 is disposed perpendicular to the major axis (cc) of the second ellipse 310, and the major axis (bb) of the first ellipse 307 is concurrent with (aligned with and overlaying) a minor axis of the second ellipse 310. This configuration ensures that ellipses 307 and 310 join tangentially at the junction point 309.

In the third implementation illustrated in FIG. 3, the major axis (cc) of the second ellipse 310 is disposed perpendicular to the load flank 350. This configuration ensures that the second ellipse 310 is joined tangentially to the load flank 350. All orientations of other axis are defined with respect to axis cc of the second ellipse 310.

It will be understood that a female box connection may have the same elements and profile as the male threading 300 illustrated and discussed above.

Referring now to FIG. 7 wherein is illustrated a tubular connection 30 having a first tube 31 with a male pin end 32 with the tapered male threading 300 (as illustrated in FIG. 3) made up to a female box end 34 of a second tube 33. The female box end 34 is illustrated with the same threading profile 300 as the male threading 300. As discussed previously herein with regard to FIGS. 2 and 6, it will be understood that the male threading and the female threading do not have to be identical and either the male threading or the female threading may have modifications as long as the profiles mate together.

In the third implementation illustrated in FIGS. 3, 3A and 7, the load flank 350 is sloped toward the root groove 303.

(You will note that FIG. 3A has the angle of the load flank 350 exaggerated for illustrative purposes.) Such a thread configuration is referred to in the art as a hook thread. The angle of the load flank measured with a line perpendicular to the axis (aa) of the threading is generally in the range of -9 to 0 degrees and more preferably from -9 to -1.5 degrees and preferably about -3 degrees. Moreover, angles from 0° (that is to say load flank perpendicular to the axis (aa) can also be used. In addition, positive flank angles from 0° to 5 degrees (e.g. see FIG. 1a) may also be used for variations of this embodiment. That is to say, the range angle of the load flank may range from -9° to 5, a more preferably the angle may range between -9 to -1.5 and a preferred value for this embodiment is -3°.

The present disclosure also includes a method of cutting a male or female threading 100, 200, 300 on an end of a tubular element. The method includes: providing a tubular element 11, 21, 31, 13, 23, 33; cutting a tapered male or female threading on a respective pin end 12, 22, 32 or box end 14, 24, 34 of the tubular element wherein the tapered threading includes a root surface 101, 201, 301. The tapered root surface 101, 201, 301 is joined tangentially at a first end by a concave curved surface 102, 202, 302 of a constant radius of curvature to a stabbing flank 120, 220, 320. The tapered root surface 101, 201, 301 is joined at a second end by a convex curved surface 104 of constant radius of curvature to a root groove 103. The root groove 103, 203, 303 extends from the tapered root surface 101, 201, 301 to a load flank 150, 250, 350. The root groove 103, 203, 303 includes: a first portion comprising a first elliptical surface 106, 206, 306 having a variable radius of curvature, said first elliptical surface 106, 206, 306 being part of an ellipse 107, 207, 307, and the root groove 103, 203, 303 further including a second portion comprising a second elliptical surface 108, 208, 308 having variable radius of curvature, said second elliptical surface being a part of the second ellipse 110, 210, 310. The second elliptical surface 108, 208, 308 is joined tangentially at a first end to the first elliptical surface 106, 206, 306 at a junction point that defines the bottom of the groove 109, 209, 309. The second elliptical surface is joined tangentially at a second end to the load flank 105, 205, 305. The second elliptical surface has its major axis (cc) perpendicular to the load flank 150, 250, 350. The major axis bb is perpendicular to the major axis cc. Orientation of axis is defined having in mind that cc should be perpendicular to the load flank and that bb and cc should be one perpendicular to the other

Advantages of Present Invention

The root profile design of the present disclosure improves fatigue resistance of the threaded connection by a combined action of several features which manifest themselves at the end of the make up operation of the connection:

- a) provision of large radial loads ("hoop loads"), as a function of root-to-crest interference. The large hoop loads improve fatigue resistance;
- b) provision of large shoulder loads that improve fatigue resistance; and
- c) provision of an lengthened radius Rb (of the arc of the curve the connects the root to the flank) lowers stress concentration in the thread roots.

The present design configuration of two ellipses allows maximization of the radius of the stress concentrator in the joint between the load flank 150, 250, 350 and the root surface 101, 201, 301, so the effect of the stress concentrator on the fatigue performance of the joint is minimized. Moreover, the effective contact between mating load flanks of the male and

female element 12 and 14 of the connection 10 is also maximized and hence efficiency of the connection is also maximized.

FIGS. 4A, 4B, 4C and 4D illustrate problems and benefits of incremental change in design configuration from the prior art standard CtR design of FIG. 4A to an exemplary root design of the present disclosure as illustrated in FIG. 4D. In FIGS. 4A to 4D, Rb is the radius of the arc connecting the root of the male thread to the load flank of the male thread. Ri is the radius of the arc connecting the thread crest and the load flank of the female thread. See FIG. 4A wherein the Rb and the Ri are equal.

Referring to FIG. 4A, wherein is illustrated a full load flank contact. Problem: contact pressures over the stress concentrator and low stress concentrator radius (Rb). Benefit: High tension efficiency due to maximized load flank contact L1.

Referring to FIG. 4B wherein is illustrated a modified CtR profile (similar to prior art design of US 20110042946 A1). Benefit: The radius Ri is enlarged to avoid contact points over the stress concentrator. Problem: The stress state near the stress concentrator is highly affected by contact stresses and remote stresses. Another problem of this configuration is the low stress concentrator radius (Rb). This configuration has the same Rb as in FIG. 4A.

Referring to FIG. 4C to maximize the stress concentrator radius Rb, there is the limit of (Rb), because it is important to avoid full load flank contact. Moreover, when increasing Rb the effect of contact stresses in the stress state around the stress concentrator becomes bigger because points A and C are closer to B.

Referring to FIG. 4D wherein the stress concentrator radius (Ri) of the male thread has been enlarged to maximize load flank contact and crest to root contact. Moreover, the stress state in the stress concentrator is less influenced by contact stresses and is only a function of remote stresses, due to the fact that contact points A and C are spaced farther away from the stress concentrator. With this geometry, contact surface L1 is restored but without contact in the stress concentrator.

Referring to FIG. 4B (a prior art design similar to US 2011 0042946 A1) and FIG. 4D (an implementation of the present root design), another benefit of using the double elliptical groove as illustrated in FIGS. 1, 2 and 3 of the present disclosure is that the stress state around the stress concentrator (KT) is less affected by the components of stresses due to contact points ($\sigma_A + \sigma_C$), and so values of stresses are lower than the ones obtained for a joint without a groove and only affected by remote stresses (σ_B).

In some prior art CtR threads (see FIG. 4B), the stress state around the stress concentrator KT is a function of contact stresses ($\sigma_A + \sigma_C$) and remote stresses (σ_B):

$$\sigma_{KT} = \sigma_A + \sigma_B + \sigma_C$$

However, in the joint of the present disclosure (see FIG. 4D), contact points A and C are far away from the stress concentrator, so the stress state around the stress concentrator KT is a function only of the remote stresses (σ_B):

$$\sigma_{KT} = \sigma_B$$

It is important to note that the choice of ellipses to form the groove is based on the fact that the ellipses are functions that allow joining two perpendicular surfaces with a curved surface that has a radius that varies from point to point. Therefore, the radiuses can be maximized and minimized. For example, an arc of circle having the same radius as the radius of the ellipse in the KT will remove all possibility of contact between load flanks (see FIGS. 1 to 3).

The use of a second ellipse to go from the load flank to the KT is used to maximize the radius of the KT, then the design switches to the first ellipse to quickly restore crest to root contact. This design provides a minimal removal of crest to root contact surface. Therefore, contact pressures are maintained low (see FIGS. 1 to 3).

To enhance the effect of the first ellipse, it can be narrowed as illustrated in the second implementation of the present disclosure (see FIG. 2).

Additionally increasing the taper of the tapered portion of the root surface as illustrated in the second implementation (FIG. 2), the contact surface between crest and root is enlarged and so contact pressures are minimized and galling is minimized. The contact length at crest/root is approximately double in the second implementation as compared to the design illustrated in the first implementation. This design minimizes galling. Additionally, positive (major than 0) angle of taper (β) measured from the axis of taper (α) of the threading helps to maintain the thread locked. (β) angle is also useful in enlarging the crest/root contact surface and at the same time provides for additional room for the groove for stress reduction at the pin root (see FIG. 2).

Referring now to FIGS. 8A, 8B, 9A and 9B, wherein finite element analysis has been used to generate data comparing parameters for a standard Crest to Root (CtR) thread (as illustrated in FIG. 4A) to the exemplary double elliptical design of the present disclosure (as illustrated in FIG. 4D). In FIG. 8A the cycles to fatigue failure is illustrated for the standard CtR thread design. In FIG. 8B the cycles to fatigue failure are illustrated for the double elliptical design of the present disclosure. It can be seen in FIGS. 8A and 8B how the double elliptical design of the present invention directly impacts on the number of cycles to failure in the zone where the stress concentrator is placed. The first layer of material (in the area of the stress concentrator, that is to say the joint between load flank and root surface) in the standard CtR design is the one having less number of cycles $1.120 \times 10^{+3}$ to fatigue failure (FIG. 8A), while dotted area (area near the stress concentrator) in the double elliptic profile (FIG. 8B) is the one having less number of cycles $1.0 \times 10^{+4}$. It can be seen that the fatigue life of the component is increased with the double elliptical design of the present invention.

Referring to FIGS. 9A and 9B, the stress distribution and representative von Mises values for the standard CtR thread is illustrated in FIG. 9A and the double elliptical thread profile of the present disclosure is illustrated in FIG. 9B. It can be seen that in FIG. 9A (prior art CtR design), high values of von Mises stress exist around the stress concentrator and near the contact points between the male and female thread near the stress concentrator. However, FIG. 9B, (the double elliptical thread profile of the present inventions) demonstrates a lower level of stress values and a more uniform distribution of stress near the stress concentrator. The contact points between the male and female members are desirably spaced apart from the stress concentrator and therefore not contributing to the stress state of the area near the stress concentrator.

A number of embodiments of the invention have been described. Nevertheless, it will be understood that various modifications may be made without departing from the spirit and scope of the invention. Accordingly, other embodiments are within the scope of the following claims.

What is claimed is:

1. A tubular element having a male threading disposed on an end of said tubular element, said male threading comprising:

a tapered root surface having a first angle of taper (β) measured between the tapered root surface and a longi-

13

itudinal axis (aa) of the threading, said tapered root surface being joined tangentially at a first end by a concave curved surface of a constant radius of curvature to a stabbing flank, said tapered root surface being joined at a second end by a convex curved surface of constant radius of curvature to a root groove;

said root groove extending from the tapered root surface to a load flank, said root groove including:

a first portion comprising a first elliptical surface having a variable radius of curvature, said first elliptical surface being part of an ellipse and
said root groove further including a second portion comprising a second elliptical surface having a variable radius of curvature, said second elliptical surface being part of a second ellipse, said second elliptical surface being joined tangentially at a first end to the first elliptical surface, and said second elliptical surface being joined tangentially at a second end to the load flank.

2. The tubular element of claim 1 wherein the first angle of taper (β) is 0 degrees, such that the tapered root surface is parallel to the axis of threading (aa).

3. The tubular element of claim 1 wherein the first angle of taper (β) is less than the measured value of an angle measured between a stabbing flank of the male threading and the axis of threading (aa).

4. The tubular element of claim 1 wherein an angle theta measured between the axis of threading (aa) and the longitudinal axis (dd) of the sidewall of the tubular element is between 1.5 degrees and 12 degrees.

5. The tubular element of claim 1 wherein a major axis (cc) of the second ellipse is disposed perpendicular to the load flank.

6. The tubular element of claim 1 wherein a major axis (bb) of the first ellipse is perpendicular to a major axis (cc) of the second ellipse.

7. The tubular element of claim 1 wherein a major axis (bb) of the first ellipse is aligned with a minor axis of the second ellipse.

8. The tubular element of claim 1 wherein the first ellipse has a first predetermined diameter (D1) along a major axis (bb), and a second predetermined diameter (D2) along a minor axis; and wherein the second ellipse has a predetermined diameter (D3) along a major axis (cc) that is equal to the diameter (D1) along a major axis (bb) of the first ellipse, and the second ellipse has a second diameter (D4) along a minor axis that is equal to the diameter (D2) along the minor axis of the first ellipse.

9. The tubular element of claim 1 wherein the first ellipse has a first predetermined diameter (D1) along a major axis (bb), and a second predetermined diameter (D2) along a minor axis; and wherein the second ellipse has a predetermined diameter (D3) along a major axis (cc) that is equal to the diameter (D1) along the major axis (bb) of the first ellipse, and the second ellipse has a second diameter (D4) along a minor axis that is greater than the diameter (D2) along the minor axis of the first ellipse.

10. The tubular element of claim 1 wherein the first ellipse has a first predetermined diameter (D1) along a major axis (bb), and a second predetermined diameter (D2) along a minor axis; and wherein the second ellipse has a predetermined diameter (D3) along a major axis (cc) and has a second diameter (D4) along a minor axis that is greater than the diameter (D2) along the minor axis of the first ellipse.

11. The tubular element of claim 1 wherein the first ellipse has a first predetermined diameter (D1) along a major axis (bb), and a second predetermined diameter (D2) along a

14

minor axis; and wherein the second ellipse has a predetermined diameter (D3) along a major axis (cc) and has a second diameter (D4) along a minor axis that is less than the diameter (D2) along the minor axis of the first ellipse.

12. The tubular element of claim 1 wherein the first ellipse has a first predetermined diameter (D1) along a major axis (bb), and a second predetermined diameter (D2) along a minor axis; and wherein the second ellipse has a predetermined diameter (D3) along a major axis (cc) and has a second diameter (D4) along a minor axis; and wherein the diameter (D3) along the major axis (cc) of the second ellipse is less than the diameter D1 along the major axis (bb) of the first ellipse.

13. The tubular element of claim 1 wherein the first ellipse has a first predetermined diameter (D1) along a major axis (bb), and a second predetermined diameter (D2) along a minor axis; and wherein the second ellipse has a predetermined diameter (D3) along a major axis (cc) and has a second diameter (D4) along a minor axis; and wherein the diameter (D3) along the major axis (cc) of the second ellipse is greater than the diameter (D1) along the major axis (bb) of the first ellipse.

14. The tubular element of claim 1 wherein the load flank is disposed in relation to an angle measured between the load flank and a line perpendicular to an axis of the threading (aa), wherein said angle ranges from -9 to 5 degrees.

15. The tubular element of claim 1 wherein the second elliptical surface is joined tangentially at a first end to the first elliptical surface at a junction point that defines the bottom of the root groove.

16. The tubular element of claim 15 wherein the bottom of the groove is disposed in the sidewall of the tubular element below the level of the tapered root surface.

17. A threaded tubular connection, comprising:

a male tubular element including a tapered male threading having an axis of taper (aa), and

a female tubular element including a tapered female threading having an axis of taper (aa), said female threading cooperates with the male threading when the threaded connection is made up;

wherein the root surface in at least one of the tapered male threading and the tapered female threading comprises: a tapered root surface having a first angle of taper (β) measured between the tapered root surface and a longitudinal axis (aa) of the threading, said tapered root surface being joined tangentially at a first end by a concave curved surface of a constant radius of curvature to a stabbing flank, said tapered root surface being joined at a second end by a convex curved surface of constant radius of curvature to a root groove;

said root groove extending from the tapered root surface to a load flank, said root groove including:

a first portion comprising a first elliptical surface having a variable radius of curvature, said first elliptical surface being part of an ellipse, and

said root groove further including a second portion comprising a second elliptical surface having a variable radius of curvature, said second elliptical surface being part of a second ellipse, said second elliptical surface being joined tangentially at a first end to the first elliptical surface, and said second elliptical surface being joined tangentially at a second end to the load flank.

18. The threaded tubular connection of claim 17 wherein the first angle of taper (β) is 0 degrees, such that the tapered root surface is parallel to the axis of threading (aa).

15

19. The threaded tubular connection of claim 17 wherein the first angle of taper (β) is less than the measured value of an angle measured between a stabbing flank of the male threading and the axis of threading (aa).

20. The threaded tubular connection of claim 17 wherein an angle theta measured between the axis of threading (aa) and the longitudinal axis (dd) of the sidewall of the tubular element is between 1.5 degrees and 12 degrees.

21. The threaded tubular connection of claim 17 wherein a major axis (cc) of the second ellipse is disposed perpendicular to the load flank.

22. The threaded tubular connection of claim 17 wherein a major axis (bb) of the first ellipse is perpendicular to a major axis (cc) of the second ellipse.

23. The threaded tubular connection of claim 17 wherein a major axis (bb) of the first ellipse is aligned with a minor axis of the second ellipse.

24. The threaded tubular connection of claim 17 wherein the first ellipse has a first predetermined diameter (D1) along a major axis (bb), and a second predetermined diameter (D2) along a minor axis; and wherein the second ellipse has a predetermined diameter (D3) along the major axis (cc) that is equal to the diameter (D1) along a major axis (bb) of the first ellipse, and the second ellipse has a second diameter (D4) along a minor axis that is equal to the diameter (D2) along the minor axis of the first ellipse.

25. The threaded tubular connection of claim 17 wherein the first ellipse has a first predetermined diameter (D1) along a major axis (bb), and a second predetermined diameter (D2) along a minor axis; and wherein the second ellipse has a predetermined diameter (D3) along a major axis (cc) that is equal to the diameter (D1) along the major axis (bb) of the first ellipse, and the second ellipse has a second diameter (D4) along a minor axis that is greater than the diameter (D2) along the minor axis of the first ellipse.

26. The threaded tubular connection of claim 17 wherein the first ellipse has a first predetermined diameter (D1) along a major axis (bb), and a second predetermined diameter (D2) along a minor axis; and wherein the second ellipse has a

16

predetermined diameter (D3) along a major axis (cc) and has a second diameter (D4) along a minor axis that is greater than the diameter (D2) along the minor axis of the first ellipse (207).

27. The threaded tubular connection of claim 17 wherein the first ellipse has a first predetermined diameter (D1) along a major axis (bb), and a second predetermined diameter (D2) along a minor axis; and wherein the second ellipse has a predetermined diameter (D3) along a major axis (cc) and has a second diameter (D4) along a minor axis that is less than the diameter (D2) along the minor axis of the first ellipse.

28. The threaded tubular connection of claim 17 wherein the first ellipse has a first predetermined diameter (D1) along a major axis (bb), and a second predetermined diameter (D2) along a minor axis; and wherein the second ellipse has a predetermined diameter (D3) along a major axis (cc) and has a second diameter (D4) along a minor axis; and wherein the diameter (D3) along the major axis (cc) of the second ellipse is less than the diameter (D1) along the major axis (bb) of the first ellipse.

29. The threaded tubular connection of claim 17 wherein the first ellipse has a first predetermined diameter (D1) along a major axis (bb), and a second predetermined diameter (D2) along a minor axis; and wherein the second ellipse has a predetermined diameter (D3) along a major axis (cc) and has a second diameter (D4) along a minor axis; and wherein the diameter (D3) along the major axis (cc) of the second ellipse is greater than the diameter (D1) along the major axis (bb) of the first ellipse.

30. The threaded tubular connection of claim 17 wherein the load flank is disposed in relation to an angle measured between the load flank and a line perpendicular to an axis of the threading (aa), wherein said angle ranges from -9 to 5 degrees.

31. The threaded tubular connection of claim 17 wherein the second elliptical surface is joined tangentially at a first end to the first elliptical surface at a junction point that defines the bottom of the root groove.

* * * * *

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www.uspto.gov

NOTIFICACIÓN DE CONCESIÓN Y ARANCELES PENDIENTES DE PAGO

26237 7590 10/23/2013
FISH & RICHARDSON P.C. (DA)
P.O. BOX 1022
MINNEAPOLIS, MN 55440-1022

Examinador: Bochna, David

Art Unit: 3679. Nro. de documento: Fecha de despacho: 23-10-2013

Nro. de Solicitud: 13/315,354. Fecha de presentación: 09/12/2011.

Primer inventor mencionado: Gastón Mauro Mazzaferro

Expediente del agente: 24692-0013001

Número de confirmación: 1045

Título de la invención:

CONEXIÓN ROSCADA CON UN PERFIL DE ROSCA DE RAÍZ MEJORADO

Tipo de solicitud: No provisional

Estado del ente: Sin reducción arancelaria

Arancel por concesión pendiente de pago: \$ 1780

Arancel por publicación pendiente de pago: \$ 300

Arancel por concesión abonado previamente: \$0

Total aranceles pendientes de pago: \$ 2089

Fecha de vencimiento: 23-01-2014

La solicitud de la referencia ha sido examinada y se concederá una patente. La tramitación sobre el mérito de la invención ha concluido. La presente notificación de concesión no otorga derechos Patentarios. Podrá no concederse la patente a instancias de la oficina o por petición del solicitante. Véase CFR 37, 1.313 y MPEP 1308.

El arancel por concesión y publicación en su caso deben ser abonados dentro del plazo de tres meses desde la fecha de despacho de la presente notificación, caso contrario se considerará que la solicitud ha sido abandonada. Este plazo legal no puede ser prorrogado. Véase USC 35, 151. El arancel por concesión pendiente de pago antes indicado no refleja crédito alguno por las sumas previamente abonadas en tal concepto en la presente solicitud. En caso de haberse abonado este arancel en la presente solicitud (según lo indicado), el retorno de la Parte B de este formulario se considerará como un requerimiento para imputar el monto abonado al arancel pendiente de pago.

Cómo contestar la presente notificación:

1. Verifique el estado del ente antes indicado. Si el estado del ente es PYME o MICRO, asegúrese que aún resulte aplicable.

Si el estado del ente es el mismo al indicado anteriormente, abone el total de los aranceles pendientes de pago.

Si el estado del ente se ha modificado respecto del indicado, en la Parte B – Transmisión de Aranceles, complete la sección número 5 titulada “Cambio del estado del ente (respecto del estado antes indicado)”.

A los fines de la presente notificación, los aranceles para PYMES son la mitad de los aranceles sin descuento, en tanto en el caso de microempresas, los aranceles serán la mitad de los aranceles para PYMES.

II. La Parte B. Transmisión de aranceles, o su equivalente, debe completarse y devolverse a la Oficina de Patentes y Marcas de los Estados Unidos (USPTO) con el Arancel por Concesión y el Arancel por Publicación (en su caso). Si está debitando el arancel de su cuenta, debe completarse la sección 4b de la Parte B – Transmisión de Aranceles, y presentarse una copia extra del formulario. En caso de presentarse un equivalente de la Parte B, debe solicitarse claramente la imputación de los aranceles previamente abonados, y en tal caso podrán producirse demoras en el trámite debidas a la dificultad de reconocer el documento presentado como un equivalente de la Parte B.

III. Todas las comunicaciones relativas a la presente solicitud deberán contener el número de solicitud. Favor de remitir todas las comunicaciones antes del otorgamiento a Mail Stop Arancel de Concesión, salvo indicación en contrario.

Recordatorio importante: Los modelos de utilidad concedidos sobre solicitudes presentadas en o luego del 12 de Diciembre de 1980 pueden requerir el pago de aranceles de mantenimiento. Es responsabilidad del titular garantizar el pago de los aranceles de mantenimiento al vencimiento.

PARTE B – TRANSMISIÓN DE ARANCELES

Complete y envíe este formulario, junto con los aranceles aplicables a:

**Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450**

Por correo: Alexandria, Virginia 22313-1450

Por fax: 571-273-2885

INSTRUCCIONES: Este formulario debe ser utilizado para la transmisión del arancel de concesión y el arancel por publicación (en su caso). Los bloques 1 a 5 deben ser completados cuando corresponda. Toda la correspondencia adicional que comprenda la patente, pedidos por adelantado y notificación de los aranceles de mantenimiento se enviará por correo a la domicilio postal actual indicada si no se corrige a continuación o salvo lo dispuesto por el bloque 1 que (a) especifique un nuevo domicilio postal y/o (b) que indique un Domicilio para Aranceles a los fines de la notificación de los aranceles de mantenimiento.

DIRECCIÓN POSTAL ACTUAL (Nota: Utilice el bloque 1 para cualquier cambio de domicilio)

Printed Name Title Invention Title
FISH & RICHARDSON P.C. (DA)
P.O. BOX 1022
MINNEAPOLIS, MN 55440-1022

Nota: Solamente puede usarse un certificado de despacho para despachos postales domésticos de la transmisión de aranceles. Este certificado no puede ser usado para otra documentación. Cada documento adicional, como una cesión de derechos o dibujos formales, debe tener su propio certificado de despacho o transmisión.

Certificado de envío o transmisión

Por la presente certifico el depósito del presente arancel de transmisión por ante el Correo de los Estados Unidos con suficiente franqueo para despacho por primera clase en un sobre dirigido al domicilio Mail Stop Issue Fee precedente, o por fax a la USPTO (571) 273-2885, en la fecha indicada a continuación

(Nombre del depositante) - (Firma) - (Fecha)

Nro. de Solicitud: 13/315,354. Fecha de presentación: 09/12/2011.

Primer inventor mencionado: Gastón Mauro Mazzaferro

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Arancel por publicación pendiente de pago: \$ 300

Arancel por concesión abonado previamente: \$0

Total aranceles pendientes de pago: \$ 2080

Fecha de vencimiento: 23-01-2014

Examinador: Bochna, David

Art Unit: 3679

Clase-Sub-clase: 285-334000

1. Cambio de domicilio postal o indicación de "Domicilio para aranceles" (37 CFR 1.363).

☐ Cambio de domicilio postal (o cambio de Formulario de Domicilio Postal PTO/SB/122) adjunto.

☐ Indicación de "Domicilio para Aranceles " (o formulario de "Domicilio para Aranceles" PTO/SB/47; Rev. 03-02 o más reciente) adjunto. Se requiere uso de Número de Usuario.

2. Para la impresión de la primera página de la patente, liste

(1) los nombres de hasta 3 agentes de la propiedad industrial o representantes, alternativamente,

(2) el nombre de una sola firma (que cuente con un agente de la propiedad industrial o representante) y los nombres de hasta dos agentes o representantes. En caso de no indicarse nombre, no se imprimirá ningún nombre.

3. NOMBRE DEL CESIONARIO Y DATOS DE RESIDENCIA que se imprimirán en la patente (letra de imprenta)

Favor tenga en cuenta: A menos que el cesionario sea identificado a continuación, no aparecerán datos de cesionario en la patente. Si el cesionario se identifica a continuación, el documento ha sido presentado para ser inscripto como se establece en 37 CFR 3.11. La confección de este formulario no exime la presentación de la cesión de derechos.

(A) NOMBRE DEL CESIONARIO (B) RESIDENCIA: (ciudad y estado o país)

Marque la categoría o categorías apropiadas de cesionario (no serán impresas en la patente)

() Persona física

() Persona jurídica

() Gobierno

4a. Se presentan los siguientes aranceles:

☐ Arancel por concesión

☐ Arancel por publicación (no se permite reducción por PYME)

☐ Pedido por adelantado - # de copias

4b. Pago de Aranceles: (Por favor, en primer lugar solicite la imputación de las sumas previamente abonadas).

☐ Se adjunta cheque

☐ Pago con tarjeta de crédito. Se adjunta Formulario PTO -2038.

☐ El Director queda autorizado a percibir los aranceles correspondientes, toda suma faltante y a acreditar todo monto que corresponda en la cuenta Nro. (adjunte copia extra de este formulario).

5. Cambio en el estado de la persona jurídica (del carácter que se indica más arriba)

☐ a. El Solicitante es una microempresa. Véase 37 CFR 1.29.

NOTA: En ausencia de una certificación de microempresa (Véase formulario PTO/SB/15A y 15B) el pago por tal concepto no será aceptado bajo el riesgo de abandono de la solicitud.

☐ b. Solicitante es una PYME. Véase 37 CFR 1.27.

NOTA: En caso de haberse formalizado la solicitud bajo el estado de microempresa, el marcar este casillero se considerará como una notificación de la pérdida de dicho estado.

☐ c. Solicitante no califica para la reducción arancelaria

NOTA: El marcar este casillero se considerará como una notificación de la pérdida del estado de microempresa o PYME, según corresponda.

NOTA: El arancel por concesión y el arancel por publicación (en su caso) no serán aceptados de ninguna persona que no sea el solicitante, agente de la propiedad industrial o representante, o cesionario u otra parte interesada conforme los registros obrantes en la Oficina de Patentes y Marcas de los Estados Unidos.

Firma Autorizada _____ Fecha _____

Nombre impreso o a mano: _____ N° de inscripción: _____

Esta información es exigida por el CFR Título 37, 1.311. La información es utilizada por el público para presentar (y por la Oficina para procesar) una solicitud. La confidencialidad está gobernada por el Título 35 del USC, 122 y el Título 37 del CFR 1.14. Se estima que para completar este formulario se necesitan 12 minutos, incluyendo la recolección, preparación y presentación de la solicitud provisional completa a la Oficina. El tiempo dependerá de las necesidades del caso. Cualquier comentario acerca del tiempo necesario para completar este formulario y/o sugerencia al efecto de reducir esta carga debe ser enviado a Chief Information Officer, Oficina de Patentes y Marcas, Departamento de Comercio de los Estados Unidos, PO BOX 1450, Alexandria Virginia 22313-1450. No envíe aranceles o formularios completos a esta dirección. Envíelos a: Comisario de Patentes, PO BOX 1450, Alexandria Virginia 22313-1450.

Conforme la Ley de Reducción de Papelería de 1995, ninguna persona está obligada a responder a una solicitud de información a menos que muestre un número de control válido OMB.

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Art unit: 3679

Fecha de despacho por correo: 23-10-2013

2623; 7591 10/23/2013
 FISH & RICHARDSON P.C. (DA)
 P.O. BOX 1022
 MINNEAPOLIS, MN 55440-1022

Determinación del Ajuste de Plazo de la Patente USC 35 1454(b)

(solicitud presentada en o con posterioridad a Mayo 29, 2000)

El Ajuste de Plazo de la Patente es de 150 días. En caso de abonarse el arancel por concesión tres meses después de la fecha de despacho de la presente notificación y la patente es concedida el Martes anterior a la fecha 28 semanas (seis meses y medio) posterior a la fecha de despacho de la presente notificación, el Ajuste de Plazo de la Patente será de 150 días.

En caso de haberse presentado una Solicitud de Continuación (CPA) sobre la solicitud antes identificada, la fecha de presentación que determine el Ajuste de Plazo de la Patente será la fecha de presentación de la CPA más reciente.

El Solicitante podrá obtener información más detallada accediendo al sitio web (PAIR) Patent Information Application Retrieval (<http://pair.uspto.gov>).

Toda consulta acerca de la Prórroga al Plazo de la Patente o determinación del Ajuste deberá cursarse a la Oficina de Administración Legal de Patentes al 571-272-7702. Las consultas relativas al pago de aranceles por concesión y publicación deberán dirigirse al Centro de Servicios al Usuario de la Oficina de Publicación de Patentes al 1-888-786-0101 o al 571-272-4200.

Declaración de la Ley de Confidencialidad

La Ley de Confidencialidad de 1974 (P.L. 93-579) requiere que se le proporcione a usted cierta información con respecto a su presentación del formulario adjunto en relación con una solicitud de patente o patente. Por lo tanto, de conformidad con los requisitos de la Ley, sírvase tomar conocimiento de: (1) que la norma jurídica general que rige la recolección de esta información es el Código de los Estados Unidos, Título 35, § 2 (b)(2) (35 U.S.C. 2(b)(2)); (2) que es voluntario proporcionar la información solicitada; y (3) que el motivo principal para el que la Oficina de Patentes y Marcas de los Estados Unidos utilizará la información es procesar y/o examinar su presentación relacionada con una solicitud de patente o patente. Si no proporciona la información requerida, es posible que la Oficina de Patentes y Marcas de los Estados Unidos no pueda procesar y/o examinar su presentación, lo que puede causar la terminación de las actuaciones o el abandono de la solicitud o la caducidad de la patente.

La información provista por usted en este formulario estará sujeta a los siguientes usos normales:

1. La información de este formulario será tratada como confidencial en la medida que lo permita la Ley de Libertad de Información (5 U.S.C. 552) y la Ley de Confidencialidad (5 U.S.C. 552a). Se pueden divulgar registros de este sistema de registros al Departamento de Justicia para determinar si la divulgación de éstos es requerida por la Ley de Libertad de Información.
2. Se puede divulgar, como un uso normal de la información, un registro de este sistema de registros durante la presentación de pruebas ante un tribunal, juez inferior o tribunal administrativo, e incluso al abogado de la parte contraria durante negociaciones de arreglos extrajudiciales.
3. Se puede divulgar, como un uso normal de la información, un registro de este sistema de registros a un Miembro del Congreso que presente un pedido que ataña a una persona, a quien corresponde el registro, cuando dicha persona haya solicitado la ayuda del Miembro del Congreso con respecto al contenido del registro.
4. Se puede divulgar, como un uso normal de la información, un registro de este sistema de registros a un contratista del Organismo que necesite la información para ejecutar un contrato. Las personas que reciban la información deberán cumplir con los requisitos de la Ley de Confidencialidad de 1974, con sus enmiendas, de conformidad con 5 U.S.C. 552a(m).
5. Se puede divulgar un registro de este sistema de registros relacionado con una solicitud internacional presentada de conformidad con el Tratado de Cooperación en Materia de Patentes, como un uso normal de la información, a la Oficina Internacional de la Organización Mundial de la Propiedad Intelectual, de conformidad con el Tratado de Cooperación en Materia de Patentes.
6. Se puede divulgar, como un uso normal de la información, un registro de este sistema de registros a otro organismo federal para los fines de una revisión de Seguridad Nacional (35 U.S.C. 181) y para una revisión de conformidad con la Ley de Energía Atómica (42 U.S.C. 218(c)).
7. Se puede divulgar, como un uso normal de la información, un registro de este sistema de registros al Administrador de Servicios Generales, o a la persona que éste designe, durante una inspección de registros llevada a cabo por la GSA como parte de la responsabilidad de ese organismo de recomendar mejoras en las prácticas y programas de administración de registros, de conformidad con 44 U.S.C. 2904 y 2906. Dicha divulgación se realizará de acuerdo con los reglamentos de la GSA que rigen la inspección de registros para este fin, y con toda otra directiva pertinente (*es decir*, de la GSA o del Departamento de Comercio). Dicha divulgación no deberá utilizarse para hacer determinaciones acerca de individuos.
8. Se puede divulgar, como un uso normal de la información, un registro de este sistema de registros al público ya sea después de la publicación de la solicitud de conformidad con 35 U.S.C. 122(b) o el otorgamiento de una patente de conformidad con 35 U.S.C. 151. Además, se puede divulgar un registro, sujeto a las limitaciones de la regla 37 CFR 1.14, como un uso normal, al público si el registro fue presentado en una solicitud que fue abandonada o con respecto a la cual se dio por finalizado el procedimiento cuando se hace referencia a dicha solicitud en una solicitud publicada, una solicitud abierta a la inspección del público o una patente otorgada.
9. Se puede divulgar, como un uso normal de la información, un registro de este sistema de registros a un organismo federal, estatal o local de aplicación de la ley, si la USPTO toma conocimiento de una violación o violación potencial de una ley o reglamento.

NOTIFICACIONES DE CONCESIÓN Y ARANCELES PENDIENTES DE PAGO
DESPACHADAS ENTRE EL 31 DE OCTUBRE DE 2013 Y EL 31 DE DICIEMBRE
DE 2013

(Anexo a PTOL-85)

En caso que la Notificación de Concesión y Aranceles Pendientes de Pago tenga como fecha de despacho el 1 de Octubre de 2013 o posterior y anterior al 1 de Enero de 2014, la siguiente información resulta aplicable.

En caso que el arancel de concesión sea abonado en término en o posteriormente al 1 de Enero de 2014, el monto será el arancel de concesión y arancel por publicación vigente al 1 de Enero de 2014. En 1 de Enero de 2014, los aranceles de concesión dispuestos por CFR 37 1.18 se reducirán significativamente y el arancel por publicación establecido en CFR 37 1.18(d)(1) se reducirá a \$0.

En caso de haberse abonado con anterioridad el arancel por concesión o publicación en esta solicitud, el solicitante no podrá reembolsar la diferencia entre el monto abonado y el monto en vigencia al 1 de Enero de 2014.

Notificación de Viabilidad de Concesión

Solicitud Número: 13/315,354

Solicitante: Mazzaferro et al.

Examinador: David E. Bochna

Art Unit: 3679

Estado AIA (primer inventor en presentar): No

La fecha de despacho por correo de la presente comunicación aparece en la carátula con el domicilio postal.

Todas las reivindicaciones pueden ser concedidas. La tramitación sobre el mérito de la invención ha concluido (permanece en tal situación). En caso de no incluirse (o de no haberse enviado previamente) se le remitirá un formulario PTOL-85 – Notificación de Concesión - o similar. La presente notificación no otorga derechos Patentarios. Podrá no concederse la patente a instancias de la oficina o por petición del solicitante. Véase CFR 37, 1.313 y MPEP 1308.

1. (x) La presente comunicación responde a la respuesta presentada en 11-7-13 y la entrevista del 11-10-13.

Se presentó una o más declaraciones juradas conforme CFR 37 1.130(b) en

2. () El solicitante ha tomado una decisión en respuesta al requerimiento de restricción indicado durante la entrevista en; el requerimiento de restricción y la decisión se incorporan al presente.

3. (x) Las reivindicaciones concedidas son 1-31. Como resultado de las reivindicaciones concedidas, puede resultar elegible para el programa Patent Prosecution Highway en una oficina de propiedad intelectual participante para la solicitud correspondiente. Para mayor información, favor de consultar: http://www.uspto.gov/patents/init_events/pph/index.jsp o envíe su inquietud a: PPHfeedback@uspto.gov

4. Se reivindica prioridad extranjera conforme USC 35 119(a)-(d) o (f).

a) () Todas.

b) () Algunas

c) () Ninguna

de las

1. () copias certificadas de los documentos de propiedad han sido recibidas.

2. () las copias certificadas de los documentos de prioridad han sido recibidas en la Solicitud Nro.

3. () Las copias de las copias certificadas de los documentos de prioridad han sido recibidas en la solicitud en etapa nacional de la Oficina Internacional (Norma del PCT 17.2(a)).

* Las copias certificadas no han sido recibidas: -----

El solicitante cuenta con tres meses desde la fecha de despacho por correo de la presente comunicación para contestar en cumplimiento de lo requerido a continuación. Caso contrario, se considerará abandono de la solicitud. El período de tres meses no es prorrogable.

5. () Deben presentarse dibujos corregidos (reemplazo de láminas).

() incluyendo los cambios indicados por la Modificación del Examinador / Comentario o en la Vista Nro. / de fecha ----- adjunta.

Los dibujos deben identificarse en el anverso (no en el reverso) de cada lámina (Véase 37 CFR 1.84(c)). Las láminas de reemplazo deben identificarse como tales en el encabezamiento conforme lo dispuesto por 37 CFR 1.121(d).

6. () Debe indicarse el depósito y/o información acerca del depósito de material biológico. Deberá considerarse el comentario del Examinador adjunto respecto del Requerimiento de Depósito de Material Biológico.

Adjunto/s

1. (x) Notificación de referencias citadas (PTO-892)

2. (x) Manifestaciones de divulgación de información (PTO/SB/08), Doc Nro./Fecha de despacho ...

3. () Comentario del Examinador respecto del Requerimiento de Depósito de Material Biológico.

4. (X) Resumen de la entrevista (PTO-413). Doc Nro./Fecha de despacho 11-10-13

5 (X) Modificación/Comentario del Examinador

6. () Manifestación del Examinador respecto de los motivos del otorgamiento

7. () Otros.

Número de Solicitud/Control: 13/315,354

Art Unit: 3679

1. La presente solicitud será examinada bajo las disposiciones de AIA.

Modificación del Examinador

2. A continuación se adjunta la modificación del examinador. En caso que los cambios y/o adiciones fuesen inaceptables para el solicitante, podrá presentarse una modificación conforme CFR 37, 1.312. Para garantizarse su consideración, debe ser presentada como máximo al momento de abonar el arancel por concesión.

La autorización a esta modificación del examinador fue otorgada en una entrevista telefónica con Russell Rippamonti en 11-10-13.

La solicitud fue modificada en los siguientes términos:

Memoria, párrafo 17, línea 4 – se modificó “convexo” por cóncavo.

Memoria, párrafo 17, línea 6 – se modificó “cóncavo” por convexo.

Memoria, párrafo 25, línea 9 – se modificó “convexo” por cóncavo.

Memoria, párrafo 25, línea 10 – se modificó “cóncavo” por convexo.

Memoria, párrafo 26, línea 7 – se modificó “convexo” por cóncavo.

Memoria, párrafo 26, línea 8 – se modificó “cóncavo” por convexo.

Memoria, párrafo 44, línea 1 – se modificó “convexo” por cóncavo.

Memoria, párrafo 44, línea 3 – se modificó “cóncavo” por convexo.

Memoria, párrafo 54, línea 6 – se modificó “convexo” por cóncavo.

Memoria, párrafo 54, línea 7 – se modificó “cóncavo” por convexo.

Memoria, párrafo 64, línea 1 – se modificó “convexo” por cóncavo.

Memoria, párrafo 64, línea 3 – se modificó “cóncavo” por convexo.

Memoria, párrafo 72, línea 6 – se modificó “convexo” por cóncavo.

Memoria, párrafo 72, línea 8 – se modificó “cóncavo” por convexo.

Reivindicación 1, línea 5, se modificó “convexo” por cóncavo.

Reivindicación 1, línea 7, se modificó “convexo” por cóncavo.

Reivindicación 6, línea 2, se modificó “el eje mayor” por “un eje mayor”

Reivindicación 8, líneas 3 y 4, se modificó “el eje mayor” por “un eje mayor”

Reivindicación 1, línea 10, se modificó “convexo” por cóncavo.

Reivindicación 1, línea 12, se modificó “convexo” por cóncavo.

Reivindicación 22, línea 2, se modificó “el eje mayor” por “un eje mayor”

Reivindicación 24, línea 4, se modificó “el eje mayor” por “un eje mayor”

Reivindicaciones 32-61 canceladas.

Conclusión

3. El estado de la técnica anterior es aplicable a la revelación del solicitante. Roussie, Williamson et al., Kessler, Verdillon, Galle et al., Enderle et al., Harle, Yousef et al., Chuang, Saunders et al., y Siator et al., revelan acoples similares que son comunes y muy conocidos en la técnica.

4. Todo comentario referido a la presente o notificaciones previas del examinador deberá ser cursado a David E. Bochna al teléfono 571-272-7078 en el horario de 8-5:30 de Martes a Viernes y cada dos Lunes.

En caso que no pueda contactarse al examinador por vía telefónica, el supervisor Daniel P. Stodola podrá ser contactado al 571-272-7087. El número de fax de la dependencia donde esta solicitud o trámite se procesa es 571-273-8300.

La información acerca del estado de una solicitud puede obtenerse a través del sistema PAIR (Patent Application Information Retrieval). La información acerca del estado de solicitudes publicadas puede obtenerse del sistema PAIR Privado o Público. La información acerca del estado de solicitudes no publicadas estará disponible solamente en el sistema PAIR privado. Para mayor información acerca del sistema PAIR véase <http://pair-direct.uspto.gov>. En caso que tenga alguna pregunta acerca del acceso al sistema PAIR privado, contacte al Electronic Business Center al 866-217-9197 (llamada gratuita). Si necesita asistencia de un Representante de Servicio al Usuario de la USPTO o acceso al sistema automatizado de información, llame al 800-786-9199 (en USA o Canadá) o al 571-272-1000.

David E. Bochna. Examinador Primario, Art Unit 3679.

EN LA OFICINA DE PATENTES Y MARCAS DE LOS ESTADOS UNIDOS

Solicitante: Gastón Mauro Mazzaferro et al. Unidad de Arte: 3679
Solicitud No.: 13/315,354 Examinador: David Bochna
Presentada: Diciembre 9, 2011 Confirmación No.: 1045
Título: CONEXIÓN ROSCADA CON UN PERFIL DE ROSCA DE RAÍZ
MEJORADO

TASA DE EXPEDICIÓN DE PARADA DE CORRESPONDENCIA

Comisionado para Patentes
P.O. Box 1450
Alexandria, VA 22313-1450

MODIFICACION DESPUÉS DE LA CONCESIÓN
DE CONFORMIDAD CON 37 C.F.R. §1.312

Por favor modificar la solicitud como se indica en las páginas siguientes.

Solicitante: Gastón Mauro Mazzaferro et al.
Solicitud No.: 13/315,354
Presentada: Diciembre 9, 2011
Página: 2

Modificaciones a las Reivindicaciones:

Este listado de reivindicaciones reemplaza todas las versiones previas y listados de las reivindicaciones en la solicitud:

Listado de Reivindicaciones:

1. (Modificada en esta Oportunidad) Un elemento tubular que tiene una rosca macho dispuesta en un extremo de dicho elemento tubular, dicha rosca macho comprende:
 - una superficie de raíz cónica que tiene un primer ángulo de conicidad (β) medido entre la superficie de raíz cónica y un eje longitudinal (aa) de la rosca, dicha superficie de raíz cónica se une tangencialmente en un primer extremo por una superficie curva cóncava de un radio constante de curvatura a un flanco de enchufe, dicha superficie de raíz cónica se une en un segundo extremo por una superficie curva ~~cóncava~~ convexa de radio de curvatura constante a un canal de raíz;
 - dicho canal de raíz se extiende desde la superficie de raíz cónica hasta un flanco de carga, dicho canal de raíz incluye:
 - una primera parte que comprende una primera superficie elíptica que tiene un radio variable de curvatura, dicha primera superficie elíptica es parte de una elipse, y
 - dicho canal de raíz incluye además una segunda porción que comprende una segunda superficie elíptica que tiene un radio variable de curvatura, dicha segunda superficie elíptica es parte de una segunda elipse, dicha segunda superficie elíptica se une tangencialmente en un primer extremo a la primera superficie elíptica, y dicha segunda superficie elíptica se une tangencialmente por un segundo extremo al flanco de carga.
2. (Original) El elemento tubular de la Reivindicación 1 en el cual el primer ángulo de conicidad (β) es de 0 grados, de tal manera que la superficie de raíz cónica es paralela al eje de roscado (aa).
3. (Original) El elemento tubular de la Reivindicación 1 en el cual el primer ángulo de conicidad (β) es menor que el valor de medición de un ángulo medido entre un flanco enchufe de la rosca macho y el eje de rosca (aa).
4. (Original) El elemento tubular de la Reivindicación 1 en el cual un ángulo theta medido entre el eje de rosca (aa) y el eje longitudinal (dd) de la pared lateral del elemento tubular oscila entre 1,5 grados y 12 grados.
5. (Original) El elemento tubular de la Reivindicación 1 en el cual un eje mayor (cc) de la segunda elipse está dispuesto perpendicular al flanco de carga.
6. (Presentada Previamente) El elemento tubular de la Reivindicación 1 en el cual un eje mayor (bb) de la primera elipse es perpendicular al eje mayor (cc) de la segunda elipse.
7. (Original) El elemento tubular de la Reivindicación 1 en el cual un eje mayor (bb) de la primera elipse está alineado con un eje menor de la segunda elipse.

Solicitante: Gastón Mauro Mazzaferro et al.
Solicitud No.: 13/315,354
Presentada: Diciembre 9, 2011
Página: 3

8. (Presentada Previamente) El elemento tubular de la Reivindicación 1 en el cual la primera elipse tiene un primer diámetro predeterminado (D1) a lo largo de un eje mayor (bb), y un segundo diámetro predeterminado (D2) a lo largo de un eje menor, y la segunda elipse tiene un diámetro predeterminado (D3) a lo largo del eje mayor (cc) que es igual al diámetro (D1) a lo largo del eje mayor (bb) de la primera elipse, la segunda elipse tiene un segundo diámetro (D4) a lo largo de un eje menor que es igual al diámetro (D2) a lo largo del eje menor de la primera elipse.

9. (Original) El elemento tubular de la Reivindicación 1 en el cual la primera elipse tiene un primer diámetro predeterminado (D1) a lo largo de un eje mayor (bb), y un segundo diámetro predeterminado (D2) a lo largo de un eje menor, y la segunda elipse tiene un diámetro predeterminado (D3) a lo largo de un eje mayor (cc) que es igual al diámetro (D1) a lo largo del eje mayor (bb) de la primera elipse, la segunda elipse tiene un segundo diámetro (D4) a lo largo de un eje menor que es mayor que el diámetro (D2) a lo largo del eje menor de la primera elipse.

10. (Original) El elemento tubular de la Reivindicación 1 en el cual la primera elipse tiene un primer diámetro predeterminado (D1) a lo largo de un eje mayor (bb), y un segundo diámetro predeterminado (D2) a lo largo de un eje menor, y la segunda elipse tiene un diámetro predeterminado (D3) a lo largo de un eje mayor (cc) y tiene un segundo diámetro (D4) a lo largo de un eje menor que es mayor que el diámetro (D2) a lo largo del eje menor de la primera elipse.

11. (Original) El elemento tubular de la Reivindicación 1 en el cual la primera elipse tiene un primer diámetro predeterminado (D1) a lo largo de un eje mayor (bb), y un segundo diámetro predeterminado (D2) a lo largo de un eje menor, y la segunda elipse tiene un diámetro predeterminado (D3) a lo largo de un eje mayor (cc) y tiene un segundo diámetro (D4) a lo largo de un eje menor que es menor que el diámetro (D2) a lo largo del eje menor de la primera elipse.

12. (Original) El elemento tubular de la Reivindicación 1 en el cual la primera elipse tiene un primer diámetro predeterminado (D1) a lo largo de un eje mayor (bb), y un segundo diámetro predeterminado (D2) a lo largo de un eje menor, y la segunda elipse tiene un diámetro predeterminado (D3) a lo largo de un eje mayor (cc) y tiene un segundo diámetro (D4) a lo largo de un eje menor, y en el que el diámetro (D3) a lo largo del eje mayor (cc) de la segunda elipse es menor que el diámetro D1 a lo largo del eje mayor (bb) de la primera elipse.

13. (Original) El elemento tubular de la Reivindicación 1 en el cual la primera elipse tiene un primer diámetro predeterminado (D1) a lo largo de un eje mayor (bb), y un segundo diámetro predeterminado (D2) a lo largo de un eje menor, y la segunda elipse tiene un diámetro predeterminado (D3) a lo largo de un eje mayor (cc) y tiene un segundo diámetro (D4) a lo largo de un eje menor, y en el que el diámetro (D3) a lo largo del eje mayor (cc) de la segunda elipse es mayor que el diámetro (D1) a lo largo de la mayor eje (bb) de la primera elipse.

Solicitante: Gastón Mauro Mazzaferro et al.
Solicitud No.: 13/315,354
Presentada: Diciembre 9, 2011
Página: 4

14. (Original) El elemento tubular de la Reivindicación 1 en el cual el flanco de carga está dispuesto en relación a un ángulo medido entre el flanco de carga y una línea perpendicular a un eje de la rosca (aa), en tanto dicho ángulo oscila entre -9 y 5 grados.

15. (Original) El elemento tubular de la Reivindicación 1 en el cual la segunda superficie elíptica se une tangencialmente en un primer extremo a la primera superficie elíptica en un punto de unión que define la parte inferior del canal de raíz.

16. (Original) El elemento tubular de la reivindicación 15 en el cual la base del canal está dispuesta en la pared lateral del elemento tubular por debajo del nivel de la superficie de raíz cónica.

17. (Modificada en esta Oportunidad) Una conexión roscada tubular, que comprende:

un elemento tubular macho que incluye una rosca macho cónica que tiene un eje de ahusamiento (aa), y

un elemento tubular hembra que incluye una rosca hembra cónica que tiene un eje de ahusamiento (aa), dicha rosca hembra coopera con la rosca macho cuando la conexión roscada se compone;

en tanto la superficie de la raíz en al menos una de la rosca macho cónica y la rosca cónica hembra comprende: una superficie de raíz cónica que tiene un primer ángulo de conicidad (β) medido entre la superficie de raíz cónica y un eje longitudinal (aa) de la rosca, dicha superficie de raíz cónica se une tangencialmente en un primer extremo por una superficie curva cóncava de un radio de curvatura constante a un flanco de enchufe, dicha superficie de raíz cónica se une en un segundo extremo por una superficie curva ~~cóncava~~ convexa de radio de curvatura constante a un canal de la raíz;

dicho canal de la raíz se extiende desde la superficie de raíz cónica hasta un flanco de carga, dicho canal de raíz incluye:

una primera parte que comprende una primera superficie elíptica que tiene un radio variable de curvatura, dicha primera superficie elíptica es parte de una elipse, y

dicho canal de raíz incluye además una segunda porción que comprende una segunda superficie elíptica que tiene un radio variable de curvatura, dicha segunda superficie elíptica es parte de una segunda elipse, dicha segunda superficie elíptica se une tangencialmente en un primer extremo a la primera superficie elíptica, y dicha segunda superficie elíptica se une tangencialmente por un segundo extremo al flanco de carga.

18. (Original) La conexión roscada tubular de la Reivindicación 17 en la cual el primer ángulo de conicidad (β) es de 0 grados, de tal manera que la superficie de raíz cónica es paralela al eje de roscado (aa).

19. (Original) La conexión roscada tubular de la Reivindicación 17 en la cual el primer ángulo de conicidad (β) es menor que el valor de medición de un ángulo medido entre un flanco enchufe de la rosca macho y el eje de rosca (aa).

Solicitante: Gastón Mauro Mazzaferro et al.
Solicitud No.: 13/315,354
Presentada: Diciembre 9, 2011
Página: 5

20. (Original) La conexión roscada tubular de la Reivindicación 17 en la cual un ángulo theta medido entre el eje de rosca (aa) y el eje longitudinal (dd) de la pared lateral del elemento tubular oscila entre 1,5 grados y 12 grados.

21. (Original) La conexión roscada tubular de la Reivindicación 17 en la cual un eje mayor (cc) de la segunda elipse está dispuesto perpendicular al flanco de carga.

22. (Presentada Previamente) La conexión roscada tubular de la Reivindicación 17 en la cual un eje mayor (bb) de la primera elipse es perpendicular al eje mayor (cc) de la segunda elipse.

23. (Original) La conexión roscada tubular de la Reivindicación 17 en la cual un eje mayor (bb) de la primera elipse está alineado con un eje menor de la segunda elipse.

24. (Presentada Previamente) La conexión roscada tubular de la Reivindicación 17 en la cual la primera elipse tiene un primer diámetro predeterminado (D1) a lo largo de un eje mayor (bb), y un segundo diámetro predeterminado (D2) a lo largo de un eje menor, y la segunda elipse tiene un diámetro predeterminado (D3) a lo largo del eje mayor (cc) que es igual al diámetro (D1) a lo largo del eje mayor (bb) de la primera elipse, la segunda elipse tiene un segundo diámetro (D4) a lo largo de un eje menor que es igual al diámetro (D2) a lo largo del eje menor de la primera elipse.

25. (Original) La conexión roscada tubular de la Reivindicación 17 en la cual la primera elipse tiene un primer diámetro predeterminado (D1) a lo largo de un eje mayor (bb), y un segundo diámetro predeterminado (D2) a lo largo de un eje menor, y la segunda elipse tiene un diámetro predeterminado (D3) a lo largo de un eje mayor (cc) que es igual al diámetro (D1) a lo largo del eje mayor (bb) de la primera elipse, la segunda elipse tiene un segundo diámetro (D4) a lo largo de un eje menor que es mayor que el diámetro (D2) a lo largo del eje menor de la primera elipse.

26. (Original) La conexión roscada tubular de la Reivindicación 17 en la cual la primera elipse tiene un primer diámetro predeterminado (D1) a lo largo de un eje mayor (bb), y un segundo diámetro predeterminado (D2) a lo largo de un eje menor, y la segunda elipse tiene un diámetro predeterminado (D3) a lo largo de un eje mayor (cc) y tiene un segundo diámetro (D4) a lo largo de un eje menor que es mayor que el diámetro (D2) a lo largo del eje menor de la primera elipse (207).

27. (Original) La conexión roscada tubular de la Reivindicación 17 en la cual la primera elipse tiene un primer diámetro predeterminado (D1) a lo largo de un eje mayor (bb), y un segundo diámetro predeterminado (D2) a lo largo de un eje menor, y la segunda elipse tiene un diámetro predeterminado (D3) a lo largo de un eje mayor (cc) y tiene un segundo diámetro (D4) a lo largo de un eje menor que es menor que el diámetro (D2) a lo largo del eje menor de la primera elipse.

Solicitante: Gastón Mauro Mazzaferro et al.
Solicitud No.: 13/315,354
Presentada: Diciembre 9, 2011
Página: 6

28. (Original) La conexión roscada tubular de la Reivindicación 17 en la cual la primera elipse tiene un primer diámetro predeterminado (D1) a lo largo de un eje mayor (bb), y un segundo diámetro predeterminado (D2) a lo largo de un eje menor, y la segunda elipse tiene un diámetro predeterminado (D3) a lo largo de un eje mayor (cc) y tiene un segundo diámetro (D4) a lo largo de un eje menor, en tanto el diámetro (D3) a lo largo del eje mayor (cc) de la segunda elipse es menor que el diámetro D1 a lo largo del eje mayor (bb) de la primera elipse.

29. (Original) La conexión roscada tubular de la Reivindicación 17 en la cual la primera elipse tiene un primer diámetro predeterminado (D1) a lo largo de un eje mayor (bb), y un segundo diámetro predeterminado (D2) a lo largo de un eje menor, y la segunda elipse tiene un diámetro predeterminado (D3) a lo largo de un eje mayor (cc) y tiene un segundo diámetro (D4) a lo largo de un eje menor, en tanto el diámetro (D3) a lo largo del eje mayor (cc) de la segunda elipse es mayor que el diámetro (D1) a lo largo del eje mayor (bb) de la primera elipse.

30. (Original) La conexión roscada tubular de la Reivindicación 17 en la cual el flanco de carga está dispuesto en relación a un ángulo medido entre el flanco de carga y una línea perpendicular a un eje de la rosca (aa), en tanto dicho ángulo oscila entre -9 y 5 grados.

31. (Original) La conexión roscada tubular de la Reivindicación 17 en la cual la segunda superficie elíptica se une tangencialmente en un primer extremo a la primera superficie elíptica en un punto de unión que define la parte inferior del canal de raíz.

32.-61. (Canceladas)

Solicitante: Gastón Mauro Mazzaferro et al.
Solicitud No.: 13/315,354
Presentada: Diciembre 9, 2011
Página: 7

COMENTARIOS

El Examinador por medio de la Modificación del Examinador de Octubre 23, 2013 de forma errónea trató de modificar la reivindicación 1, línea 7 reemplazando “convexa” con –cóncava-. Sin embargo, el término “convexa” no se encuentra en esa línea. El término “cóncava” está en dicha línea. De acuerdo con las conversaciones previas con el examinador, el Solicitante presenta la solicitud de arriba para modificar la reivindicación 1, línea 6 (la numeración se presenta junto con esta Modificación) reemplazando el término “cóncava” por –convexa--.

El Examinador además trató de modificar de forma errónea la reivindicación 17, línea 12, reemplazando “convexa” por –cóncava-. El término “convexa” tampoco se encuentra en esa línea. Por lo tanto, por las mismas razones como se indica arriba, el Solicitante ha presentado la presente solicitud de Modificación para modificar la reivindicación 17, línea 10 (la numeración se presenta junto con esta Modificación) reemplazando “cóncava” por –convexa--.

El Solicitante afirma que no se ha adicionado materia nueva con estas modificaciones. Como se detalla en el Resumen de Entrevista con el Examinador de fecha Octubre 11, 2013, los cambios en la descripción y las reivindicaciones reemplazando “cóncava” por –convexa— y “convexa” por –cóncava—han sido introducidas con la Modificación del Examinador y aclaradas en esta Modificación según la Norma 312 para reflejar el perfil de rosca como de describe desde el exterior de la superficie de rosca. El Solicitante solicita que todas las reivindicaciones sean otorgadas en vista de las modificaciones a las reivindicaciones. No se considera necesario el pago de tasas con esta presentación. Sin embargo, si el Solicitante no está en lo cierto, por favor aplicar cualquier pago o crédito necesario en la Cuenta de Depósito 06-1050, referenciando el número de documento de abogado como se indica arriba.

Solicitante: Gastón Mauro Mazzaferro et al.
Solicitud No.: 13/315,354
Presentada: Diciembre 9, 2011
Página: 8

Respetuosamente presentado,

Fecha: Diciembre 4, 2013

/Russell N. Rippamonti/

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Notificación de Referencias Citadas

Nro. de Solicitud/Control: 13/315,354

Solicitante(s)/Patente sometido a nuevo examen: MAZZAFERRO ET AL.

Examinador: David E. Bochna

Art unit: 3679

Página 1 de 1

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