UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/585,629	06/25/2019	10328993	RS180US	8583

23470 7590 06/05/2019

SRAM, LLC
1000 W. Fulton Market, 4th Floor
CHICAGO, IL 60607

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

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

The Patent Term Adjustment is 888 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

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

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

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

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

Jonathan Blair Watt, Colorado Springs, CO;
SRAM, LLC, Chicago, IL;
Robert Powell, Colorado Springs, CO;

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit SelectUSA.gov.

IR103 (Rev. 10/09)

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence 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)

23470 7590 02/12/2019
SRAM, LLC
1000 W. Fulton Market, 4th Floor
CHICAGO, IL 60607

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 transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

BRIAN GAUSE	(Typed or printed name)
/Brian Gause/	(Signature)
May 7, 2019	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/585,629	12/30/2014	Jonathan Blair Watt	RS180US	8583

TITLE OF INVENTION: Bicycle Steerer Tube with Variant Stiffness

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1000	$0.00	$0.00	$1000	05/13/2019

EXAMINER	ART UNIT	CLASS-SUBCLASS
ARCE, MARLON ALEXANDER	3611	280-279000

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 03-09 or more recent) attached. **Use of a Customer Number is required.**

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

1 _____
2 _____
3 _____

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

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE	(B) RESIDENCE: (CITY and STATE OR COUNTRY)
SRAM, LLC	CHICAGO, IL

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

4a. Fees submitted: ☒ Issue Fee ❑ Publication Fee (if required) ❑ Advance Order - # of Copies _____

4b. Method of Payment: *(Please first reapply any previously paid fee shown above)*

☒ Electronic Payment via EFS-Web ❑ Enclosed check ❑ Non-electronic payment by credit card (Attach form PTO-2038)

☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. 600322

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

❑ Applicant certifying micro entity status. See 37 CFR 1.29

❑ Applicant asserting small entity status. See 37 CFR 1.27

❑ Applicant changing to regular undiscounted fee status.

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

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

Authorized Signature /Brian Gause/ Date May 7, 2019

Typed or printed name BRIAN GAUSE Registration No. 67660

FOX Exhibit 1002, Page 2 of 348

Electronic Patent Application Fee Transmittal				
Application Number:	14585629			
Filing Date:	30-Dec-2014			
Title of Invention:	Bicycle Steerer Tube with Variant Stiffness			
First Named Inventor/Applicant Name:	Jonathan Blair Watt			
Filer:	Brian Thomas Gause/Billie Hinnen			
Attorney Docket Number:	RS180US			
Filed as Large Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	**Fee Code**	**Quantity**	**Amount**	**Sub-Total in USD($)**
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
UTILITY APPL ISSUE FEE	1501	1	1000	1000

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**1000**

Electronic Acknowledgement Receipt	
EFS ID:	35929608
Application Number:	14585629
International Application Number:	
Confirmation Number:	8583
Title of Invention:	Bicycle Steerer Tube with Variant Stiffness
First Named Inventor/Applicant Name:	Jonathan Blair Watt
Customer Number:	23470
Filer:	Brian Thomas Gause/Billie Hinnen
Filer Authorized By:	Brian Thomas Gause
Attorney Docket Number:	RS180US
Receipt Date:	07-MAY-2019
Filing Date:	30-DEC-2014
Time Stamp:	15:27:14
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$1000
RAM confirmation Number	050819INTEFSW00002022600322
Deposit Account	600322
Authorized User	Billie Hinnen
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: 37 CFR 1.16 (National application filing, search, and examination fees) 37 CFR 1.17 (Patent application and reexamination processing fees)	

37 CFR 1.19 (Document supply fees)

37 CFR 1.20 (Post Issuance fees)

37 CFR 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	RS180_19-05-07_Issue_Fee_Submitted.pdf	314905 8f909419c2be7be589abf3cf62a6ca85d44f7424	no	1
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	30469 970dee26b6438ff1e0cf730f8c42f462ec276ece	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	345374		

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

New Applications Under 35 U.S.C. 111

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

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

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

New International Application Filed with the USPTO as a Receiving Office

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

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

23470 7590 02/12/2019

SRAM, LLC
1000 W. Fulton Market, 4th Floor
CHICAGO, IL 60607

EXAMINER
ARCE, MARLON ALEXANDER

ART UNIT	PAPER NUMBER
3611	

DATE MAILED: 02/12/2019

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/585,629	12/30/2014	Jonathan Blair Watt	RS180US	8583

TITLE OF INVENTION: Bicycle Steerer Tube with Variant Stiffness

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1000	$0.00	$0.00	$1000	05/13/2019

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: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at www.uspto.gov/PatentMaintenanceFees.

PTOL-85 (Rev. 02/11)

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

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

23470 7590 02/12/2019
SRAM, LLC
1000 W. Fulton Market, 4th Floor
CHICAGO, IL 60607

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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 transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/585,629	12/30/2014	Jonathan Blair Watt	RS180US	8583

TITLE OF INVENTION: Bicycle Steerer Tube with Variant Stiffness

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1000	$0.00	$0.00	$1000	05/13/2019

EXAMINER	ART UNIT	CLASS-SUBCLASS
ARCE, MARLON ALEXANDER	3611	280-279000

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 03-09 or more recent) attached. **Use of a Customer Number is required.**

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

1 _____
2 _____
3 _____

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

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

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

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

4a. Fees submitted: ❑ Issue Fee ❑ Publication Fee (if required) ❑ Advance Order - # of Copies _____

4b. Method of Payment: *(Please first reapply any previously paid fee shown above)*

❑ Electronic Payment via EFS-Web ❑ Enclosed check ❑ Non-electronic payment by credit card (Attach form PTO-2038)

❑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. _____

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

❑ Applicant certifying micro entity status. See 37 CFR 1.29

❑ Applicant asserting small entity status. See 37 CFR 1.27

❑ Applicant changing to regular undiscounted fee status.

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

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

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

FOX Exhibit 1002, Page 8 of 348

UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/585,629	12/30/2014	Jonathan Blair Watt	RS180US	8583

23470 7590 02/12/2019

SRAM, LLC
1000 W. Fulton Market, 4th Floor
CHICAGO, IL 60607

EXAMINER	
ARCE, MARLON ALEXANDER	
ART UNIT	**PAPER NUMBER**
3611	

DATE MAILED: 02/12/2019

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

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

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

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

PTOL-85 (Rev. 02/11)

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

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

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

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

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

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

Notice of Allowability	Application No. 14/585,629	Applicant(s) Watt et al.	
	Examiner Marlon A Arce	Art Unit 3611	AIA Status Yes

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

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

1. ☑ This communication is responsive to remarks filed 11/12/18.
   ☐ 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 1,3-21 and 23-67 . 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 areply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

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

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

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

Attachment(s)

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

/MARLON A ARCE/ Examiner, Art Unit 3611	/ANNE MARIE M BOEHLER/ Primary Examiner, Art Unit 3611

Notice of Pre-AIA or AIA Status

The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

EXAMINER'S AMENDMENT

1. 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.

2. Authorization for this examiner's amendment was given in an interview with Drew Coelho on 2/1/19.

The application has been amended as follows: the dependency of claim 10 has been changed to claim 1 instead of 2, so as to read –"the steerer tube of claim 1, wherein an outer diameter of the lower section of the body is substantially the same as an outer diameter of the upper section of the body"--.

Election/Restrictions

3. Claim 1 is allowable. The restriction requirement of claims 6,10,26,30 and 41-67, as set forth in the Office action mailed on 7/11/2017 , has been reconsidered in view of the allowability of claims to the elected invention pursuant to MPEP § 821.04(a). **The restriction requirement is hereby withdrawn as to any claim that requires all the limitations of an allowable claim**. Therefore claims 6,10,26,30 and 41-67 are rejoined and allowed

In view of the above noted withdrawal of the restriction requirement, applicant is advised that if any claim presented in a continuation or divisional application is anticipated by, or includes all the limitations of, a claim that is allowable in the present application, such claim may be subject to provisional statutory and/or nonstatutory double patenting rejections over the claims of the instant application.

Once a restriction requirement is withdrawn, the provisions of 35 U.S.C. 121 are no longer applicable. See *In re Ziegler*, 443 F.2d 1211, 1215, 170 USPQ 129, 131-32 (CCPA 1971). See also MPEP § 804.01.

Allowable Subject Matter

4. Claims 1,3 -21 and 23-67 are allowed.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marlon A Arce whose telephone number is (571)272-1341. The examiner can normally be reached on 8AM - 4:30PM.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph Rocca can be reached on 571-272-5191. 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.

/MARLON A ARCE/
Examiner, Art Unit 3611

/ANNE MARIE M BOEHLER/
Primary Examiner, Art Unit 3611

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14/585,629	Watt et al.
	Examiner	Art Unit
	Marlon A Arce	3611

CPC								
Symbol							Type	Version
B62K	/	21	/	04			F	2013-01-01
B62K	/	19	/	32			I	2013-01-01
B62K	/	21	/	18			I	2013-01-01
B62K	/	19	/	02			A	2013-01-01

CPC Combination Sets								
Symbol					Type	Set	Ranking	Version
	/		/					

/MARLON A ARCE/ Examiner, Art Unit 3611	01 February 2019	Total Claims Allowed:	
(Assistant Examiner)	(Date)	65	
/ANNE MARIE M BOEHLER/ Primary Examiner, Art Unit 3611	03 February 2019	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	2 and 5a

U.S. Patent and Trademark Office — Part of Paper No.: 20190201

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14/585,629	Watt et al.
	Examiner	**Art Unit**
	Marlon A Arce	3611

INTERNATIONAL CLASSIFICATION				
CLAIMED				
B62K	/	21	/	04

NON-CLAIMED				
	/		/	

US ORIGINAL CLASSIFICATION	
CLASS	**SUBCLASS**

CROSS REFERENCES(S)						
CLASS	**SUBCLASS (ONE SUBCLASS PER BLOCK)**					

/MARLON A ARCE/ Examiner, Art Unit 3611	01 February 2019	**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	65	
/ANNE MARIE M BOEHLER/ Primary Examiner, Art Unit 3611	03 February 2019	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	2 and 5a

U.S. Patent and Trademark Office — Part of Paper No.: 20190201

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14/585,629	Watt et al.
	Examiner	Art Unit
	Marlon A Arce	3611

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1	9	10	65	19	21	28	30	37	39	46	48	55	57	64
	2	10	11	14	20	22	29	31	38	40	47	49	56	58	65
2	3	11	12	15	21	23	30	32	39	41	48	50	57	59	66
3	4	12	13		22	24	31	33	40	42	49	51	58	60	67
4	5	61	14	16	23	25	32	34	41	43	50	52	59		
5	6	62	15	17	24	26	33	35	42	44	51	53	60		
6	7	63	16	18	25	27	34	36	43	45	52	54	61		
7	8	13	17	19	26	28	35	37	44	46	53	55	62		
8	9	64	18	20	27	29	36	38	45	47	54	56	63		

/MARLON A ARCE/ Examiner, Art Unit 3611 (Assistant Examiner)	01 February 2019 (Date)	Total Claims Allowed: 65	
/ANNE MARIE M BOEHLER/ Primary Examiner, Art Unit 3611 (Primary Examiner)	03 February 2019 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 2 and 5a

U.S. Patent and Trademark Office Part of Paper No.: 20190201

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14/585,629	Watt et al.
	Examiner	Art Unit
	Marlon A Arce	3611

CPC - Searched*		
Symbol	Date	Examiner
b62k21/04, b62k19/32, b62k21/18, b62k19/02	07/07/2017	MAA
update	01/11/2018	MAA
update	08/03/2018	MAA
update	02/01/2019	MAA

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
conducted applicant search	06/29/2017	MAA

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner
see	search history	02/01/2019	MAA

EAST Search History

EAST Search History (Prior Art)

< This search history is empty>

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	133	bicycle and (steer adj tube)	US-PGPUB	OR	OFF	2019/02/01 10:31
L2	36	bicycle and (steer adj tube and (cross-section))	US-PGPUB	OR	OFF	2019/02/01 10:34
L3	82	bicycle and (steer adj tube and (diameter))	US-PGPUB	OR	OFF	2019/02/01 10:34
L4	2	bicycle and (steer adj tube and (circular adj cross-section))	US-PGPUB	OR	OFF	2019/02/01 10:35
L5	8	bicycle and (steerer adj tube and (circular adj cross-section))	US-PGPUB	OR	OFF	2019/02/01 10:35

2/ 1/ 2019 10:36:13 AM

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 14/585,629	Filing Date 12/30/2014	☐ To be Mailed

ENTITY: ☑ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		x $80 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $420 =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL	

APPLICATION AS AMENDED - PART II

AMENDMENT	11/12/2018	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 65	Minus	** 67	= 0		x $100 =	0
	Independent (37 CFR 1.16(h))	* 3	Minus	*** 3	= 0		x $460 =	0
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	0

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.	LIE
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	/TRACEY M YOUNG/
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".	
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.	

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

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

CERTIFICATE OF ELECTRONIC TRANSMISSION

I hereby certify that this correspondence is being electronically deposited with the United States Patent and Trademark Office through the Electronic Filing System, on the below date:
Date: November 12, 2018 Name: Drew Coelho (Reg. No. 77,126) Signature: /Drew Coelho/

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Appln. of:	WATT	
Appln. No.:	14/585,629	Examiner: Marlon A. Arce
Filed:	December 20, 2014	Group Art Unit: 3611
For:	BICYCLE STEERER TUBE WITH VARIANT STIFFNESS	Confirmation No. 8583
Attorney Docket No:	RS180US	

RESPONSE

Mail Stop: AMENDMENT
Commissioner for Patents
Post Office Box 1450
Alexandria, VA 22313-1450

Dear Sir:

This communication is in response to the Office Action dated August 10, 2018. Please enter and consider the following remarks:

Listing of the claims begin on page 2.

Remarks begin on page 15.

Electronic Acknowledgement Receipt	
EFS ID:	34278007
Application Number:	14585629
International Application Number:	
Confirmation Number:	8583
Title of Invention:	Bicycle Steerer Tube with Variant Stiffness
First Named Inventor/Applicant Name:	Jonathan Blair Watt
Customer Number:	23470
Filer:	Drew Thomas Alexander Coelho/Billie Hinnen
Filer Authorized By:	Drew Thomas Alexander Coelho
Attorney Docket Number:	RS180US
Receipt Date:	12-NOV-2018
Filing Date:	30-DEC-2014
Time Stamp:	14:53:51
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		RS180_20180810_nfoar_final.pdf	533944 df76d41def509a3e71544b21a5c595ad52f8c064	yes	16

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Applicant Arguments/Remarks Made in an Amendment	15	16
	Claims	2	14
	Amendment/Req. Reconsideration-After Non-Final Reject	1	1
Warnings:			
Information:			
	Total Files Size (in bytes):	533944	

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

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.
National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

REMARKS

Claims 1-67 were pending. Claims 1, 11, 14, 18, and 23 are currently amended, with claims 14 and 18 amended into independent form. No new claims are presented. Claims 6, 10, 26, 30, and 41-67 are withdrawn. Claims 2 and 22 are cancelled. Thus, claims 1-67 are pending, with claims 1, 3-5, 7-9, 11-21, 23-25, 27-29, and 31-40 currently at issue, including independent claims 1, 14, and 18.

Claims 1, 17, 20, 21, 31, 33 and 40 were rejected under 35 U.S.C. § 103 as being unpatentable over U.S. Patent Number 6,145,862 ("D'Aluisio") in view of U.S. Patent Number 8,366,130 ("Galasso").

Applicant respectfully traverses the rejections and requests reconsideration of the claims, the specification, and the drawings in view of the present amendments and the following remarks.

I. Allowable Subject Matter and Rejections under 35 U.S.C. § 103

Applicant thanks the Examiner for the indication that claims 2-5, 7-9, 11-16, 18, 19, 22-25, and 27-29 contain allowable subject matter. Claims 1, 14, and 18 have been amended into independent form and include, respectively, limitations of claims 2, 14, and 18 indicated as allowable. Since claims 1, 14, and 18 include indicated allowable content, claims 1, 14, and 18, as well as claims 3-5, 7-9, 11-13, 15-17, 19-21, 23-25, 27-29, and 31-40 which depend therefrom, are allowable over the provided references. Accordingly, Applicant respectfully submits that all pending rejections are rendered moot, and that the claims as now presented are currently in condition for allowance.

II. Interview Request

Applicant hereby requests a telephone interview with the Examiner prior to the next office action if that next action is not a notice of allowance. The Examiner is respectfully requested to call the undersigned to schedule the interview at a mutually convenient date and time.

III. CONCLUSION

Each of the rejections and/or required actions in the Office Action has been addressed and no new matter has been added. Applicant submits that all of the pending claims are in condition for allowance and notice to this effect is respectfully requested. The Examiner is invited to call the undersigned if it would expedite the prosecution of this application.

Respectfully submitted,

Dated: November 12, 2018

/Drew Coelho/

Drew Coelho
Registration No. 77,126
Attorney for Applicants

SRAM. LLC
1000 W. Fulton Market, 4th Flr.
Chicago, IL 60607
(312) 664-8800 x1447

LISTING OF THE CLAIMS

The claims are as follows:

1. (Currently Amended) A steerer tube for a bicycle, the steerer tube comprising:

an elongate hollow body arranged around a steering axis located in a vertical plane of travel of the bicycle,

the body having upper and lower sections, a segment of the upper section adapted to be joined to a bicycle handlebar, a segment of the lower section adapted to be joined to a crown of a front wheel fork of the bicycle, the lower section joined to the upper section, and outer surfaces of the upper and lower sections of the body being circular in cross section, and

the body formed by a wall, a thickness of the wall at any point in the lower section of the body varying as a function of the cross-sectional angle of the point relative to the plane of travel, the wall thickness being at a maximum in the plane of travel of the bicycle.

2. (Cancelled)

3. (Currently Amended) The steerer tube of claim [[2]]1, wherein an outer diameter of the lower section of the body is greater than an outer diameter of the upper section of the body.

4. (Original) The steerer tube of claim 3, wherein the lower section of the body has first and second portions, the first portion adjoining the upper section of the body, an outer

diameter of the first portion of the lower section being greater than an outer diameter of the upper section and less than an outer diameter of the second portion of the lower section.

5. (Original) The steerer tube of claim 4, wherein the outer diameter of the first portion of the lower section gradually tapers from the second portion of the lower section to the upper section of the body.

6. (Withdrawn) The steerer tube of claim 5, wherein an inner surface of the upper section forms an ellipse in cross section, a major diameter of the ellipse formed to be perpendicular to the plane of travel, a minor diameter of the ellipse formed to be in the plane of travel of the bicycle.

7. (Original) The steerer tube of claim 5, wherein an inner surface of the upper section is circular in cross section.

8. (Original) The steerer tube of claim 7, wherein the inner and outer surfaces of the upper section are substantially circularly cylindrical and the outer surface of the second portion of the lower section is substantially circularly cylindrical.

9. (Original) The steerer tube of claim 7, wherein a ratio of an inner diameter of the upper section of the body to an outer diameter of the upper section of the body is within the range of 0.75 to 0.95, inclusive.

10. (Withdrawn) The steerer tube of claim 2, wherein an outer diameter of the lower section of the body is substantially the same as an outer diameter of the upper section of the body.

11. (Currently Amended) The steerer tube of claim [[2]]1, wherein an inner surface of the upper section is circular in cross section.

12. (Original) The steerer tube of claim 11, wherein the inner and outer surfaces of the upper section are substantially circularly cylindrical and the outer surface of the lower section is substantially circularly cylindrical.

13. (Original) The steerer tube of claim 11, wherein a ratio of an inner diameter of the upper section of the body to an outer diameter of the upper section of the body is within the range of 0.75 to 0.95, inclusive.

14. (Currently Amended) A steerer tube for a bicycle, the steerer tube comprising:

an elongate hollow body arranged around a steering axis located in a vertical plane of travel of the bicycle,

the body having upper and lower sections, a segment of the upper section adapted to be joined to a bicycle handlebar, a segment of the lower section adapted to be joined to a crown of a front wheel fork of the bicycle, the lower section joined to the upper section,

~~The steerer tube of claim 1, wherein~~ and an outer diameter of the lower section of the body is greater than an outer diameter of the upper section of the body, and

the body formed by a wall, a thickness of the wall at any point in the lower section of the body varying as a function of the cross-sectional angle of the point relative to the plane of travel, the wall thickness being at a maximum in the plane of travel of the bicycle.

15. (Original) The steerer tube of claim 14, wherein the lower section of the body has first and second portions, the first portion adjoining the upper section of the body, an outer diameter of the first portion of the lower section being greater than an outer diameter of the upper section and less than an outer diameter of the second portion of the lower section.

16. (Original) The steerer tube of claim 15, wherein the outer diameter of the first portion of the lower section gradually tapers from the second portion of the lower section to the upper section of the body.

17. (Original) The steerer tube of claim 1, wherein the segment of the lower section of the body is formed as one piece with the crown of the front wheel fork.

18. (Currently Amended) A steerer tube for a bicycle, the steerer tube comprising:

an elongate hollow body arranged around a steering axis located in a vertical plane of travel of the bicycle,

the body having upper and lower sections, a segment of the upper section adapted to be joined to a bicycle handlebar, a segment of the lower section adapted to be joined to a crown of a front wheel fork of the bicycle, the lower section joined to the upper section, ~~The steerer tube of claim 1, wherein~~ and the segment of the lower section of the body is joined to

the crown of the front wheel fork, the body formed of a material different from the crown of the front wheel fork, and

the body formed by a wall, a thickness of the wall at any point in the lower section of the body varying as a function of the cross-sectional angle of the point relative to the plane of travel, the wall thickness being at a maximum in the plane of travel of the bicycle.

19. (Original) The steerer tube of claim 18, wherein the segment of the lower section of the body is formed as one piece with the crown of the front wheel fork.

20. (Original) The steerer tube of claim 1, wherein the body is formed from a material selected from the group consisting of steel, carbon fiber reinforced composite, aluminum, titanium and magnesium.

21. (Original) The steerer tube of claim 1, wherein the wall thickness is at a minimum in a plane containing the steering axis and orthogonal to the plane of travel of the bicycle.

22. (Cancelled)

23. (Currently Amended) The steerer tube of claim [[22]]21, wherein an outer diameter of the lower section of the body is greater than an outer diameter of the upper section of the body.

24. (Original) The steerer tube of claim 23, wherein the lower section of the body has first and second portions, the first portion adjoining the upper section of the body, an outer diameter of the first portion of the lower section being greater than an outer diameter of the upper section and less than an outer diameter of the second portion of the lower section.

25. (Original) The steerer tube of claim 24, wherein the outer diameter of the first portion of the lower section gradually tapers from the second portion of the lower section of the body to the upper section of the body.

26. (Withdrawn) The steerer tube of claim 25, wherein an inner surface of the upper section forms an ellipse in cross section, a major diameter of the ellipse formed to be perpendicular to the plane of travel, a minor diameter of the ellipse formed to be in the plane of travel of the bicycle.

27. (Original) The steerer tube of claim 25, wherein an inner surface of the upper section is circular in cross section.

28. (Original) The steerer tube of claim 27, wherein the inner and outer surfaces of the upper section are substantially circularly cylindrical and the outer surface of the second portion of the lower section is substantially circularly cylindrical.

29. (Original) The steerer tube of claim 27, wherein a ratio of an inner diameter of the upper section of the body to an outer diameter of the upper section of the body is within the range of 0.75 to 0.95, inclusive.

30. (Withdrawn) The steerer tube of claim 21, wherein an outer diameter of the lower section of the body is substantially the same as an outer diameter of the upper section of the body.

31. (Original) The steerer tube of claim 21, wherein an inner surface of the upper section is circular in cross section.

32. (Previously presented) The steerer tube of claim 31, wherein the inner surface and an outer surface of the upper section are substantially circularly cylindrical and an outer surface of a portion of the lower section is substantially circularly cylindrical.

33. (Original) The steerer tube of claim 31, wherein a ratio of an inner diameter of the upper section of the body to an outer diameter of the upper section of the body is within the range of 0.75 to 0.95, inclusive.

34. (Original) The steerer tube of claim 21, wherein an outer diameter of the lower section of the body is greater than an outer diameter of the upper section of the body.

35. (Original) The steerer tube of claim 34, wherein the lower section of the body has first and second portions, the first portion adjoining the upper section of the body, an outer diameter of the first portion of the lower section being greater than an outer diameter of the upper section and less than an outer diameter of the second portion of the lower section.

36. (Original) The steerer tube of claim 35, wherein the outer diameter of the first portion of the lower section gradually tapers from the second portion of the lower section of the body to the upper section of the body.

37. (Original) The steerer tube of claim 21, wherein the segment of the lower section of the body is formed as one piece with the crown of the front wheel fork.

38. (Original) The steerer tube of claim 21, wherein the segment of the lower section of the body is joined to the crown of the front wheel fork, the body formed of a material different from the crown of the front wheel fork.

39. (Original) The steerer tube of claim 38, wherein the segment of the lower section of the body is formed as one piece with the crown of the front wheel fork.

40. (Original) The steerer tube of claim 21, wherein the body is formed from a material selected from the group consisting of steel, carbon fiber reinforced composite, aluminum, titanium and magnesium.

41. (Withdrawn) The steerer tube of claim 21, wherein an inner surface of the wall within the lower section of the body is formed as an ellipse in cross section, a major diameter of the ellipse formed to be perpendicular to the plane of travel, a minor diameter of the ellipse formed to be in the plane of travel of the bicycle.

42. (Withdrawn) The steerer tube of claim 41, wherein outer surfaces of the upper and lower sections of the body are circular in cross section.

43. (Withdrawn) The steerer tube of claim 42, wherein an outer diameter of the lower section of the body is greater than an outer diameter of the upper section of the body.

44. (Withdrawn) The steerer tube of claim 43, wherein the lower section of the body has first and second portions, the first portion adjoining the upper section of the body, an outer diameter of the first portion of the lower section being greater than an outer diameter of the upper section and less than an outer diameter of the second portion of the lower section.

45. (Withdrawn) The steerer tube of claim 44, wherein the outer diameter of the first portion of the lower section gradually tapers from the second portion of the lower section of the body to the upper section of the body.

46. (Withdrawn) The steerer tube of claim 45, wherein an inner surface of the upper section forms an ellipse in cross section, a major diameter of the ellipse formed to be

perpendicular to the plane of travel, a minor diameter of the ellipse formed to be in the plane of travel of the bicycle.

47. (Withdrawn) The steerer tube of claim 45, wherein an inner surface of the upper section is circular in cross section.

48. (Withdrawn) The steerer tube of claim 47, wherein the inner and outer surfaces of the upper section are substantially circularly cylindrical and the outer surface of the second portion of the lower section is substantially circularly cylindrical.

49. (Withdrawn) The steerer tube of claim 47, wherein a ratio of an inner diameter of the upper section of the body to an outer diameter of the upper section of the body is within the range of 0.75 to 0.95, inclusive.

50. (Withdrawn) The steerer tube of claim 41, wherein an outer diameter of the lower section of the body is substantially the same as an outer diameter of the upper section of the body.

51. (Withdrawn) The steerer tube of claim 41, wherein an inner surface of the upper section is circular in cross section.

52. (Withdrawn) The steerer tube of claim 51, wherein the inner and outer surfaces of the upper section are substantially circularly cylindrical and the outer surface of the second portion of the lower section is substantially circularly cylindrical.

53. (Withdrawn) The steerer tube of claim 51, wherein a ratio of an inner diameter of the upper section of the body to an outer diameter of the upper section of the body is within the range of 0.75 to 0.95, inclusive.

54. (Withdrawn) The steerer tube of claim 41, wherein an outer diameter of the lower section of the body is greater than an outer diameter of the upper section of the body.

55. (Withdrawn) The steerer tube of claim 54, wherein the lower section of the body has first and second portions, the first portion adjoining the upper section of the body, an outer diameter of the first portion of the lower section being greater than an outer diameter of the upper section and less than an outer diameter of the second portion of the lower section.

56. (Withdrawn) The steerer tube of claim 55, wherein the outer diameter of the first portion of the lower section gradually tapers from the second portion of the lower section of the body to the upper section of the body.

57. (Withdrawn) The steerer tube of claim 41, wherein the segment of the lower section of the body is formed as one piece with the crown of the front wheel fork.

58. (Withdrawn) The steerer tube of claim 41, wherein the segment of the lower section of the body is joined to the crown of the front wheel fork, the body formed of a material different from the crown of the front wheel fork.

59. (Withdrawn) The steerer tube of claim 58, wherein the segment of the lower section of the body is formed as one piece with the crown of the front wheel fork.

60. (Withdrawn) The steerer tube of claim 41, wherein the body is formed from a material selected from the group consisting of steel, carbon fiber reinforced composite, aluminum, titanium and magnesium.

61. (Withdrawn) The steerer tube of claim 41, wherein an inner surface of the upper section is circular in cross section, an inner diameter of the upper section being substantially the same as the minor diameter of the lower section.

62. (Withdrawn) The steerer tube of claim 41, wherein the lower section has an axial length, the minor diameter remaining substantially the same along the axial length of the lower section.

63. (Withdrawn) The steerer tube of claim 41, wherein the minor diameter decreases as a function of proximity to the upper section of the body.

64. (Withdrawn) The steerer tube of claim 41, wherein a ratio of the major diameter to the minor diameter taken at a lower end of the lower section is within the range of 1.05 to 1.3, inclusive.

65. (Withdrawn) The steerer tube of claim 64, wherein the ratio is within the range of 1.10 to 1.25, inclusive.

66. (Withdrawn) The steerer tube of claim 41, wherein the major diameter of the lower section tapers from the second portion of the lower section to the first portion of the lower section.

67. (Withdrawn) The steerer tube of claim 41, wherein a ratio of the major diameter to the minor diameter decreases as a function of proximity to the upper section of the body.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/585,629	12/30/2014	Jonathan Blair Watt	RS180US	8583

23470 7590 08/10/2018

SRAM, LLC
1000 W. Fulton Market, 4th Floor
CHICAGO, ILLINOIS 60607
UNITED STATES OF AMERICA

EXAMINER	
ARCE, MARLON ALEXANDER	

ART UNIT	PAPER NUMBER
3611	

NOTIFICATION DATE	DELIVERY MODE
08/10/2018	ELECTRONIC

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

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

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

bgause@sram.com
bhinnen@sram.com
lserdynski@sram.com

PTOL-90A (Rev. 04/07)

Office Action Summary	**Application No.** 14/585,629	**Applicant(s)** Watt et al.	
	Examiner Marlon A Arce	**Art Unit** 3611	**AIA Status** Yes

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

Period for Reply

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

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

Status

1)☑ Responsive to communication(s) filed on 4/12/18.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL.** 2b) ☑ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5) ☑ Claim(s) 1-67 is/are pending in the application.

5a) Of the above claim(s) 6,10,26,30 and 41-67 is/are withdrawn from consideration.

6) ☐ Claim(s) _____ is/are allowed.

7) ☑ Claim(s) 1,17,20-21,31,33 and 40 is/are rejected.

8) ☑ Claim(s) 2-5,7-9,11-16,18-19,22-25 and 27-29 is/are objected to.

9) ☐ Claim(s) _____ are subject to restriction and/or election requirement

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

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

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

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

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

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

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

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

Attachment(s)

1) ☑ Notice of References Cited (PTO-892)

2) ☑ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

4) ☐ Other: _____.

DETAILED ACTION

Notice of Pre-AIA or AIA Status

The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Response to Arguments

1. Applicant's arguments, see remarks, filed 4/12/18, with respect to the rejection(s) of claim(s) 1,2,11,12 and 17-20 under Murphy (US 2007/0257466) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of D'Aluisio (US 6145862) in view of Galasso (US 8366130).

Claim Rejections - 35 USC § 103

2. In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

3. The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:

> A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1,17,20,21,31,33,37 and 40 is/are rejected under 35 U.S.C. 103 as being unpatentable over D'Aluisio (US 6145862) in view of Galasso (US 8366130). D'aluisio discloses a bicycle suspension comprising:

an elongate hollow body (14 in FIg. 1A or 18 in Fig.) arranged around a steering axis located in a vertical plane of travel of the bicycle,

the body having upper and lower sections, a segment of the upper section adapted to be joined to a bicycle handlebar –{{Col. 2, line 52, also it would be obvious for one of ordinary skill in the art to know that a handlebar would attach to the body 14/18 in order to steer the bicycle}}--, a segment of the lower section adapted to be joined to a crown of a front wheel fork of the bicycle (see figure 1A), the lower section joined to the upper section, and the body formed by a wall,

D'Aluisio shows different types of profiles (figures 1A and 6C) of the body, however he does not show a thickness of the wall at any point in the lower section of the body varying as a function of the cross-sectional angle of the point relative to the plane of travel, the wall thickness being at a maximum in the plane of travel of the bicycle.

However; Galasso discloses a vehicle suspension comprising: a tube (8) with a thickness of the wall at any point in a section of the body varying as a function of the cross-sectional angle of the point relative to the plane of travel, the wall thickness being at a maximum in the plane of travel of the vehicle (See figure 2A). It would have been obvious for one of ordinary skill in the art before the effective filing date of the current invention to modify D'Aluisio by adjusting the thickness of the body at any section to match the appearance of the tube in Galasso, in order to enhance the stiffness of the tube to include a major and minor stiffness (see summary of the invention in Galasso at the bottom of Col. 1 and the beginning of Col. 2). Wherein the combination of D'Aluisio and Galasso can be seen as a combination of prior art elements according to known methods to yield predictable results.

Regarding claims 17 and 37, wherein D'Aluisio discloses that the segment of the lower section of the body is joined as one piece with the crown of the front wheel fork (see figure 1A).

Regarding claims 20 and 40, the body in D'Aluisio is formed of steel.

Regarding claim 21, the combination of D'Aluisio and Galasso ends with a wall thickness is at a minimum in a plane containing the steering axis and orthogonal to the plane of travel of the bicycle (see figure 2A in Galasso).

Regarding claim 31, the combination of D'Aluisio and Galasso ends with an inner surface of any section being circular in a cross-section (see figure 2A in Galasso).

Regarding claim 33, neither D'Aluisio or Galasso mention a ratio of the thickness; however, It would have been obvious for one of ordinary skill in the art to modify the thickness of the upper section in order to be within an specific ratio, in order to fit an specific configuration or an specific version of a bicycle. The modification can be seen as the use of a known technique to improve similar devices (methods, or products) in the same way.

Allowable Subject Matter

5. Claims 2-5,7-9,11-16,18-19,22-25,27-29 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marlon A Arce whose telephone number is (571)272-1341. The examiner can normally be reached on 8AM - 4:30PM.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph Rocca can be reached on 571-272-5191. 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.

/MARLON A ARCE/
Examiner, Art Unit 3611
8/3/18

/ANNE MARIE M BOEHLER/
Primary Examiner, Art Unit 3611

Notice of References Cited	Application/Control No. 14/585,629	Applicant(s)/Patent Under Reexamination Watt et al.	
	Examiner Marlon A Arce	Art Unit 3611	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-8366130-B2	02-2013	Galasso; Mario	B62K21/02	280/276
*	B	US-6145862-A	11-2000	D'Aluisio; Christopher P.	B62K21/20	280/276
	C					
	D					
	E					
	F					
	G					
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	I					
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	K					
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FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N					
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	P					
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NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
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	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14/585,629	Watt et al.
	Examiner	Art Unit
	Marlon A Arce	3611

CPC - Searched*		
Symbol	Date	Examiner
b62k21/04, b62k19/32, b62k21/18, b62k19/02	07/07/2017	MAA
update	01/11/2018	MAA
update	08/03/2018	MAA

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
conducted applicant search	06/29/2017	MAA

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (03-15)
Approved for use through 07/31/2016. OMB 0651-0031
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	14585629
Filing Date	2014-12-30
First Named Inventor	WATT
Art Unit	3611
Examiner Name	ARCE, MARLON ALEXANDER
Attorney Docket Number	RS180US

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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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	1	20100259028	A1	2010-10-14	MOECHNIG	

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	1	2228046	CN	Y	1996-05-29	JIE ANTE NA CO LTD		☒
	2	202557710	CN	U	2012-11-28	WENCHUAN LIU		☒
	3	2930094	EP	A1	2015-10-14	DT SWISS AG		☒

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ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.A.A/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	14585629
	Filing Date	2014-12-30
	First Named Inventor	WATT
	Art Unit	3611
	Examiner Name	ARCE, MARLON ALEXANDER
	Attorney Docket Number	RS180US

	4	0174654	WO	A1	2001-10-11	TIME SPORT INTERNATIONAL, et al.		☒

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

Examiner Signature	/MARLON A ARCE/	Date Considered	08/03/2018

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.A.A/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	14585629
	Filing Date	2014-12-30
	First Named Inventor	WATT
	Art Unit	3611
	Examiner Name	ARCE, MARLON ALEXANDER
	Attorney Docket Number	RS180US

CERTIFICATION STATEMENT

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

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

OR

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

See attached certification statement.

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

☒ A certification statement is not submitted herewith.

SIGNATURE

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

Signature	/BRIAN GAUSE/	Date (YYYY-MM-DD)	2018-04-12
Name/Print	BRIAN GAUSE	Registration Number	67660

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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Privacy Act Statement

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

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

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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CERTIFICATE OF ELECTRONIC TRANSMISSION

I hereby certify that this correspondence is being electronically deposited with the United States Patent and Trademark Office through the Electronic Filing System, on the below date:
Date: April 12, 2018 Name: Brian Gause (Reg. No. 67,660) Signature: /Brian Gause/

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Appln. of:	WATT	
Appln. No.:	14/585,629	Examiner: Marlon A. Arce
Filed:	December 20, 2014	Group Art Unit: 3611
For:	BICYCLE STEERER TUBE WITH VARIANT STIFFNESS	Confirmation No. 8583
Attorney Docket No:	RS180US	

RESPONSE

Mail Stop: AMENDMENT
Commissioner for Patents
Post Office Box 1450
Alexandria, VA 22313-1450

Dear Sir:

This communication is in response to the Office Action dated January 17, 2018. Please enter and consider the following remarks:

Listing of the claims begin on page 2.

Remarks begin on page 14.

LISTING OF THE CLAIMS

The claims are as follows:

1. (Original) A steerer tube for a bicycle, the steerer tube comprising:

an elongate hollow body arranged around a steering axis located in a vertical plane of travel of the bicycle,

the body having upper and lower sections, a segment of the upper section adapted to be joined to a bicycle handlebar, a segment of the lower section adapted to be joined to a crown of a front wheel fork of the bicycle, the lower section joined to the upper section, and

the body formed by a wall, a thickness of the wall at any point in the lower section of the body varying as a function of the cross-sectional angle of the point relative to the plane of travel, the wall thickness being at a maximum in the plane of travel of the bicycle.

2. (Original) The steerer tube of claim 1, wherein outer surfaces of the upper and lower sections of the body are circular in cross section.

3. (Original) The steerer tube of claim 2, wherein an outer diameter of the lower section of the body is greater than an outer diameter of the upper section of the body.

4. (Original) The steerer tube of claim 3, wherein the lower section of the body has first and second portions, the first portion adjoining the upper section of the body, an outer diameter of the first portion of the lower section being greater than an outer diameter of the upper section and less than an outer diameter of the second portion of the lower section.

5. (Original) The steerer tube of claim 4, wherein the outer diameter of the first portion of the lower section gradually tapers from the second portion of the lower section to the upper section of the body.

6. (Withdrawn) The steerer tube of claim 5, wherein an inner surface of the upper section forms an ellipse in cross section, a major diameter of the ellipse formed to be perpendicular to the plane of travel, a minor diameter of the ellipse formed to be in the plane of travel of the bicycle.

7. (Original) The steerer tube of claim 5, wherein an inner surface of the upper section is circular in cross section.

8. (Original) The steerer tube of claim 7, wherein the inner and outer surfaces of the upper section are substantially circularly cylindrical and the outer surface of the second portion of the lower section is substantially circularly cylindrical.

9. (Original) The steerer tube of claim 7, wherein a ratio of an inner diameter of the upper section of the body to an outer diameter of the upper section of the body is within the range of 0.75 to 0.95, inclusive.

10. (Withdrawn) The steerer tube of claim 2, wherein an outer diameter of the lower section of the body is substantially the same as an outer diameter of the upper section of the body.

11. (Original) The steerer tube of claim 2, wherein an inner surface of the upper section is circular in cross section.

12. (Original) The steerer tube of claim 11, wherein the inner and outer surfaces of the upper section are substantially circularly cylindrical and the outer surface of the lower section is substantially circularly cylindrical.

13. (Original) The steerer tube of claim 11, wherein a ratio of an inner diameter of the upper section of the body to an outer diameter of the upper section of the body is within the range of 0.75 to 0.95, inclusive.

14. (Original) The steerer tube of claim 1, wherein an outer diameter of the lower section of the body is greater than an outer diameter of the upper section of the body.

15. (Original) The steerer tube of claim 14, wherein the lower section of the body has first and second portions, the first portion adjoining the upper section of the body, an outer diameter of the first portion of the lower section being greater than an outer diameter of the upper section and less than an outer diameter of the second portion of the lower section.

16. (Original) The steerer tube of claim 15, wherein the outer diameter of the first portion of the lower section gradually tapers from the second portion of the lower section to the upper section of the body.

17. (Original) The steerer tube of claim 1, wherein the segment of the lower section of the body is formed as one piece with the crown of the front wheel fork.

18. (Original) The steerer tube of claim 1, wherein the segment of the lower section of the body is joined to the crown of the front wheel fork, the body formed of a material different from the crown of the front wheel fork.

19. (Original) The steerer tube of claim 18, wherein the segment of the lower section of the body is formed as one piece with the crown of the front wheel fork.

20. (Original) The steerer tube of claim 1, wherein the body is formed from a material selected from the group consisting of steel, carbon fiber reinforced composite, aluminum, titanium and magnesium.

21. (Original) The steerer tube of claim 1, wherein the wall thickness is at a minimum in a plane containing the steering axis and orthogonal to the plane of travel of the bicycle.

22. (Original) The steerer tube of claim 21, wherein outer surfaces of the upper and lower sections of the body are circular in cross section.

23. (Original) The steerer tube of claim 22, wherein an outer diameter of the lower section of the body is greater than an outer diameter of the upper section of the body.

24. (Original) The steerer tube of claim 23, wherein the lower section of the body has first and second portions, the first portion adjoining the upper section of the body, an outer diameter of the first portion of the lower section being greater than an outer diameter of the upper section and less than an outer diameter of the second portion of the lower section.

25. (Original) The steerer tube of claim 24, wherein the outer diameter of the first portion of the lower section gradually tapers from the second portion of the lower section of the body to the upper section of the body.

26. (Withdrawn) The steerer tube of claim 25, wherein an inner surface of the upper section forms an ellipse in cross section, a major diameter of the ellipse formed to be perpendicular to the plane of travel, a minor diameter of the ellipse formed to be in the plane of travel of the bicycle.

27. (Original) The steerer tube of claim 25, wherein an inner surface of the upper section is circular in cross section.

28. (Original) The steerer tube of claim 27, wherein the inner and outer surfaces of the upper section are substantially circularly cylindrical and the outer surface of the second portion of the lower section is substantially circularly cylindrical.

29. (Original) The steerer tube of claim 27, wherein a ratio of an inner diameter of the upper section of the body to an outer diameter of the upper section of the body is within the range of 0.75 to 0.95, inclusive.

30. (Withdrawn) The steerer tube of claim 21, wherein an outer diameter of the lower section of the body is substantially the same as an outer diameter of the upper section of the body.

31. (Original) The steerer tube of claim 21, wherein an inner surface of the upper section is circular in cross section.

32. (Previously presented) The steerer tube of claim 31, wherein the inner surface and an outer surface of the upper section are substantially circularly cylindrical and an outer surface of a portion of the lower section is substantially circularly cylindrical.

33. (Original) The steerer tube of claim 31, wherein a ratio of an inner diameter of the upper section of the body to an outer diameter of the upper section of the body is within the range of 0.75 to 0.95, inclusive.

34. (Original) The steerer tube of claim 21, wherein an outer diameter of the lower section of the body is greater than an outer diameter of the upper section of the body.

35. (Original) The steerer tube of claim 34, wherein the lower section of the body has first and second portions, the first portion adjoining the upper section of the body, an outer diameter of the first portion of the lower section being greater than an outer diameter of the upper section and less than an outer diameter of the second portion of the lower section.

36. (Original) The steerer tube of claim 35, wherein the outer diameter of the first portion of the lower section gradually tapers from the second portion of the lower section of the body to the upper section of the body.

37. (Original) The steerer tube of claim 21, wherein the segment of the lower section of the body is formed as one piece with the crown of the front wheel fork.

38. (Original) The steerer tube of claim 21, wherein the segment of the lower section of the body is joined to the crown of the front wheel fork, the body formed of a material different from the crown of the front wheel fork.

39. (Original) The steerer tube of claim 38, wherein the segment of the lower section of the body is formed as one piece with the crown of the front wheel fork.

40. (Original) The steerer tube of claim 21, wherein the body is formed from a material selected from the group consisting of steel, carbon fiber reinforced composite, aluminum, titanium and magnesium.

41. (Withdrawn) The steerer tube of claim 21, wherein an inner surface of the wall within the lower section of the body is formed as an ellipse in cross section, a major diameter of the ellipse formed to be perpendicular to the plane of travel, a minor diameter of the ellipse formed to be in the plane of travel of the bicycle.

42. (Withdrawn) The steerer tube of claim 41, wherein outer surfaces of the upper and lower sections of the body are circular in cross section.

43. (Withdrawn) The steerer tube of claim 42, wherein an outer diameter of the lower section of the body is greater than an outer diameter of the upper section of the body.

44. (Withdrawn) The steerer tube of claim 43, wherein the lower section of the body has first and second portions, the first portion adjoining the upper section of the body, an outer diameter of the first portion of the lower section being greater than an outer diameter of the upper section and less than an outer diameter of the second portion of the lower section.

45. (Withdrawn) The steerer tube of claim 44, wherein the outer diameter of the first portion of the lower section gradually tapers from the second portion of the lower section of the body to the upper section of the body.

46. (Withdrawn) The steerer tube of claim 45, wherein an inner surface of the upper section forms an ellipse in cross section, a major diameter of the ellipse formed to be perpendicular to the plane of travel, a minor diameter of the ellipse formed to be in the plane of travel of the bicycle.

47. (Withdrawn) The steerer tube of claim 45, wherein an inner surface of the upper section is circular in cross section.

48. (Withdrawn) The steerer tube of claim 47, wherein the inner and outer surfaces of the upper section are substantially circularly cylindrical and the outer surface of the second portion of the lower section is substantially circularly cylindrical.

49. (Withdrawn) The steerer tube of claim 47, wherein a ratio of an inner diameter of the upper section of the body to an outer diameter of the upper section of the body is within the range of 0.75 to 0.95, inclusive.

50. (Withdrawn) The steerer tube of claim 41, wherein an outer diameter of the lower section of the body is substantially the same as an outer diameter of the upper section of the body.

51. (Withdrawn) The steerer tube of claim 41, wherein an inner surface of the upper section is circular in cross section.

52. (Withdrawn) The steerer tube of claim 51, wherein the inner and outer surfaces of the upper section are substantially circularly cylindrical and the outer surface of the second portion of the lower section is substantially circularly cylindrical.

53. (Withdrawn) The steerer tube of claim 51, wherein a ratio of an inner diameter of the upper section of the body to an outer diameter of the upper section of the body is within the range of 0.75 to 0.95, inclusive.

54. (Withdrawn) The steerer tube of claim 41, wherein an outer diameter of the lower section of the body is greater than an outer diameter of the upper section of the body.

55. (Withdrawn) The steerer tube of claim 54, wherein the lower section of the body has first and second portions, the first portion adjoining the upper section of the body, an outer diameter of the first portion of the lower section being greater than an outer diameter of the upper section and less than an outer diameter of the second portion of the lower section.

56. (Withdrawn) The steerer tube of claim 55, wherein the outer diameter of the first portion of the lower section gradually tapers from the second portion of the lower section of the body to the upper section of the body.

57. (Withdrawn) The steerer tube of claim 41, wherein the segment of the lower section of the body is formed as one piece with the crown of the front wheel fork.

58. (Withdrawn) The steerer tube of claim 41, wherein the segment of the lower section of the body is joined to the crown of the front wheel fork, the body formed of a material different from the crown of the front wheel fork.

59. (Withdrawn) The steerer tube of claim 58, wherein the segment of the lower section of the body is formed as one piece with the crown of the front wheel fork.

60. (Withdrawn) The steerer tube of claim 41, wherein the body is formed from a material selected from the group consisting of steel, carbon fiber reinforced composite, aluminum, titanium and magnesium.

61. (Withdrawn) The steerer tube of claim 41, wherein an inner surface of the upper section is circular in cross section, an inner diameter of the upper section being substantially the same as the minor diameter of the lower section.

62. (Withdrawn) The steerer tube of claim 41, wherein the lower section has an axial length, the minor diameter remaining substantially the same along the axial length of the lower section.

63. (Withdrawn) The steerer tube of claim 41, wherein the minor diameter decreases as a function of proximity to the upper section of the body.

64. (Withdrawn) The steerer tube of claim 41, wherein a ratio of the major diameter to the minor diameter taken at a lower end of the lower section is within the range of 1.05 to 1.3, inclusive.

65. (Withdrawn) The steerer tube of claim 64, wherein the ratio is within the range of 1.10 to 1.25, inclusive.

66. (Withdrawn) The steerer tube of claim 41, wherein the major diameter of the lower section tapers from the second portion of the lower section to the first portion of the lower section.

67. (Withdrawn) The steerer tube of claim 41, wherein a ratio of the major diameter to the minor diameter decreases as a function of proximity to the upper section of the body.

REMARKS

Claims 1-67 were pending. No new claims are presented and no claims are currently amended. Claims 6, 10, 26, 30, and 41-67 are withdrawn. Thus, claims 1-67 are pending, with claims 1-5, 7-9, 11-25, 27-29, and 31-40 currently at issue, including independent claim 1.

Claims 1, 2, 11, 12, and 17-20 were rejected under 35 U.S.C. § 102(a)(1) as being anticipated by U.S. Patent Application Number 2007/0257466 ("Murphy"). Claim 13 was rejected under 35 U.S.C. § 103as being unpatentable over Murphy.

Applicant respectfully traverses the rejections and requests reconsideration of the claims, the specification, and the drawings in view of the present amendments and the following remarks.

I. Allowable Subject Matter

Applicant thanks the Examiner for the indication that claims 3-5, 7-9, 14-16, 21-25, 27-29, and 31-40 contain allowable subject matter. However, Applicant respectfully submits that all claims are currently in condition for allowance.

II. Interview Request

Applicant hereby requests a telephone interview with the Examiner prior to the next office action if that next action is not a notice of allowance. The Examiner is respectfully requested to call the undersigned to schedule the interview at a mutually convenient date and time.

III. Rejections under 35 U.S.C. §§ 102 and 103

Claims 1, 2, 11, 12, 17-20 were rejected under 35 U.S.C. § 102(a)(1) as being anticipated by Murphy. Claim 1 recites, in relevant part, an elongate hollow body arranged around a steering axis located in a vertical plane of travel of the bicycle, the body formed by a wall, a thickness of the wall at any point in the lower section of the body varying as a function of the cross-sectional angle of the point relative to the plane of travel.

Murphy relates to "a steer tube that is preferably metallic and is preferably tapered and mates with and is bonded to a carbon reinforced plastic portion comprising a steer tube stub and fork crown." (Murphy, para. [0012]). Specifically, Murphy discloses that "[s]teer tube 14 is formed with varying wall thickness and wall diameter progressively from handlebar stem receiving portion 40, having a fairly large diameter and fairly thin wall, through transition zone 42 at which an internal taper 44 thickens the wall, while the external taper 46 reduces the diameter, terminating in end 22." (Murphy, para. [0033]). Murphy discloses various cross sections, each having a consistent wall thickness defined by a diameter. (*See* Murphy, para. [0033]). Murphy discloses that the thickness varies along the length of the shaft. Varying along a length is different than varying as a function of an angle from a plane of travel. Murphy does not disclose varying thickness of a wall as a function of the cross-sectional angle of the point relative to the plane of travel.

The Examiner also cites Fig. 7 of Murphy. The embodiment of Fig. 7 in Murphy shows the fairly large diameter portion 40 (*see* Murphy, Fig. 3), the transition zone 42 with a varying diameter, and the end 22 having a reduced diameter. Murphy discloses that each of the above portions in Fig. 7 is characterized as having an internal diameter and an external diameter. (*See* Murphy, paras. [0017], [0033]; *see also* Murphy, Fig. 7). Murphy discloses a steer tube with concentric circular inner and outer profiles. A steer tube with concentric circular inner and outer profiles has a uniform wall thickness across all cross-sectional angles. Murphy does not disclose a thickness of the wall at any point in the lower section of the body varying as a function of the cross-sectional angle of the point relative to the plane of travel.

Murphy does not disclose each and every limitation of claim 1. Claim 1 is allowable over Murphy. Claims 1-5, 7-9, 11-25, 27-29, and 31-40 depend from claim 1 and are allowable for at least the same reasons.

Claim 13 was rejected under 35 U.S.C. § 103as being unpatentable over Murphy. Murphy is described above and does not teach or disclose a thickness of the wall at any point in the lower section of the body varying as a function of the cross-sectional angle of the point relative to the plane of travel. Claim 13 is allowable for at least the same reasons as claim 1, from which it depends.

IV. CONCLUSION

Each of the rejections and/or required actions in the Office Action has been addressed and no new matter has been added. Applicant submits that all of the pending claims are in condition for allowance and notice to this effect is respectfully requested. The Examiner is invited to call the undersigned if it would expedite the prosecution of this application.

Respectfully submitted,

Dated: April 12, 2018

/Brian Gause/

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	14585629
Filing Date	2014-12-30
First Named Inventor	WATT
Art Unit	3611
Examiner Name	ARCE, MARLON ALEXANDER
Attorney Docket Number	RS180US

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	1	2228046	CN	Y	1996-05-29	JIE ANTE NA CO LTD		☓
	2	202557710	CN	U	2012-11-28	WENCHUAN LIU		☒
	3	2930094	EP	A1	2015-10-14	DT SWISS AG		☒

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	14585629
	Filing Date	2014-12-30
	First Named Inventor	WATT
	Art Unit	3611
	Examiner Name	ARCE, MARLON ALEXANDER
	Attorney Docket Number	RS180US

	4	0174654	WO	A1	2001-10-11	TIME SPORT INTERNATIONAL, et al.		☒

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[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

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	Application Number	14585629
	Filing Date	2014-12-30
	First Named Inventor	WATT
	Art Unit	3611
	Examiner Name	ARCE, MARLON ALEXANDER
	Attorney Docket Number	RS180US

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

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

OR

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

See attached certification statement.

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

☒ A certification statement is not submitted herewith.

SIGNATURE

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

Signature	/BRIAN GAUSE/	Date (YYYY-MM-DD)	2018-04-12
Name/Print	BRIAN GAUSE	Registration Number	67660

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7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

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9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Espacenet

Bibliographic data: CN2228046 (Y) — 1996-05-29

Front fork joint of cycle

Inventor(s): HUIMING ZHENG [CN] ± (ZHENG HUIMING)

Applicant(s): JIE ANTE NA CO LTD [CN] ± (JIE'ANTE NA) CO., LTD)

Classification: **- international:*B62K19/32; B62K21/02;*** (IPC1-7): B62K19/32; B62K21/02

- cooperative:

Application number: CN1995222551U 19950929

Priority number(s): CN1995222551U 19950929

Abstract of CN2228046 (Y)

The utility model relates to a bicycle front fork joint, comprising a front fork joint and a front fork vertical pipe. The front fork joint is composed of a hollow neck part and two front fork bones. The thickness of the pipe wall of the hollow neck part of the front fork part is increased inward to form a hollow circular hole whose internal diameter is relatively small. One small segment of the top of the hollow circular hole is provided with a cone part whose internal diameter is increased upward; the corresponding part of the bottom end of the front fork vertical pipe forms a sheathing sleeve whose external diameter is relatively small. The top of the sheathing pipe is a positioning conical surface whose external diameter is increased gradually, and the internal diameter of the front fork vertical pipe decreases downward from the lower part of a straight pipe gradually. The thickness of the pipe wall of a force application position is relatively big, and the strength is increased. The precision positioning is achieved through the high-precision adding assembly of the cone part and the conical surface.

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DESCRIPTION CN2228046

A bicycle front fork joint comprises a front fork joint, a front fork standpipe, a front fork joint consisting of a hollow neck and two front fork bones, and a hollow neck of the front fork joint, the wall thickness of which is thickened inwards. , forming a hollow hole with a small inner diameter, a small section at the top of the hollow circular hole, with a conical part with an enlarged inner diameter upward; and a sleeve tube with a smaller outer diameter is formed at the corresponding part at the bottom end of the front fork vertical tube; The top end of the joint pipe is a positioning cone surface with an increasing outer diameter, and the inner diameter of the front fork vertical pipe gradually decreases from the lower part of the straight pipe downward, forming a force part with a larger pipe wall thickness and increasing the strength, and the tapered part and the Cone-face high-precision plus grouping for precise positioning.

Bicycle fork connector

The utility model relates to a bicycle part, in particular to a bicycle front fork joint.

At present, bicycles that are developed toward light weight have mostly aluminum alloy or carbon fiber tubes, and their parts are mostly made of aluminum alloy. Therefore, after the front fork joint is joined to the front fork standpipe, the neck of the front fork joint is easy to produce. As stress concentration and cracking occur, the present inventor has designed an improved structure of a front fork joint, which is characterized in that the hollow round hole of the hollow neck of the front fork joint is an upper end having a large diameter and gradually tapering to the lower end. The inner cone-shaped hole with a smaller diameter and the corresponding

end of the fork standpipe also shrink into a corresponding conical shape, which is intended to increase the size of the front fork joint neck without changing the size of the relevant accessories. Thickness (wall thickness) increases the strength of the fork joint. This structural improvement does indeed achieve the desired effect, but the hollow round hole with tapering neck needs to be processed by the dewaxing casting method, and the entire joint surface needs precision casting and high-precision machining, resulting in high production costs. As the quality of the casting quality is low, it needs further improvement.

The purpose of the utility model is to provide a new structure of a bicycle front fork joint, so that the processing is simple, the function is reliable, and the production cost is low.

The purpose of the utility model is to realize a bicycle front fork joint, which comprises a front fork joint and a front fork standpipe, wherein the fork joint is a hollow neck and two front fork bones extending to both sides. In the composition, a front fork standpipe is sleeved in the hollow neck, which is characterized in that the hollow neck of the front fork joint is an outer diameter that does not change and the wall thickness of the pipe is thickened inward to form a hollow with an inner diameter smaller than the original inner diameter. The round hole has a tapered section with an enlarged inner diameter at a small section at the top of the hollow round hole; the front fork standpipe includes two sections of a large-diameter pipe section and a relatively small-diameter fitting pipe section, and the top end of the fitting pipe section has an outer diameter. The gradual increase of the positioning cone surface toward the large diameter pipe section, which coincides with the inclined surface of the oblique tapered part at the top of the hollow hole of the front fork joint, and the inside diameter of the front fork riser gradually decreases from the bottom of the large diameter pipe section downwards. The diameter of the large-diameter pipe section of the fork standpipe is equal to the diameter of the fork stand pipe used commonly.

The new structure of the front fork joint, which not only makes the front fork riser has a larger wall thickness of the force and the strength increases, but also only in the hollow circular hole at the top of the tapered cone position and the positioning of the top of the pipe fittings The precise positioning of the front fork joint and the front fork riser can be realized by precision casting and high-precision machining on the tapered surface, so that the original precision machining of the entire sleeve surface can be converted into the precision machining of the local mating surface, which greatly simplifies the utility model. The processing reduces the production cost, and the reliability of its casting quality is improved.

The structure of the present invention will be further described below with reference to the embodiments and the accompanying drawings.

Description of the drawings

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Figure 1 is anatomical view of the utility model

Figure 2 is a combination of the utility model schematic

As shown in FIGS. 1 and 2 , the utility model comprises a front fork joint 10 and a front fork standpipe 20 , wherein the fork joint 10 is made of aluminum alloy or other composite material and consists of a centrally located hollow body. The neck 11 and two front fork bones 12 symmetrically extending on two sides are characterized in that the hollow neck is a hollow tube, and its wall thickness is thickened inwards, so that the inner diameter of the hollow circular hole 13 is relatively Commonly used small, a small section of the top end of the circular hole 13 is provided with a tapered taper portion 131 with an enlarged inner diameter upward, and a bottom of the circular hole 13 is a limiting hole 132 with a smaller inner diameter than the hollow circular hole; and the hollow hole is nested in the hole The front fork standpipe 20 of the 13 also forms a fitting pipe 21 whose outer diameter is smaller than that of the upper pipe section at the corresponding end of the fork standpipe 20, and the inner and outer diameters of the upper pipe section are the same as the commonly used specifications, and the fitting pipe 21 is The turning point of the upper pipe section is a positioning cone surface 211 with a gradually increasing outer diameter and a gradually narrowing down hole diameter at the lower part of the inner diameter of the upper pipe section to form an inner tapered pipe 2 so that the front fork stand pipe 20 is formed. The force-receiving area and the tube wall of the sheathing tube 21 have larger wall thicknesses, and The use of the cooperation of the taper surface 131 of the front fork joint 10 and the taper surface 211 of the fork stem 20 can achieve very precise positioning. In addition, if the limiting hole at the bottom of the front fork joint is adapted to the thickness of the glue, the front fork riser can be inserted into the front fork joint better.

It can be seen that this creation requires only general cutting processing or precision casting processing at the tapered taper portion 131 at the top of the circular hole 13 and the positioning taper surface 211 at the top of the sleeve 21 to achieve a very good assembly and ensure Strength and no cracking.

As can be seen from FIG. 2 , since the outer diameter of the hollow neck of the front fork joint 10 of the present invention does not change, the size of the lower ball plug 31 matched therewith remains unchanged, relative to the earth nest 32, the bead bowl 33 and the head tube 34. The relevant parts can be used; at the same time, the front fork riser 20 part, because only the outer diameter of the bottom end of the sleeve 21 is reduced and the inner diameter of the lower half gradually decreases into the inner conical hole 22, and the remaining diameter of the pipe The dimensions have not changed, so the related parts such as the upper bowl 35, the rider upright 36, and the triangle nut 37 can also be used, and there is no problem of incompatibility due to the specification of the parts.

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It can be seen that the front fork joint of this structure can realize the crack of the front fork joint neck and the strength of the joint thereof without requiring replacement of its related parts, with a simple structure and simple processing. And the purpose of low production costs.

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CLAIMS CN2228046

1、

A bicycle front fork joint includes a front fork joint and a front fork standpipe, wherein the front fork joint is composed of a hollow neck and two front fork bones extending to both sides, and is fixed in the hollow neck. The front fork standpipe is characterized in that the hollow neck of the front fork joint is a hollow round hole whose inner diameter is not changed and the thickness of the wall is thickened inward to form a smaller inner diameter than the original inner diameter. The short end of the hollow round hole is short There is a tapered taper with an enlarged inner diameter; the fork stacker comprises two parts of a large diameter pipe section and a smaller diameter pipe fitting section, and the top end of the sleeve pipe section is a positioning cone with a gradually increasing outer diameter of the large diameter pipe section. On the surface, the taper conforms to the slope of the taper part of the hollow circular hole at the top of the front fork joint. The inner diameter of the fork riser is gradually reduced from the lower part of the large diameter pipe section downward, and the large pipe section of the front fork rise pipe is gradually reduced. The diameter is equal to the diameter of the fork standpipe that is commonly used.

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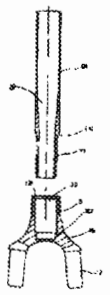
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权利要求书 1 页 说明书 4 页 附图页数 2 页

[54]实用新型名称 自行车前叉接头

[57]摘要

一种自行车前叉接头包含有前叉接头、前叉竖管，前叉接头由一中空颈部及二支前叉骨所组成，前叉接头的中空颈部，其管壁厚度朝内加厚，形成一内径较小的中空圆孔，在中空圆孔顶端一小段，设有内径朝上扩大的锥形部位；在前叉竖管底端相应部分形成外径较小的套合管，套合管顶端为外径渐增的定位锥面，且前叉竖管内径由直管的下部处朝下渐次缩小，形成受力部位具有较大管壁厚而增加强度，并由锥形部位与锥面位高精度加式组配实现精密定位。



(BJ)第 1452 号

权 利 要 求 书

1、一种自行车前叉接头，包括有前叉接头、前叉竖管，其中前叉接头为由一中空颈部及向两侧延伸的二支前叉骨所组成，在中空颈部中套固一前叉竖管，其特征在于前叉接头的中空颈部，为一外径不改变、管壁厚度向内加厚而形成一内径较原来内径小的中空圓孔，该中空圓孔顶端一小段上设有内径向上扩大的斜锥部位；前叉竖管包括大直径管段和较小直径的套合管段二部份，且套合管段的顶端为外径向大直径管段平缓渐增的定位锥面，该锥面与前叉接头中空圓孔顶端的斜锥部位的斜面相吻合，前叉竖管的内径为自大直径管段的下部处朝下渐次缩小，而前叉竖管大直径管段的直径与原常用的前叉竖管直径相等。

说　明　书

自行车前叉接头

本实用新型涉及一种自行车零件，尤其涉及一种自行车前叉接头。

目前朝轻量化发展的自行车，其车架多为铝合金或碳纤管构成，其零件亦大抵采用铝合金成型，因而使前叉接头与前叉竖管接合后，前叉接头的颈部容易产生应力集中而龟裂的现象，为此，本发明人曾设计一种前叉接头改良结构，其特征在于前叉接头的中空颈部的中空圆孔为一上端园径较大以至渐缩至下端圆径较小的内锥状孔，而与之相配合的前叉竖管的端部亦收缩成对应的锥状，其意在不变动各相关配件的尺寸下，增加前叉接头颈部的肉厚(管壁厚度)来增加前叉接头的强度。这一结构改良确实收到预期的功效，但这种颈部渐缩的中空圆孔，需采用脱腊铸造方式加工，且整个套合面需精密铸造和高精度的加工，因此造成生产成本高及铸造品质可靠度较低的困扰，所以需进一步改进。

本实用新型的目的在于提供一种自行车前叉接头的新结构，以使加工较简单，功能可靠，且生产成本低。

本实用新型的目的是这样实现的，一种自行车前叉接头，包括有前叉接头、前叉竖管，其中前叉接头为由一中空颈部及向两侧延伸的二支前叉骨所组成，在中空颈部中套固一前叉竖管，其特征在于前叉接头的中空颈部，为一外径不改变、

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管壁厚度向内加厚而形成一内径较原来内径小的中空圆孔，该中空圆孔顶端一小段上设有内径向上扩大的斜锥部位；前叉竖管包括大直径管段和较小直径的套合管段二部份，且套合管段的顶端为外径向大直径管段平缓渐增的定位锥面，该锥面与前叉接头中空圆孔顶端的斜锥部位的斜面相吻合，前叉竖管的内径为自大直径管段的下部处朝下渐次缩小，而前叉竖管大直径管段的直径与原常用的前叉竖管直径相等。

上述新结构前叉接头，它既使得该前叉竖管受力部位具有较大的管壁厚度而强度增大，又只需于该中空圆孔顶端的斜锥部位及套合管顶端的定位锥面处施行精密铸造及高精度加工，就可实现前叉接头与前叉竖管的精密定位，从而使原来整个套合面精密加工转化为局部配合面的精密加工，使本实用新型大大简化了加工，降低了生产成本，且其精铸品质可靠度提高。

下面以实施例和附图来对本实用新型的结构作进一步叙述。

附图说明

图1　为本实用新型的分解剖视图

图2　为本实用新型的组合示意图

由图1、2所示可见，本实用新型包含有一前叉接头10及一前叉竖管20，其中前叉接头10系以铝合金或其他复合材料制作而成，它由一位于中央的中空颈部11及向二侧对称延伸的二支前叉骨12所构成，其特征在于中空颈部为一中空状管，且其管壁厚度朝内加厚，使其中空圆孔13的内径较常用的小，

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该圆孔13的顶端一小段设有内径朝上扩大的斜锥部位131，圆孔13底部为一内径较中空圆孔孔径小的限位孔132；而套入该中空圆孔13的前叉竖管20，亦于其底端相对应部分形成外径较上部管段直径小的套合管21，且上部管段的内、外径皆与常用的规格相同，在套合管21与上部管段的转折处为一外径平缓向上渐增的定位锥面211，在上管段内径的下部处孔径朝下渐次缩小，而形成一内锥状管2，这样，使前叉竖管20受力部位及套合管21的管壁均具有较大的管壁增厚，并且利用前叉接头10的锥面131与前叉竖管20的锥面211的配合，可达成很精密地定位。此外，在前叉接头底部的限位孔若辅以适应厚度的胶，则可使前叉竖管插入前叉接头的定位功能更好。

由此可见，本创作只需于圆孔13顶端的斜锥部位131及套合管21顶端的定位锥面211进行一般的切削加工或精铸加工，就可实现很好组配，而且能确保强度和不产生龟裂。

由图2所示可见，由于本实用新型的前叉接头10的中空颈部的外径未改变，所以与其配合的下球塞31尺寸不变，相对地球巢32、珠碗33及车头管34等相关零件均可沿用；同时其前叉竖管20部分，因只有底端套合管21部分的外径减小及下半段的内径渐次缩小成内锥状孔22外，其余管径的尺寸均未改变，所以与其相配合的上碗35、车手竖杆36及三角螺母37等相关零件亦可沿用，完全没有零件规格造成的不能互换性的问题存在。

由此可见采用本结构的前叉接头，可以在不需改换其相

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关零件的情况下，用简便的结构，简便的加工就可实现前叉接头颈部不产生龟裂、且其接合处强度高和生产成本低的目的。

说 明 书 附 图

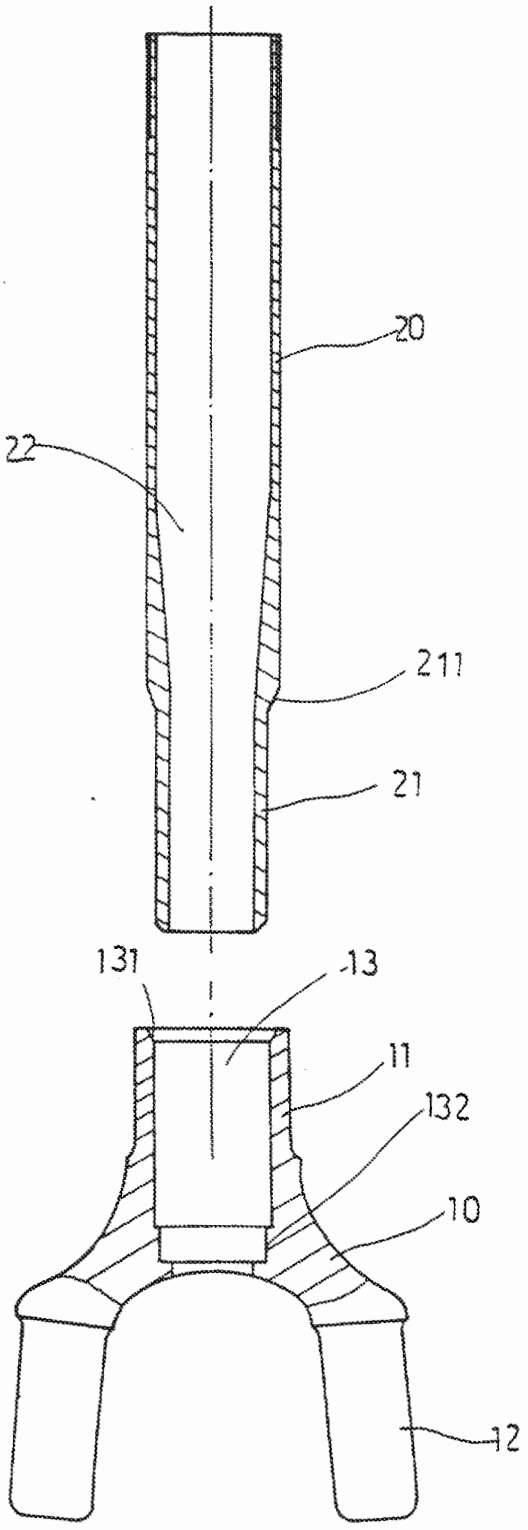
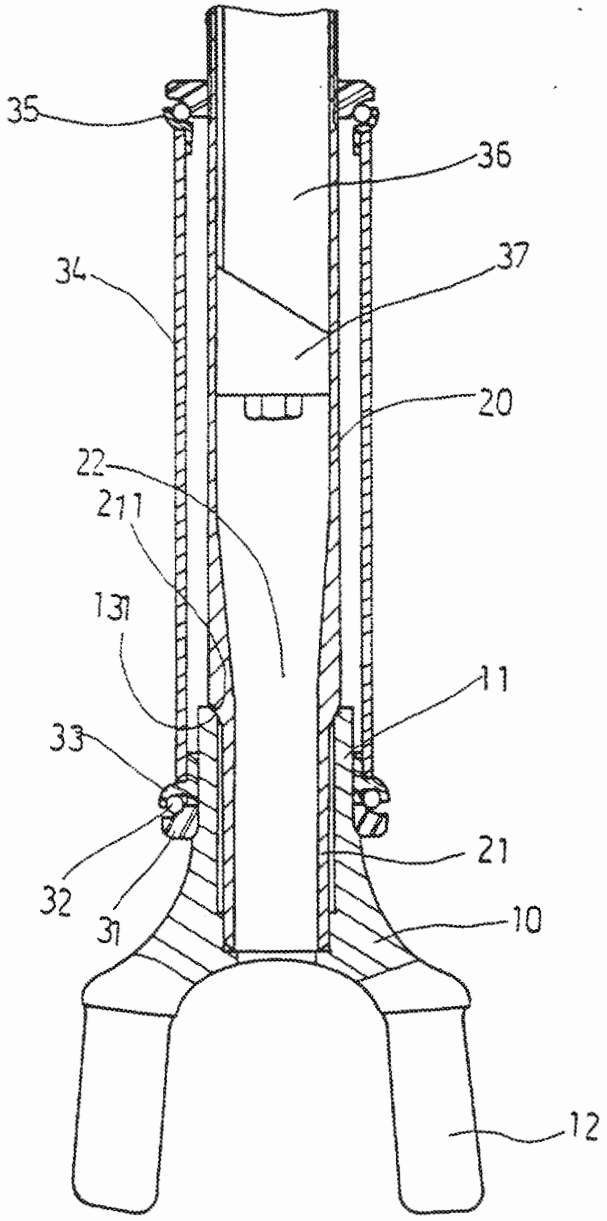


图 1


35
36
34
37
20
22
211
131
11
33
21
32
31
10
12

Espacenet

Bibliographic data: CN202557710 (U) — 2012-11-28

Integral bicycle front fork vertical tube

Inventor(s):	WENCHUAN LIU ± (LIU WENCHUAN)
Applicant(s):	WENCHUAN LIU ± (LIU WENCHUAN)
Classification:	**- international:** ***B62K21/02***
	- cooperative:
Application number:	CN2012294752U 20120314
Priority number(s):	CN2012294752U 20120314

Abstract of CN202557710 (U)

The utility model provides an integral bicycle front fork vertical tube, belonging to the technical field of bicycle. The integral bicycle front fork vertical tube comprises a tubular main body formed by forging, the tubular main body has a front section with a large wall thickness and a back section with a small wall thickness, and a bearing seat is arranged at the outer side of the front section. The integral bicycle front fork vertical tube provided by the utility model is integrally formed by forging, has simple structure, high strength and good safety, and is convenient and rapid in manufacturing.

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DESCRIPTION CN202557710

The utility model belongs to the technical field of bicycles and provides an integrated bicycle front fork riser. The one-piece bicycle front fork riser includes a forged tubular body having a front wall having a relatively large wall thickness and a rear wall having a smaller wall thickness. A bearing seat is provided on the outer side of the front section. According to the integrated bicycle front fork riser of the utility model, the integral forging type is simple, the structure is simple, the manufacture is convenient, the strength is high, and the safety is good.

One-piece bicycle fork riser

Technical field

The utility model relates to a bicycle fork riser, in particular to an integrated bicycle front fork riser.

Background technique

Referring to Fig. 2, an existing bicycle front fork riser includes a standpipe 10' and a sleeve 20' sleeved at one end thereof and connected to the bearing stand with the weld 30'. A front fork tube is welded to the bearing housing sleeve 20', the wheels are mounted on the front fork tube, and the other end of the standpipe 10' is mounted on the frame head tube. Because the sleeve is to be welded with the standpipe after being pressed at the bottom end,

the assembly process is complicated, and the welding often occurs because the welding is not firm, and the accident occurs when the bicycle is detached during riding. On the other hand, its complex structure also increases manufacturing costs and material costs, raises its selling price, and reduces the bicycle manufacturer's market competitiveness.

Utility model content

The purpose of the utility model is to solve the above problems and provide an integrated bicycle front fork riser with a simple and firm structure.

To achieve the above purpose, the technical solution adopted by the utility model is as follows:

An integral bicycle front fork riser includes a forged tubular body having a front wall with a larger wall thickness and a rear wall with a smaller wall thickness. A bearing seat is provided on the outside of the front section.

The wall thickness gradually decreases from the end of the front section.

The utility model has the beneficial effects of integrated type forging, simple structure, convenient and rapid manufacture, high strength and good safety.

Description of the drawings

FIG. 1 is a sectional view of an integrated bicycle front fork riser according to a preferred embodiment of the present invention.

FIG. 2 is a sectional view of a bicycle front fork riser of the prior art.

detailed description

The following further describes the specific implementation of the present invention with reference to the

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accompanying drawings:

Referring to FIG. 1, an integrated bicycle front fork riser includes a wrought tubular body 10. The tubular body 10 has a front section 11 with a large wall thickness and a rear section 12 with a small wall thickness. The wall thickness of the front section 11 is gradually reduced to meet the strength requirements of the connection location. The bearing seat 13 is provided outside the front section 11 and is integrally formed with the tubular body forging.

The above content is a further detailed description of the present invention in combination with specific preferred embodiments, and it cannot be assumed that the specific implementation of the present invention is limited to these descriptions. For a person of ordinary skill in the art to which the present invention belongs, it is to be understood that various changes or modifications may be made within the scope of the present invention without departing from the spirit of the present invention.

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CLAIMS CN202557710

1.

An integrated bicycle front fork riser is characterized in that it comprises a forging-type tubular body having a front section with a larger wall thickness and a rear section with a smaller wall thickness, and a bearing seat is provided on the outside of the front section.

2.

The integrated bicycle front fork riser according to claim 1, wherein the wall thickness of the front section gradually decreases from the end.□

(19)中华人民共和国国家知识产权局

(12)实用新型专利

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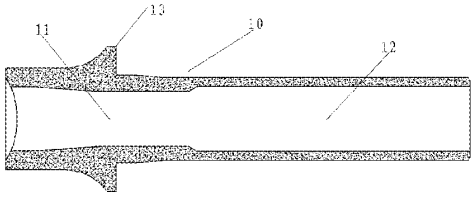
权利要求书 1 页 说明书 1 页 附图 1 页

(54)实用新型名称

一体式自行车前叉立管

(57)摘要

本实用新型属于自行车技术领域，提供一种一体式自行车前叉立管。这种一体式自行车前叉立管，包括锻造成型的管状本体，具有壁厚度较大的前段及壁厚度较小的后段，前段外侧设有轴承座。根据本实用新型的一体式自行车前叉立管，一体式锻造成型，结构简单，制造方便快捷，强度高，安全性好。



CN 202557710 U

1. 一种一体式自行车前叉立管，其特征在于：包括锻造成型的管状本体，具有壁厚度较大的前段及壁厚度较小的后段，前段外侧设有轴承座。

2. 根据权利要求 1 所述一体式自行车前叉立管，其特征在于：所述前段自端部开始壁厚度逐渐减小。

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一体式自行车前叉立管

技术领域

[0001] 本实用新型涉及自行车前叉立管，尤其是一种一体式自行车前叉立管。

背景技术

[0002] 参见图 2，一种现有自行车前叉立管，包括一竖管 10’及套在其一端并与之由焊接部 30’连接轴承座的套管 20’。轴承座套管 20’上焊接前叉管，车轮则安装于前叉管之上，竖管 10’的另一端供安装车架头管上。因套管要与竖管压合后在底端部焊接，因此装配过程复杂，而且焊接也常出现焊接不牢，以至在骑行过程中脱落而出现事故。另一方面，其复杂的结构也增加了制造成本及材料成本，抬高了其售价，降低了自行车制造商的市场竞争力。

实用新型内容

[0003] 本实用新型的目的是解决上述问题，提供一种结构简单而牢固的一体式自行车前叉立管。

[0004] 为实现上述目的，本实用新型所采取的技术方案如下：

[0005] 一种一体式自行车前叉立管，包括锻造成型的管状本体，具有壁厚度较大的前段及壁厚度较小的后段，前段外侧设有轴承座。

[0006] 所述前段自端部开始壁厚度逐渐减小。

[0007] 本实用新型的有益效果：一体式锻造成型，结构简单，制造方便快捷，强度高，安全性好。

附图说明

[0008] 图 1 为根据本实用新型一种优选实施例的一体式自行车前叉立管的剖视图。

[0009] 图 2 为现有技术的自行车前叉立管的剖视图。

具体实施方式

[0010] 下面结合附图对本实用新型的具体实施方式做进一步说明：

[0011] 参见图 1，一种一体式自行车前叉立管，包括锻造成型的管状本体 10。管状本体 10 具有壁厚度较大的前段 11 及壁厚度较小的后段 12。前段 11 壁厚度逐渐减小，以适应连接位置的强度要求。轴承座 13 设在前段 11 外侧，与管状本体锻造一体成型。

[0012] 以上内容是结合具体的优选实施方式对本实用新型所作的进一步详细说明，不能认定本实用新型的具体实施只局限于这些说明。对于本实用新型所属技术领域的普通技术人员来说，在不脱离本实用新型构思的前提下，做出具体的改变或变化均属于本实用新型的保护范围。

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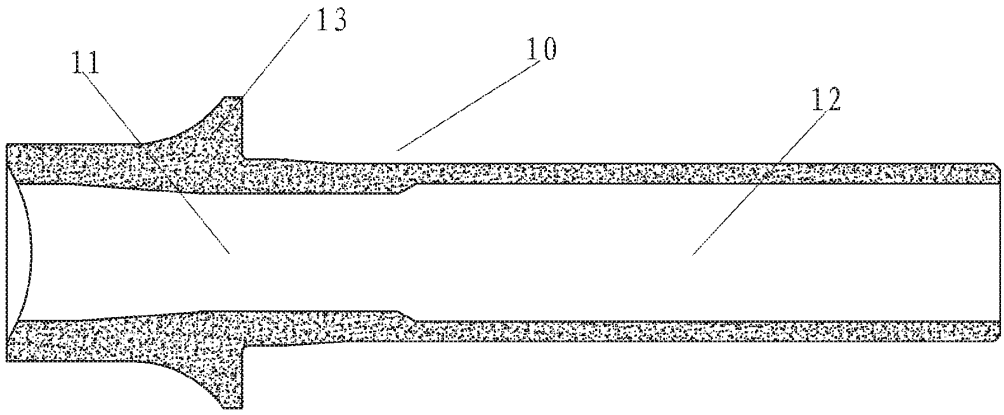


图 1

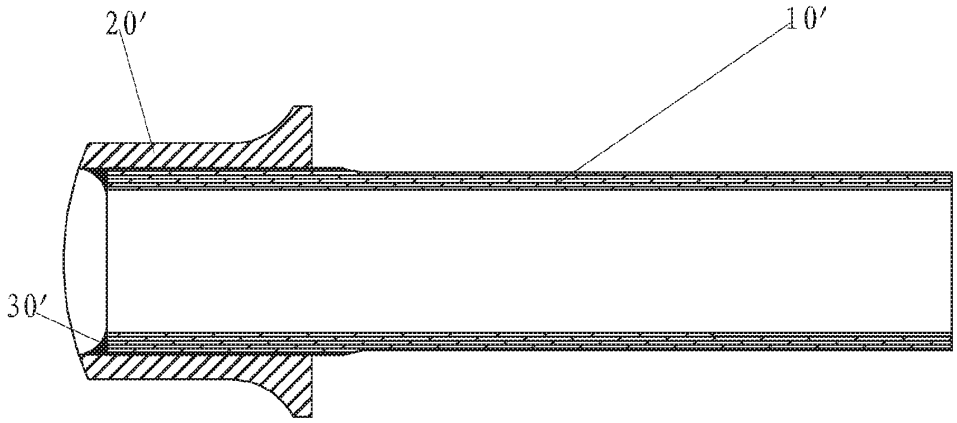


图 2

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ABSTRACT EP2930094

Fork component (1) for an at least partially muscle-operated vehicle and in particular a bicycle (100) with a shaft tube unit (3) made of fiber composite material (2). The shaft tube unit (3) comprises a shaft tube (4) and a fork crown (5), which are formed as two separate and positively connected to each other to the shaft tube unit (3) parts.

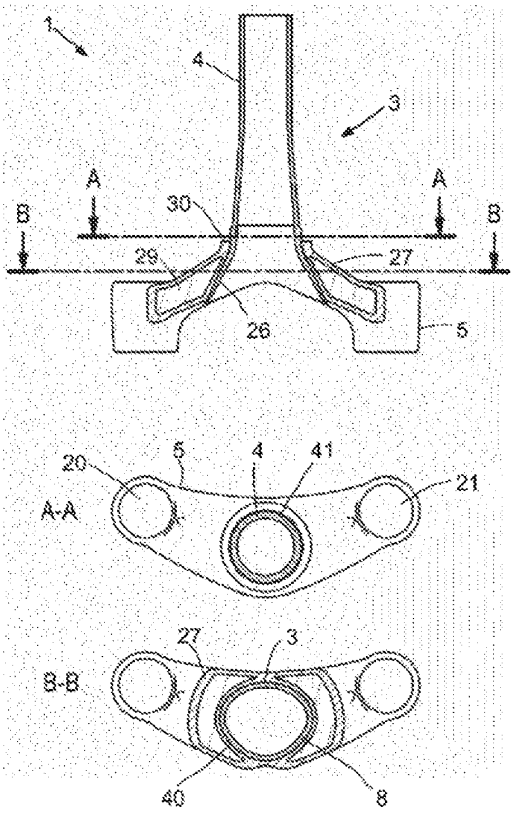


Fig. 7

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DESCRIPTION EP2930094

[0001]

The present invention relates to a fork component for an at least partially human-powered vehicle, and more particularly to a bicycle. Even and especially with bicycles is trying to reduce the weight of the entire bike and the individual components more and more to improve the agility and the acceleration behavior when driving.

[0002]

From the prior art forks have become known for bicycles, which consist of steel. Such forks are reliable in themselves, but have a high weight. Therefore, forks have become known, made of aluminum or Aluminum alloys exist to save weight. Such aluminum forks typically have two fork legs to receive the front wheel on the dropouts of the fork. The fork legs can be held in a separate fork crown. Between the fork legs, a shaft tube is attached to the fork crown, which is rotatably received on the head tube of the bicycle frame and serves to transmit the steering movements of the handlebar to the fork and thus the front wheel.

[0003]

The use of aluminum as a material for the production of bicycle forks has already allowed the weight to be significantly reduced. Forks made of steel or aluminum consist of several components that are pressed together or clamped together, so that the forces are transmitted reliably. In order to ensure the transmission of the necessary forces, larger wall thicknesses must be used at the connection points, which not only intercept the normal load occurring during operation, but also provide sufficient clamping forces at all times. This leads to a still increased weight despite the light materials used.

[0004]

For further weight savings, it has therefore become known to produce forks made of fiber composite material. Thus, one-piece bicycle forks made of fiber composite material have become known, which allow a particularly low weight. In addition, through the one-piece production, an optimization of the fabric layers, so that only there fiber fabric is used, where it is needed from the stability ago, which further reduces the weight.

[0005]

However, it has been found that in the manual manufacturing processes used, inaccuracies in the positioning of the fiber mats or prepregs used can occur, so that more layers must be used than would theoretically be required by the stability.

[0006]

It is therefore the object of the present invention to provide a fork component for at least partially muscle-operated bicycles, with which a low total weight is made possible with a high stability.

[0007]

This object is achieved by a fork component with the features of claim 1. Preferred developments of the invention are subject of the dependent claims. Further advantages and features of the present invention will become apparent from the general description and the description of the

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embodiments.

[0008]

A fork component according to the invention for an at least partially muscle-operated vehicle and in particular a bicycle comprises a shaft tube unit consisting at least partially of fiber composite material. The shaft tube unit comprises a shaft tube and a fork crown, which are formed as two separate and positively connected to one another to a shaft tube unit parts.

[0009]

The fork component according to the invention has considerable advantages. Characterized in that the shaft tube and the fork crown are connected to each other and that the shaft tube is received positively on the fork crown, a particularly lightweight construction method can be selected. The stem tube unit formed from two parts can be made easier and cheaper. In addition, the manufacturing process in both the production of the shaft tube and in the production of the fork crown can be designed so that a displacement or movement of the fabric layers used is practically impossible. As a result, the number of fabric layers used to produce the individual components can be reduced, so that overall a particularly lightweight shaft tube unit and thus fork component can be made available. Such a shaft tube unit is lighter and more stable than in a conventional one-piece manufacturing method.

[0010]

At the same time, because the fork crown and the shaft tube are positively connected to one another, it is achieved that the pressing pressure acting between the shaft tube and the fork crown can be considerably reduced, since a positive connection is produced between the two parts which are initially manufactured separately.

[0011]

Overall, a significantly lighter and at the same time even more stable fork component can be made available.

[0012]

In a preferred embodiment, the shaft tube and the fork crown are connected to one another in a manner secure against rotation on a receiving section of the fork crown. In a simple case, the receiving portion of the fork crown may have a negative shape of a receiving region of the shaft tube.

[0013]

The fork crown and the shaft tube are connected to each other in particular via a positive reception.

[0014]

In advantageous developments, the shaft tube has a non-circular outer cross-section in a receiving region. The receiving region of the shaft tube is in particular intended to cooperate with the receiving portion of the fork crown. A non-circular outer cross section of the shaft tube can basically be arbitrarily shaped. Preferred is an oval or an elongated or a polygonal shape, wherein the individual corners can also be rounded.

[0015]

In preferred developments, the shaft tube has a polygonal outer cross section at the receiving region. For example, a triangular, quadrangular, pentagonal, hexagonal or octagonal outer cross section is possible. Such embodiments are also particularly suitable when the fork component is not to be made of a fiber composite material, but of metal. The applicant reserves the right to claim such a fork component, which comprises a shaft tube unit, wherein the shaft tube unit comprises a shaft tube and a fork crown, and wherein the shaft tube and the fork crown are formed as two separate parts which are connected to the shaft tube unit and wherein Shaft tube is positively received on the fork crown. In such an embodiment, the shaft tube unit and the fork component altogether at least substantially also made of metal and in particular also consist of a light metal.

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[0016]

In all embodiments, it is possible that the shaft tube is designed to be divergent in the receiving area in the axial direction. By "axial direction" is meant a longitudinal direction along the axial extent of the shaft tube.

[0017]

The shaft tube may be configured conically on the receiving area in the axial direction, so that the shaft tube z. B. flared towards the lower end. The lower end of the shaft tube is that end which is located in the normal intended use of the fork component below.

[0018]

In advantageous developments, the shaft tube on the receiving region and the fork crown on the receiving portion cooperating with each other threaded portions. For example, it is possible that the shaft tube is screwed to the fork crown. For this purpose, a coarse thread is preferably used, in which the distance between two threads is preferably greater than a wall thickness of the shaft tube. Such a thread can also be formed by the fiber composite material.

[0019]

In particular, the threaded portions are conical. Preferably, an outer diameter of one turn is smaller than an inner diameter of another turn. In particular, an outer diameter of a turn is smaller than an inner diameter of a winding after next.

[0020]

In preferred embodiments, it is possible to introduce the receiving portion and the receiving area into each other, so that there is a tight fit of the shaft tube to the fork crown with only one or two turns or even half a turn.

[0021]

In all cases, the fork crown preferably extends transversely to the shaft tube and has at least one and in particular two fork leg receptacles or stand pipe receptacles. If two fork leg receptacles are provided, the shaft tube is arranged in particular centrally between the two fork leg recordings.

[0022]

In advantageous developments, the shaft tube above the fork crown comprises a stiffening section. In particular, the stiffening section has a higher rigidity in a longitudinal direction transversely to the extension of the fork crown. This means that preferably the shaft tube has a higher rigidity in the direction of travel of a bicycle equipped with such a fork component. Since higher forces generally occur in this direction during operation than transversely thereto, the overall weight of the fork component can be optimized and reduced.

[0023]

It is possible for us that the stiffening section has an oval or oblong cross section in the direction of travel.

[0024]

In preferred embodiments, the shaft tube and / or the fork crown has a wall or Walls of a fiber composite material.

[0025]

It is possible that the shaft tube and / or the fork crown has at least one core made of a lighter material. In particular, the fork crown has one or more cores arranged in the interior of the fork crown, which are covered or surrounded by fiber fabric layers before production.

[0026]

It is possible that the core is made of a foam material or the like. It is also possible that the core consists of a gas-filled container. As a result, the weight can be reduced and there is only material available where it is needed.

[0027]

In all embodiments, the fork crown may have a bearing seat on which, for example, a metallic ring or the like is embedded in the fork crown.

[0028]

Preferably, a sleeve-shaped extension extends axially upwardly within the bearing seat. The sleeve-shaped extension increases the contact surface between the fork crown and the shaft tube, so that a larger adhesive surface and also a higher rigidity of the connection and thus the stem tube unit is achieved.

[0029]

In all cases, it is possible and preferred that the shaft tube and the fork crown are initially formed as two separate parts, which are then glued together at an adhesive receptacle to the shaft tube unit. At least one guide section and at least one adhesive section can be provided on the adhesive receptacle.

[0030]

It is possible that the shaft tube and / or the fork crown are configured conically on the adhesive receptacle. In particular, the outer region of the shaft tube and the inner region of the fork crown are each slightly tapered at the adhesive receptacle. In particular, an approximately cone-shaped

shaft tube is present on the fork crown. A slightly conical adhesive receptacle is to be understood here as an adhesive receptacle which has a small taper at an angle of less than 10 ° to the longitudinal axis of the shaft tube. An angle of conicity is preferably less than 5 ° and in particular between 1 ° and 4 °.

[0031]

Preferably, at least one inwardly projecting protrusion is formed on at least one standpipe receiving. In particular, a maximum radial extent is less than 1% of the diameter of the standpipe receiving. The radial extent of the projection is preferably less than 0.5 mm and in particular greater than 0.05 mm. Preferably, a maximum radial extent is between 0.1 and 0.2 mm, preferably 0.15 mm.

[0032]

In all embodiments, it is particularly preferred that the walls of the shaft tube unit and / or the fork crown at least partially consist of several layers of cured and resinated fibers, fiber bundles or fiber fabric mats. In this case, the threads of the fiber material can be fixed individually or in bundles via separate transverse threads in their relative position to each other. Preferably, the plurality of plies or at least two plies of fibrous tissue mats are needled or sewn together prior to loading into the mold. In particular, at least two layers of fibrous tissue mats are connected to one another in a planar manner. It is possible that the multiple layers of individual fibers are needled together at many separate locations. It is also possible to sew or glue the fibers or entire fabric mats together before the fiber structures are inserted into the production mold.

[0033]

It is possible and preferred that prepregs be used. Particularly preferred is the use of dry fiber fabric mats or Fiber layers that are not subject to aging and can be handled easily. Subsequently, matrix material in the form of resin or the like is injected into the mold or drawn in, for example by vacuum, in order to completely impregnate the fibers in the mold with the resin as matrix material.

[0034]

Preferably, single fibers or fibers connected to strings or the like are used for manufacture. A layer of very thin and light fabric is used as the base layer. Then the fibers are laid as desired and fixed in each case on the substrate. By suitable and in particular robotic laying the dry fibers are arranged as desired. In each case, the desired fiber thickness is set locally. The fibers can be positioned and laid according to the expected load. The protruding parts of the base layer are cut off before being placed in the mold.

[0035]

In another embodiment, a fork component for at least partially muscle-powered vehicles and in particular two-wheeled a shaft tube and a fork crown. The shaft tube and the fork crown are formed as two separate parts, which are glued to each other at a Klebeaufnahme to a shaft tube unit. In particular, a guide section and at least one adhesive section are provided in the adhesive receptacle. In the guide section, the two components, namely the shaft tube and the fork crown are preferably completely or essentially completely against one another. In the at least one adhesive portion there is a small and defined gap between the shaft tube and the fork crown, which is filled with the adhesive in order to achieve an optimal adhesive result. It is possible and preferred that in each case an adhesive section is provided on both sides of a guide section. It is also possible that a plurality of guide sections and correspondingly also a plurality of adhesive sections are provided.

[0036]

A slight conicity of the components glued together facilitates assembly, since during insertion of the shaft tube into the fork crown, the applied adhesive is not stripped off the adhesive portion.

[0037]

The applicant reserves the right to claim a fork component or shaft tube unit for at least partially muscle-operated vehicles and in particular bicycles, in which the shaft tube unit comprises a shaft tube and a fork crown. The shaft tube and the fork crown are formed as two separate parts, which are connected to a unit or the shaft tube unit. The shaft tube is positively received on the fork crown.

[0038]

Further advantages and features of the present invention will become apparent from the description of the embodiment, which is explained below with reference to the accompanying figures.

[0039]

1 shows a schematic view of a mountain bike equipped with a fork component according to the invention; 2 shows a fork component according to the invention in a perspective view; Fig. 3: the fork component of Figure 2 in section and a schematic representation of several fiber or fabric layers. 4 shows the shaft tube of the fork component from FIG. 3 in a perspective illustration; 5 shows a section through the shaft tube and the fork crown; FIG. 5a is a bottom view of the fork component of FIG. 3; FIG. Fig. 5b: the cross-section A-A of Fig. 5a; Fig. 5c: the enlarged detail "Y" of Fig. 5a; 6 shows a schematic front view of a further embodiment of the fork component according to the invention and three associated sections; 7 shows a further fork component according to the invention in section and two cross-sections perpendicular thereto; 8 shows a schematic cross section through an inventive fork component with enlarged details.

9 shows another fork component according to the invention in section; FIG. 10 shows the shaft tube from FIG. 9 in a perspective illustration; and FIG. 11 shows a schematic view of a racing bike equipped with a fork component according to the invention;

[0040]

With reference to the attached Figures 1 to 11 embodiments of the invention will be explained below.

[0041]

FIG. 1 shows a schematic representation of a mountain bike as a bicycle 100. The bicycle 100 is equipped with a front wheel 101 and a rear wheel 102. The bicycle 100 has a frame 103, a fork

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104, a handlebar 106 and a saddle 107. On the front wheel 101 and the rear wheel 102, a plurality of spokes 109 is provided in each case. The rim 110 is connected to the central hub via the spokes 109. At the front wheel 101, a radial sliding is provided here, while at the rear wheel 102, the spokes are arranged at least partially tangentially on the hub in order to enable the transmission of torque. The front wheel is held sprung on a fork 104 designed as a fork, while a damper 105 is available for the damping of the rear wheel. A disc brake 111 is for braking.

[0042]

The suspension fork 104 comprises a shaft tube unit 3 as a fork component 1. At the fork component 1 standpipes 20, 21 are attached. The standpipes movably cooperate with dip tubes of a dip tube unit 45 which damp the movement of the fork.

[0043]

FIG. 2 shows a perspective schematic representation of the fork component 1 according to the invention. At the fork component 1 standpipes 20 and 21 are fixed, which cooperate with movable dip tubes, so that a complete suspension fork 104 is formed, which can be used for example on the bicycle of Figure 1.

[0044]

It can be seen that the stiffening section 22 has a greater dimension in the longitudinal direction 23 than in the transverse direction 24 in order to increase the rigidity there in a targeted manner.

[0045]

The shaft tube unit 3 here consists essentially and practically completely of at least one fiber composite material 2. It is possible that a few metal parts or the like may be incorporated, for example, on the bearing seat 30, or may be attached there later. Otherwise, the fork component 1 consists of fiber composite material or fiber composite materials.

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[0046]

The shaft tube unit 3 consists of two initially separately manufactured parts 4 and 5. The part 4 is formed as a shaft tube 4 and the part 5 is designed as a kind of fork crown 5, on which the shaft tube 4 is firmly secured against rotation and also in the axial direction 11.

[0047]

FIG. 3 shows a cross section through the fork component 1 according to FIG. 2, which comprises or consists of a shaft tube unit 3.

[0048]

Here, the shaft tube 4 is positively secured to the fork crown 5, so that not only a non-positive, but also a positive connection is present. Furthermore, the shaft tube 4 and the fork crown 5 are glued together on the adhesive receptacle 32. At the adhesive receptacle 32, the shaft tube 4 on a receiving portion 6, which cooperates with the receiving portion 7 of the fork crown.

[0049]

In order to increase the adhesive effect and the rigidity of the shaft tube unit 3, a sleeve-shaped extension 31 is provided on the fork crown 5, which extends from the bearing seat 30 upwards. This means that in normal intended use, the sleeve-shaped extension 31 extends from the bearing seat upwards in the direction of the handlebar. Through the sleeve-shaped extension 31, the contact and contact surface between the shaft tube 4 and the fork crown 5 is considerably increased.

[0050]

In the middle region between 6 and 7, a shoulder 42 is provided in particular for the axial securing of the shaft tube 4 in the crown in order to allow a firm fit even with permanently changing load.

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[0051]

Because the shaft tube unit 3 consists of two parts 4, 5 initially manufactured separately, each part, namely the shaft tube 4 and the fork crown 5, can be made simpler and more reproducible. The fiber fabric mats or Fiber layers 38 of the fiber composite material 2 can thus be positioned for ideal strength of the respective component. The fact that the shaft tube 4 has a very simple geometric shape, the positioning of the fiber layers is correspondingly simple and can be repeated with high accuracy.

[0052]

If, however, a one-piece shaft tube unit is produced directly in a single production step, all walls 26 of the shaft tube 4 and all walls 27 of the fork crown 5 must be positioned and cured in a single production step. Since in the curing of fiber composites usually pressure is exerted on the fiber fabric layers to achieve the desired cure results, simple manufacturing forms are much more advantageous than complicated geometric shapes in which individual layers or fibers can slip during curing, so that a particularly good reproducible production not or only with extremely great effort is possible.

[0053]

It has now been found that inflatable hoses z. B. inside an internal pressure is generated, which can cause a total slipping of the fiber layers during curing and thus uncontrolled changes in static properties due to the flexible wall or the flexibility of the hose. Nevertheless, in order to be able to ensure sufficient rigidity and strength of the component, the number of fiber fabric layers used in the transitional parts has hitherto been increased in one-piece production in practice. As a result, the desired strength could be ensured even with a certain uncontrolled shift of the fibers during curing.

[0054]

In contrast, the present invention has the advantage that two relatively simple components are prefabricated, which can be easily and accurately made. After assembly and bonding of the two

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parts 4 and 5, a reproducible manufacturable stem tube unit 3 is provided, which reliably withstands the high and highest loads by the positive connection of the shaft tube 4 with the fork crown 5. Front forks of a bicycle are safety-relevant parts, as in a fraction of the same a high risk of accidents with possibly serious consequences of an accident exists, which is why special care must be taken to high manufacturing consistency.

[0055]

The present invention enables a reproducible and cost-effective production of fork components 1, in which additionally the total weight can be reduced, since only the strength required for the number of fiber layers 38 is used on the shaft tube 4 and the fork crown 5.

[0056]

In this case, shaft tube units 3 for suspension forks 104 can be produced very stably and yet easily. Such shaft tube units 3 usually have fork crowns 5 with a very high width 44. The width 44 must be so large that the used for mountain bikes wide (profile) tires 112 (see. Fig. 1) between the legs of the fork. Also, there must still remain a sufficient safety distance for adhering dirt etc. between the tire and the stanchions, so that a grinding of the tire on the fork or even a blockage of the front wheel is prevented. Especially with suspension forks, the area of the fork crown 5 therefore has a large transverse extent. The width 44 is preferably at least four times as large and in particular at least five times as large as the diameter of the fork leg receptacles 18 or 19. Due to the large width, a one-piece production is considerably more difficult because the fiber courses have two bends of about 90 °.

This considerably increases the problem of shifting fibers or fiber layers in the mold.

[0057]

The shaft tube unit 3 may have, in a middle height range, a stiffening portion 22 which has a higher flexural rigidity in the longitudinal direction 23 than in the transverse direction 24. The longitudinal direction 23 corresponds to a normal straight ahead driving the direction of the bicycle. The stiffening section 22 thus has a higher rigidity in the longitudinal direction 23 than in the transversely provided transverse direction 24, so that the flexural rigidity about an axis parallel to

the axis 24 on the stiffening section 22 is increased.

[0058]

The shaft tube 4 is received here centrally on the fork crown 5 on the receiving portion 6. The fork crown extends substantially horizontally and transversely to the shaft tube 4 in the transverse direction 24. At the fork crown 5 at least one fork leg receptacle for receiving a fork leg is provided. It is also possible that one or two fork legs are made in one piece with the fork crown. Preferably, two separate fork legs 20 and 21 (see. FIG. 3) on fork leg receptacles 18 and 19.

[0059]

In order to save material and thereby weight 5 cavities are provided in the fork crown, which are filled with cores 28. A core 28 may in particular consist of a foam material 29. It is also possible for gas-filled containers to be used as core 28. Such a container may for example have a wall made of a hose material.

[0060]

In addition, FIG. 3 also shows a schematic illustration of a fiber composite material 2, which consists of a plurality of layers 38 of fiber fabric. The individual fiber layers 38 are needled together prior to insertion into the mold or fixed by seams 39 relative to each other. This ensures that there is no displacement of the fiber layers 38 relative to one another in the mold. As a result, the reproducibility can be significantly increased, so that the total weight can be further reduced by an optimal placement of the individual fiber layers.

[0061]

4 shows a perspective view of the lower end of the shaft tube 4 is shown. In the lower area approximately in the middle of the height of the fork crown, a shoulder 42 is provided, which reliably prevents it from being pulled out of the fork crown 5. The non-circular cross-section 8 results from the nose 10th The nose 10 extends radially outward here and causes a positive connection with the fork crown 5, so that a rotationally fixed connection of the shaft tube 4 is

present with the correspondingly configured fork crown 5.

[0062]

Furthermore, the adhesive portions 32 and the guide portions 33 can be seen. It is also the non-circular cross section at the stiffening portion 22 can be seen.

[0063]

5 shows a schematic cross section through the fork component 1. Clearly recognizable is the nose 10, which projects radially from the shaft tube 4 and provides an anti-rotation device.

[0064]

In Fig. 5a is a view of the fork component 1 is shown from below, with essentially the fork crown 5 can be seen with the tube supports 18 and 19. Central is the shaft tube 4 firmly connected. The different stepped diameters of the downwardly expanding shaft tube are recognizable.

[0065]

FIG. 5b shows the cross-section A-A from FIG. 5a through the standpipe receptacle 19, which in this respect is constructed analogously to the standpipe receptacle 18. In the interior of the stand pipe receptacles preferably four projections 46 distributed symmetrically over the circumference each extend over a circumferential width of approximately 1 mm to 3 mm, preferably approximately 2 mm +/- 10%. The projections 46 are here preferably aligned approximately parallel to the axial direction 11 and extend over a length 48, which is preferably more than half and in particular more than 2/3 of the axial length of a stand pipe receiving 18, 19. The axial length is here about 38 mm and thus about 5 to 7 mm less than an axial length of a stand pipe receiving 18, 19.

[0066]

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In Fig. 5c, the detail "Y" of Fig. 5a is shown, in which a plan view of the projection 46 can be seen. The projection 46 is rounded in a horizontal cross section and has a radial extension 47 inwardly of between about 0.1 mm and 0.2 mm and in particular 0.15 mm.

[0067]

The projections 46 are used in the bonding of the uprights with the fork crown 5 for the defined provision of an adhesive gap, so that an optimal adhesive effect is achieved.

[0068]

5d shows a cross section through the fork component 1 with the shaft tube 4 widening downwards. In the longitudinal direction 23 and the wall thickness of the shaft tube is down towards stronger. In the lowermost region on the fork crown 5, the wall thickness of the shaft tube 4 in the longitudinal direction 23 may be twice as large as at the upper or free end of the shaft tube 4th The wall thickness difference in the longitudinal direction 23 can also be larger. This achieves greater rigidity in the desired dimension.

[0069]

In the transverse direction 24, however, the wall thickness of the shaft tube 4 changes less or even not at all.

[0070]

FIG. 6 shows another exemplary embodiment of a fork component 1 according to the invention, which comprises a shaft tube unit 3 with a shaft tube 4 and a fork crown 5. In addition, dashed tubes 20 and 21 are shown which are connected to fork leg receptacles or Stand pipes receptacles 18 and 19 are attached.

[0071]

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The section A-A shows a substantially round cross-section of the shaft tube 4 there.

[0072]

The cross section B-B at the level of the stiffening portion 22 shows a slightly oval cross-section of the shaft tube 4, which has a greater extension in the longitudinal direction 23.

[0073]

The cross section C-C shows the in the region of the lower bearing seat substantially again round outer cross-section of the unit. 1

[0074]

By the positive connection ensures that the shaft tube 4 can not rotate relative to the fork crown 5 during operation, whereby the risk of accidents is significantly reduced. By the single part production of the shaft tube 4 and the fork crown 5 and the subsequent connection of the two parts to the shaft tube unit 3, the individual wall thicknesses 26 and 27 can be ideally adapted, so that overall high stability is achieved with less weight.

[0075]

The section D-D is already shown in FIG. 5 in principle. Due to the non-circular contour of the shaft tube 4 with the outwardly projecting nose 10 and the corresponding recess in the fork crown 5, a rotationally fixed connection of the shaft tube unit 3 is ensured.

[0076]

Figure 7 shows yet another embodiment of a fork component 1 according to the invention, which is

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designed as a shaft tube unit 3. The shaft tube 4 is executed in the receiving portion 6 here downwards diverging. As a result, a higher connection and adhesive surface between the shaft tube 4 and the fork crown 5 is made possible.

[0077]

Furthermore, in the receiving portion 6, a non-circular cross-section 8 of the shaft tube 4 before, wherein the shaft tube 4 in the region of the non-circular cross-section 8 has a greater extent in the transverse direction 24 than in the longitudinal direction 23.

[0078]

As before, the fork crown 5 may have cavities, each with a core or with a plurality of cores 28 of z. B. a foam material 29 are filled. The cores 28 may be removed after completion. But it is also possible that the cores from z. B. foam material 29 remain permanently in the shaft tube unit 3. The shaft tube unit 3 or the shaft tube 4 can have a round cross section 41 in the region of the bearing seat 30. In the region of the receiving portion 6 and the receiving area 7 are adapted cross sections of the shaft tube 4 and the fork crown 5, which, as the cross section B-B shows, are made out of round.

[0079]

FIG. 8 shows possible details of the preceding exemplary embodiments of the fork component 1, comprising a shaft tube unit 3 with a shaft tube 4 and a fork crown 5. In particular, the details A and B of FIG. 8 also show the enlarged configurations of receiving section 6 and of the receiving region 7 of the fork component from FIG. 3 or also FIG. 6 or FIG. 7 .

[0080]

As the enlarged detail A shows, a first adhesive receptacle 32 is provided in the upper area of the receiving portion 6 or the receiving area 7, which comprises a guide portion 33 and two adhesive portions 34 and 35 which extend above and below the guide portion 33. At the guide portion 33, the components 4, 5 are preferably directly to each other. In the areas of the adhesive portions 34

and 35, a small and defined gap is provided, which is filled with adhesive and provides for a particularly reliable adhesion to the adhesive receptacle 32. The gap width is in particular smaller than a wall thickness of the shaft tube 4 and is preferably between 10 .mu.m and 500 .mu.m and is in particular smaller than 250 .mu.m.

[0081]

Analogous to the upper adhesive receptacle 32, a lower adhesive receptacle 32 is provided, which is shown enlarged by the detail "B". The lower adhesive receptacle 32 has a guide portion 33 and adjoining thereto adhesive portions 34 and 35. At the adhesive portions 34 and 35, in turn, a defined gap is present, which is filled with adhesive and ensures a reliable bonding of the two components.

[0082]

In order to ensure insertion of the shaft tube 4 into the fork crown 5 such that no adhesive is stripped off the adhesive sections 34, 35, the adhesive receptacles 32 are preferably made slightly conical. An angle 37 between a central axis of the shaft tube 4 and the fork crown 5 and the contact surfaces on the guide portions 33 and the adhesive portions 34, 35 is preferably between 0 ° and 10 ° and in particular between 1 ° and 5 ° and more preferably at about 2 to 3 °.

[0083]

Also in this embodiment, it is possible that in the region of the adhesive receptacle 32 at least one non-circular outer cross-section 8 is present to a positive connection of the shaft tube 4 and the fork crown 5 z. B. to ensure outwardly projecting lugs.

[0084]

FIG. 9 shows a further exemplary embodiment of a fork component 1 according to the invention, which in turn is designed here as a shaft tube unit 3. The one-piece shaft tube unit 3 consists of the shaft tube 4 and the fork crown 5, here in each case again made of fiber composite material g. Preferably, the same fiber composite material for both components 4, 5 is used.

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[0085]

In all embodiments, it is possible that the same fiber composite material for the components 4, 5 is used. But it is also possible that different fiber composites are used. In this case, partially or completely the same fiber material and different matrix materials and / or different fiber materials and the same matrix materials can be used.

[0086]

Also in the embodiment according to FIG. 9, the shaft tube 4 widens conically at the receiving section 6 downwards. At the receiving portion 6 and the receiving area 7, the components 4, 5 cooperating threaded portions 12, 13, so that on the shaft tube 4, an external thread 12 and in the fork crown 5, an internal thread 13 are provided. The threaded portions 12, 13 are arranged on a cone 9. In this case, the cone on such an angle that in particular directly adjacent turns of the thread have such different diameters that only half or a complete rotation of the shaft tube 4 is sufficient to after insertion of the shaft tube 4 in the fork crown 5 a tight fit of the shaft tube 4 to ensure the fork crown 5. As a result, a positive connection is also made, which can be protected by additional adhesive against accidental loosening.

[0087]

It is possible that the outer diameter 14 of one turn 15 has a smaller dimension than the inner diameter 16 of the next but one axially adjacent turn 17.

[0088]

Again, it is possible that cavities are provided in the fork crown, which may be filled with cores.

[0089]

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FIG. 10 shows a schematic perspective illustration of the threaded shaft tube 4.

[0090]

FIG. 11 shows a bicycle 100 designed as a touring or road bike, which is equipped with a front wheel 101 and a rear wheel 102. The bicycle has a frame 103, a fork 104, a handlebar 106 and a saddle 107. On the front wheel 101 and the rear wheel 102, a plurality of spokes 109 is provided in each case. The rim 110 is connected to the central hub via the spokes 109, respectively. At the front wheel 101, a radial sliding is provided here, while at the rear wheel 102, the spokes are arranged at least partially tangentially on the hub in order to enable the transmission of torque. The fork 104 includes a standpipe unit 3, as previously described. Even on a racing bike such a fork component 1 can be used. List of Reference Signs: 1 Fork component 33 Guide section 2 Fiber composite material 34 Adhesive section 3 Stem tube unit 35 Adhesive section 4 Shaft tube 36 Exterior 5 Fork crown 37 Angle 6 Sheave section of 5 38 Location , Fiber fabric mat 7 Pickup area of 4 39 Seam 8 Unround section 40 Unround section 9 Cone 41 Round section 10 Nose 42 Shoulder extension 11 Axial direction 12 Thread section to 4 43 <SEP > Base 13 Thread section to 5 44 Width 14 Outer diameter of 15 45 Lower tube unit 15 Turn 46 Projection 16 Inner diameter of 17 47 Extension 17 Winding 48 Length 18 Standpipe receiving 49 Length 19 Standpipe Pickup 100 Bike 20 Gab elbow 101 Front wheel 21 Leg 102 Rear wheel 22 Stiffener section 103 Frame 23 Longitudinal direction < SEP> 104 Fork, suspension fork 24 Transverse direction 105 Damper 25 Cross section of 22 106 Handlebar 26 Wall 107 Saddle 27 Wall 108 Hub 28 Core 109 Spokes 29 Foam Material < SEP> 110 Rim 30 Bearing seat 111 Disc brake 31 Sleeve-shaped extension 112 Tire 32 Adhesive pick-up <SEP > <September>

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CLAIMS EP2930094

1.

Fork component (1) for an at least partially muscle-operated vehicle and in particular bicycle (100) with a shaft tube unit (3) consisting at least partially of fiber composite material (2), characterized in that the shaft tube unit (3) comprises a shaft tube (4) and a fork crown (5), which are formed as two separate and positively connected to each other to a shaft tube unit (3) parts.

2.

Fork component (1) according to claim 1, wherein relative to the longitudinal axis (11), the shaft tube (4) and the fork crown (5) against rotation on a receiving portion (6) of the fork crown (5) are interconnected and wherein in particular the shaft tube (4) in a receiving area (7) has a non-circular and / or polygonal outer cross-section (8).

3.

Fork component (1) according to the preceding claim, wherein the shaft tube (4) at the receiving area (7) has at least one outwardly projecting lug (10).

4.

Fork component (1) according to one of the three preceding claims, wherein the shaft tube (4) on the receiving area (7) and the fork crown (5) on the receiving portion (6) adapted to each other cross sections.

5.

Fork component (1) according to one of the preceding claims, wherein the shaft tube (4) and the fork crown (5) of the shaft tube unit (3) in an axial direction (11) of the shaft tube (4) are positively connected to each other.

6.

Fork component (1) according to one of the preceding claims, wherein the shaft tube (4) on the receiving area (7) in the axial direction (11) is conical or divergent.

7.

Fork component (1) according to one of the preceding claims, wherein the shaft tube (4) on the receiving area (7) and the fork crown (5) on the receiving portion (6) cooperating threaded portions (12, 13) and wherein in particular the threaded portions (12 , 13) are conical, so that an outer diameter (14) of one turn (15) is smaller than an inner diameter (16) of another turn (17).

8.

Fork component (1) according to one of the preceding claims, wherein the fork crown (5) extends transversely to the shaft tube (4) and wherein the fork crown (5) has at least one fork leg receptacle (18, 19) and / or wherein the fork crown (5) comprises two fork leg receptacles (18, 19), between which the shaft tube (4) is received on the fork crown (5).

9.

Fork component (1) according to one of the preceding claims, wherein the shaft tube (4) above the fork crown (5) comprises a stiffening portion (22) having a higher rigidity in a longitudinal direction (23) transverse to the extension of the fork crown (5) and wherein the stiffening portion (22) has in particular an oval or oblong cross-section (25).

10.

Fork component (1) according to one of the preceding claims, wherein the shaft tube (4) and / or the fork crown (5) has a wall (26, 27) made of a fiber composite material (2) and at least one core (28) made of a lighter material.

11.

Fork component (1) according to one of the preceding claims, wherein on the shaft tube (4) is provided a shoulder-shaped extension and / or wherein on the fork crown (5) a bearing seat (30) is provided and wherein radially within the bearing seat (30) sleeve-shaped extension (31) extends axially upwards.

12.

Fork component (1) according to one of the preceding claims, wherein the shaft tube (4) and the fork crown (5) are formed as two separate parts, which are glued to each other at an adhesive receptacle (32) to the shaft tube unit (3), wherein at the adhesive receptacle (32) a guide portion (33) and at least one adhesive portion (34, 35) are provided and wherein in particular the shaft tube (4) and / or the fork crown (5) on the adhesive receptacle (32) are conical, and in particular at least partially the outer region (36) of the shaft tube (4) and the inner region (37) of the fork crown (5) are each slightly tapered on the adhesive receptacle (32) and wherein preferably an angle (37) of the taper is less than 5 ° and in particular between 1 ° and 4 °.

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13.

Fork component (1) according to one of the preceding claims, wherein at least one standpipe receiving means (18, 19) at least one inwardly projecting projection (46) is formed.

14.

A fork component (1) according to any one of the preceding claims, wherein the walls (26, 27) of the stem tube unit (3) consist, at least in part, of a plurality of layers (38) of cured and resinated fiber layers which are needlepunched or sewn together several layers (38) of the fibers are in particular connected to one another in a flat manner.

15.

Fork component (1) for at least partially muscle-operated vehicles and in particular two-wheeled vehicles (100) with a shaft tube (4) and a fork crown (5), characterized in that the shaft tube (4) and the fork crown (5) are formed as two separate parts, which are glued to a shaft tube unit (3) with each other, wherein on the adhesive receiving a guide portion and an adhesive portion are provided.

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(54) GABELKOMPONENTE FÜR EIN WENIGSTENS TEILWEISE MUSKELBETRIEBENES FAHRRAD

(57) Gabelkomponente (1) für ein wenigstens teilweise muskelbetriebenes Fahrzeug und insbesondere Fahrrad (100) mit einer aus Faserverbundwerkstoff (2) bestehenden Schaftrohreinheit (3). Die Schaftrohreinheit (3) umfasst ein Schaftrohr (4) und eine Gabelkrone (5), welche als zwei separate und formschlüssig miteinander zu der Schaftrohreinheit (3) verbundene Teile ausgebildet sind.

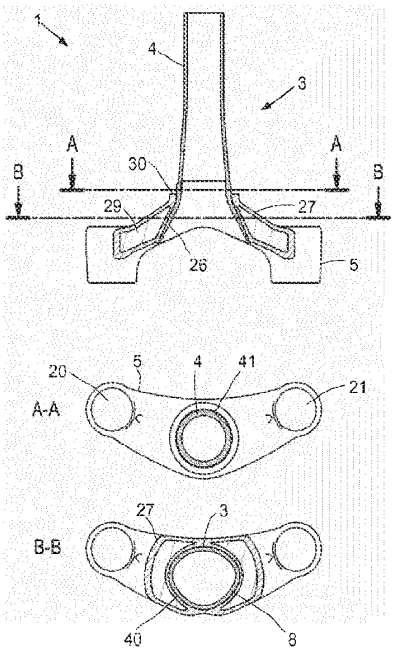


Fig. 7

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Beschreibung

[0001] Die vorliegende Erfindung betrifft eine Gabelkomponente für ein wenigstens teilweise muskelbetriebenes Fahrzeug und insbesondere ein Fahrrad. Auch und gerade bei Fahrrädern wird versucht, das Gewicht des gesamten Fahrrads und der einzelnen Bauteile immer weiter zu verringern, um die Agilität und das Beschleunigungsverhalten beim Fahren zu verbessern.

[0002] Aus dem Stand der Technik sind Gabeln für Fahrräder bekannt geworden, die aus Stahl bestehen. Solche Gabeln funktionieren an sich zuverlässig, weisen aber ein hohes Gewicht auf. Deshalb sind auch Gabeln bekannt geworden, die aus Aluminium bzw. Aluminiumlegierungen bestehen, um Gewicht einzusparen. Solche aus Aluminium bestehenden Gabeln weisen in der Regel zwei Gabelbeine auf, um an den Ausfallenden der Gabel das Vorderrad aufzunehmen. Die Gabelbeine können in einer separaten Gabelkrone gehalten werden. Zwischen den Gabelbeinen ist an der Gabelkrone ein Schaftrohr befestigt, welches drehbar an dem Steuerrohr des Fahrradrahmens aufgenommen ist und zur Übertragung der Lenkbewegungen von dem Lenker auf die Gabel und somit das Vorderrad dient.

[0003] Durch die Verwendung von Aluminium als Werkstoff zur Herstellung von Gabeln von Fahrrädern konnte das Gewicht bereits erheblich reduziert werden. Gabeln aus Stahl oder Aluminium bestehen aus mehreren Komponenten, die miteinander verpresst oder verklemmt werden, damit die auftretenden Kräfte zuverlässig übertragen werden. Um die Übertragung der nötigen Kräfte sicherzustellen, müssen an den Verbindungsstellen größere Wandstärken eingesetzt werden, die nicht nur die normale im Betrieb auftretende Belastung abfangen, sondern die auch jederzeit genügende Klemmkräfte zur Verfügung stellen. Das führt trotz der verwendeten leichten Materialien zu einem immer noch erhöhten Gewicht.

[0004] Zur weiteren Gewichtsersparung ist es deshalb bekannt geworden, Gabeln aus Faserverbundwerkstoff herzustellen. So sind einteilig gefertigte Fahrradgabeln aus Faserverbundwerkstoff bekannt geworden, die ein besonders geringes Gewicht ermöglichen. Außerdem kann durch die einteilige Fertigung eine Optimierung der Gewebelagen erfolgen, sodass nur dort Fasergewebe eingesetzt wird, wo es von der Stabilität her benötigt wird, was das Gewicht weiter reduziert.

[0005] Es hat sich aber herausgestellt, dass es bei den verwendeten manuellen Herstellprozessen zu Ungenauigkeiten bei der Positionierung der verwendeten Fasermatten oder Prepregs kommen kann, sodass doch mehr Lagen verwendet werden müssen als von der Stabilität theoretisch erforderlich wäre.

[0006] Es ist deshalb die Aufgabe der vorliegenden Erfindung, eine Gabelkomponente für wenigstens teilweise muskelbetriebene Fahrräder zur Verfügung zu stellen, mit der ein geringes Gesamtgewicht bei einer hohen Stabilität ermöglicht wird.

[0007] Diese Aufgabe wird durch eine Gabelkomponente mit den Merkmalen des Anspruchs 1 gelöst. Bevorzugte Weiterbildungen der Erfindung sind Gegenstand der Unteransprüche. Weitere Vorteile und Merkmale der vorliegenden Erfindung ergeben sich aus der allgemeinen Beschreibung und der Beschreibung der Ausführungsbeispiele.

[0008] Eine erfindungsgemäße Gabelkomponente für ein wenigstens teilweise muskelbetriebenes Fahrzeug und insbesondere Fahrrad umfasst eine wenigstens teilweise aus Faserverbundwerkstoff bestehende Schaftrohreinheit. Die Schaftrohreinheit umfasst ein Schaftrohr und eine Gabelkrone, welche als zwei separate und formschlüssig miteinander zu einer Schaftrohreinheit verbundene Teile ausgebildet sind.

[0009] Die erfindungsgemäße Gabelkomponente hat erhebliche Vorteile. Dadurch, dass das Schaftrohr und die Gabelkrone miteinander verbunden sind und dass das Schaftrohr an der Gabelkrone formschlüssig aufgenommen ist, kann eine besonders leichte Konstruktionsweise gewählt werden. Die aus zwei Einzelteilen gebildete Schaftrohreinheit kann einfacher und kostengünstiger hergestellt werden. Außerdem kann der Fertigungsprozess sowohl bei der Herstellung des Schaftrohrs als auch bei der Herstellung der Gabelkrone so ausgestaltet werden, dass eine Verschiebung oder Bewegung der verwendeten Gewebelagen praktisch ausgeschlossen ist. Dadurch kann die Anzahl der zur Herstellung der einzelnen Bauteile verwendeten Gewebelagen reduziert werden, sodass insgesamt eine besonders leichte Schaftrohreinheit und somit Gabelkomponente zur Verfügung gestellt werden kann. Eine solche Schaftrohreinheit ist leichter und stabiler als bei einer konventionellen einteiligen Fertigungsweise.

[0010] Gleichzeitig wird dadurch, dass die Gabelkrone und das Schaftrohr formschlüssig miteinander verbunden sind, es erzielt, dass der zwischen dem Schaftrohr und der Gabelkrone wirkende Pressdruck erheblich verringert werden kann, da eine formschlüssige Verbindung zwischen beiden zunächst separat gefertigten Teilen hergestellt wird.

[0011] Insgesamt kann eine deutliche leichtere und gleichzeitig sogar noch stabilere Gabelkomponente zur Verfügung gestellt werden.

[0012] In einer bevorzugten Weiterbildung sind das Schaftrohr und die Gabelkrone verdrehsicher an einem Aufnahmeabschnitt der Gabelkrone miteinander verbunden. In einem einfachen Fall kann der Aufnahmeabschnitt der Gabelkrone eine Negativform eines Aufnahmebereichs des Schaftrohres aufweisen.

[0013] Die Gabelkrone und das Schaftrohr sind insbesondere über eine formschlüssige Aufnahme miteinander verbunden.

[0014] In vorteilhaften Weiterbildungen weist das Schaftrohr in einem Aufnahmebereich einen unrunden Außenquer-

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schnitt auf. Der Aufnahmebereich des Schaftrohres ist insbesondere dafür vorgesehen, mit dem Aufnahmeabschnitt der Gabelkrone zusammenzuwirken. Ein unrunder Außenquerschnitt des Schaftrohres kann grundsätzlich beliebig geformt sein. Bevorzugt ist eine ovale oder eine längliche oder eine mehreckige Form, wobei die einzelnen Ecken auch abgerundet sein können.

[0015] In bevorzugten Weiterbildungen weist das Schaftrohr an dem Aufnahmebereich einen mehreckigen Außenquerschnitt auf. Möglich ist beispielsweise ein dreieckiger, viereckiger, fünfeckiger, sechseckiger oder achteckiger Außenquerschnitt. Derartige Ausgestaltungen bieten sich insbesondere auch dann an, wenn die Gabelkomponente nicht aus einem Faserverbundwerkstoff, sondern aus Metall hergestellt werden soll. Die Anmelderin behält sich vor, eine solche Gabelkomponente zu beanspruchen, die eine Schaftrohreinheit umfasst, wobei die Schaftrohreinheit ein Schaftrohr und eine Gabelkrone umfasst, und wobei das Schaftrohr und die Gabelkrone als zwei separate Teile ausgebildet sind, die zu der Schaftrohreinheit verbunden sind und wobei das Schaftrohr an der Gabelkrone formschlüssig aufgenommen ist. Bei einer solchen Ausgestaltung können die Schaftrohreinheit und die Gabelkomponente insgesamt wenigstens im Wesentlichen auch aus Metall und insbesondere auch aus einem Leichtmetall bestehen.

[0016] In allen Ausgestaltungen ist es möglich, dass das Schaftrohr in dem Aufnahmebereich in axialer Richtung divergierend ausgestaltet ist. Unter "axialer Richtung" wird dabei eine Längsrichtung entlang der axialen Erstreckung des Schaftrohres verstanden.

[0017] Das Schaftrohr kann an dem Aufnahmebereich in axialer Richtung konisch ausgestaltet sein, sodass sich das Schaftrohr z.B. zu dem unteren Ende hin konisch erweitert. Das untere Ende des Schaftrohres ist jenes Ende, welches sich im normalen bestimmungsgemäßen Gebrauch der Gabelkomponente unten befindet.

[0018] In vorteilhaften Weiterbildungen weisen das Schaftrohr an dem Aufnahmebereich und die Gabelkrone an dem Aufnahmeabschnitt miteinander zusammenwirkende Gewindeabschnitte auf. Beispielsweise ist es möglich, dass das Schaftrohr mit der Gabelkrone verschraubt ist. Dazu wird vorzugsweise ein grobes Gewinde verwendet, bei dem der Abstand zweier Gewindegänge vorzugsweise größer als eine Wandstärke des Schaftrohres ist. Ein solches Gewinde kann auch durch den Faserverbundwerkstoff gebildet werden.

[0019] Insbesondere sind die Gewindeabschnitte konisch ausgebildet. Vorzugsweise ist ein Außendurchmesser einer Windung kleiner als ein Innendurchmesser einer anderen Windung. Insbesondere ist ein Außendurchmesser einer Windung kleiner als ein Innendurchmesser einer übernächsten Windung.

[0020] In bevorzugten Ausgestaltungen ist es so möglich, den Aufnahmeabschnitt und den Aufnahmebereich ineinander einzuführen, sodass mit nur einer oder zwei Drehungen oder sogar nur einer halben Drehung ein fester Sitz des Schaftrohres an der Gabelkrone vorliegt.

[0021] In allen Fällen erstreckt sich die Gabelkrone vorzugsweise quer zu dem Schaftrohr und weist wenigstens eine und insbesondere zwei Gabelbeinaufnahmen oder Standrohraufnahmen auf. Wenn zwei Gabelbeinaufnahmen vorgesehen sind, ist das Schaftrohr insbesondere mittig zwischen den beiden Gabelbeinaufnahmen angeordnet.

[0022] In vorteilhaften Weiterbildungen umfasst das Schaftrohr oberhalb der Gabelkrone einen Versteifungsabschnitt. Der Versteifungsabschnitt weist insbesondere eine höhere Steifigkeit in einer Längsrichtung quer zur Erstreckung der Gabelkrone auf. Das bedeutet, dass vorzugsweise das Schaftrohr in Fahrtrichtung eines mit einer solchen Gabelkomponente ausgerüsteten Fahrrads eine höhere Steifigkeit aufweist. Da in dieser Richtung im Betrieb in der Regel höhere Kräfte auftreten als quer dazu, kann das Gesamtgewicht der Gabelkomponente optimiert und reduziert werden.

[0023] Es ist möglich uns bevorzugt, dass der Versteifungsabschnitt einen in Fahrtrichtung ovalen oder länglichen Querschnitt aufweist.

[0024] In bevorzugten Ausgestaltungen weist das Schaftrohr und/oder die Gabelkrone eine Wandung bzw. Wandungen aus einem Faserverbundwerkstoff auf.

[0025] Es ist möglich, dass das Schaftrohr und/oder die Gabelkrone wenigstens einen Kern aus einem leichteren Material aufweist. Insbesondere weist die Gabelkrone ein oder mehr im Inneren der Gabelkrone angeordnete Kerne auf, die mit Fasergewebelagen vor der Herstellung bedeckt oder umgeben werden.

[0026] Es ist möglich, dass der Kern aus einem Schaummaterial oder dergleichen besteht. Möglich ist es auch, dass der Kern aus einem mit Gas gefüllten Behälter besteht. Dadurch kann das Gewicht reduziert werden und es ist nur dort Material vorhanden, wo es auch benötigt wird.

[0027] In allen Ausgestaltungen kann die Gabelkrone einen Lagersitz aufweisen, an dem beispielsweise ein metallischer Ring oder dergleichen in die Gabelkrone eingelassen ist.

[0028] Vorzugsweise erstreckt sich radial innerhalb des Lagersitzes ein hülsenförmiger Fortsatz axial nach oben. Der hülsenförmige Fortsatz erhöht die Kontaktfläche zwischen der Gabelkrone und dem Schaftrohr, sodass eine größere Klebefläche und auch eine höhere Steifigkeit der Verbindung und somit der Schaftrohreinheit erzielt wird.

[0029] In allen Fällen ist es möglich und bevorzugt, dass das Schaftrohr und die Gabelkrone zunächst als zwei separate Teile ausgebildet werden, die anschließend an einer Klebeaufnahme zu der Schaftrohreinheit miteinander verklebt sind. An der Klebeaufnahme können wenigstens ein Führungsabschnitt und wenigstens ein Klebeabschnitt vorgesehen sein.

[0030] Es ist möglich, dass das Schaftrohr und/oder die Gabelkrone an der Klebeaufnahme konisch ausgestaltet sind. Insbesondere sind der Außenbereich des Schaftrohres und der Innenbereich der Gabelkrone an der Klebeaufnahme

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jeweils leicht konisch ausgebildet. An der Gabelkrone liegt insbesondere ein etwa kegelmantelförmiges Schaftrohr vor. Unter einer leicht konisch ausgebildeten Klebeaufnahme ist hier eine Klebeaufnahme zu verstehen, die eine geringe Konizität mit einem Winkel kleiner als 10° zur Längsachse des Schaftrohres aufweist. Vorzugsweise beträgt ein Winkel der Konizität weniger als 5° und liegt insbesondere zwischen 1° und 4°.

[0031] Vorzugsweise ist an wenigstens einer Standrohraufnahme wenigstens ein nach innen ragender Vorsprung ausgebildet. Insbesondere beträgt eine maximale radiale Erstreckung weniger als 1% des Durchmessers der Standrohraufnahme. Die radiale Erstreckung des Vorsprungs ist vorzugsweise kleiner als 0,5 mm und insbesondere größer als 0,05 mm. Vorzugsweise liegt eine maximale radiale Erstreckung zwischen 0,1 und 0,2 mm bei bevorzugten 0,15 mm.

[0032] In allen Ausgestaltungen ist es besonders bevorzugt, dass die Wandungen der Schaftrohreinheit und/oder der Gabelkrone wenigstens zum Teil aus mehreren Lagen von ausgehärteten und mit Harz versehenen Fasern, Faserbündeln oder Fasergewebematten bestehen. Dabei können die Fäden des Fasermaterials einzeln oder bündelweise über separate Querfäden in ihrer relativen Lage zueinander fixiert werden. Vorzugsweise werden die mehreren Lagen oder es werden wenigstens zwei Lagen der Fasergewebematten vor dem Einlegen in die Form miteinander vernadelt oder vernäht. Insbesondere werden wenigstens zwei Lagen von Fasergewebematten flächig miteinander verbunden. Es ist möglich, dass die mehreren Lagen der einzelnen Fasern an vielen separaten Stellen miteinander vernadelt sind. Möglich ist auch ein Vernähen oder Verkleben der Fasern oder ganzer Gewebematten miteinander, bevor die Fasergebilde in die Herstellform eingelegt werden.

[0033] Es ist möglich und bevorzugt, dass Prepregs verwendet werden. Besonders bevorzugt ist der Einsatz von trockenen Fasergewebematten bzw. Faserlagen, die so keiner Alterung unterliegen und einfach gehandhabt werden können. Anschließend wird in die Form Matrixmaterial in Form von Harz oder dergleichen eingespritzt oder beispielsweise über Vakuum eingezogen, um die Fasern in der Form vollständig mit dem Harz als Matrixmaterial zu tränken.

[0034] Vorzugsweise werden Einzelfasern oder zu Schnüren oder dergleichen verbundene Fasern zur Herstellung verwendet. Dabei wird eine Lage aus sehr dünnem und leichtem Stoff als Untergrundlage verwendet. Darauf werden die Fasern wie gewünscht verlegt und jeweils auf der Untergrundlage befestigt. Durch geeignete und insbesondere robotergestützte Verlegung werden die trockenen Fasern wie gewünscht angeordnet. Es wird jeweils lokal die gewünschte Faserstärke gelegt. Die Fasern können dabei gemäß der zu erwartenden Belastung positioniert und verlegt werden. Die überstehenden Teile der Untergrundlage werden vor dem Einlegen in die Form abgeschnitten.

[0035] In einer anderen Ausgestaltung weist eine Gabelkomponente für wenigstens teilweise muskelbetriebene Fahrzeuge und insbesondere Zweiräder ein Schaftrohr und eine Gabelkrone auf. Das Schaftrohr und die Gabelkrone sind als zwei separate Teile ausgebildet, die an einer Klebeaufnahme zu einer Schaftrohreinheit miteinander verklebt sind. In der Klebeaufnahme sind insbesondere ein Führungsabschnitt und wenigstens ein Klebeabschnitt vorgesehen. In dem Führungsabschnitt liegen die beiden Bauteile, nämlich das Schaftrohr und die Gabelkrone vorzugsweise vollständig oder im Wesentlichem vollständig aneinander an. In dem wenigstens einen Klebeabschnitt liegt ein geringer und definierter Spalt zwischen dem Schaftrohr und der Gabelkrone vor, der mit dem Klebstoff gefüllt ist, um ein optimales Klebeergebnis zu erzielen. Möglich und bevorzugt ist es, dass auf beiden Seiten eines Führungsabschnitts jeweils ein Klebeabschnitt vorgesehen ist. Möglich ist es auch, dass mehrere Führungsabschnitte und entsprechend auch mehrere Klebeabschnitte vorgesehen sind.

[0036] Eine leichte Konizität der miteinander verklebten Bauteile erleichtert die Montage, da beim Einführen des Schaftrohres in die Gabelkrone der aufgetragene Klebstoff nicht von dem Klebeabschnitt abgestreift wird.

[0037] Die Anmelderin behält sich vor, eine Gabelkomponente oder Schaftrohreinheit für wenigstens teilweise muskelbetriebene Fahrzeuge und insbesondere Fahrräder zu beanspruchen, bei der die Schaftrohreinheit ein Schaftrohr und eine Gabelkrone umfasst. Das Schaftrohr und die Gabelkrone sind als zwei separate Teile ausgebildet, die zu einer Einheit oder der Schaftrohreinheit verbunden sind. Das Schaftrohr ist an der Gabelkrone formschlüssig aufgenommen.

[0038] Weitere Vorteile und Merkmale der vorliegenden Erfindung ergeben sich aus der Beschreibung des Ausführungsbeispiels, das im Folgenden mit Bezug auf die beiliegenden Figuren erläutert wird.

[0039] In den Figuren zeigen:

Fig. 1 eine schematische Ansicht eines mit einer erfindungsgemäßen Gabelkomponente ausgerüsteten Mountain-Bikes;

Fig. 2 eine erfindungsgemäße Gabelkomponente in einer perspektivischen Darstellung;

Fig. 3 die Gabelkomponente nach Fig. 2 im Schnitt und eine schematische Darstellung mehrerer Faser- oder Gewebelagen;

Fig. 4 das Schaftrohr der Gabelkomponente aus Figur 3 in einer perspektivischen Darstellung;

Fig. 5 einen Schnitt durch das Schaftrohr und die Gabelkrone;

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Fig. 5a eine Ansicht der Gabelkomponente aus Figur 3 von unten;

Fig. 5b den Querschnitt A-A aus Fig. 5a;

Fig. 5c das vergrößerte Detail "Y" aus Fig. 5a;

Fig. 6 eine schematische Vorderansicht einer weiteren Ausführungsform der erfindungsgemäßen Gabelkomponente und drei zugehörige Schnitte;

Fig. 7 eine weitere erfindungsgemäße Gabelkomponente im Schnitt und zwei dazu senkrechte Querschnitte;

Fig. 8 einen schematischen Querschnitt durch eine erfindungsgemäße Gabelkomponente mit vergrößerten Details.

Fig. 9 noch eine erfindungsgemäße Gabelkomponente im Schnitt;

Fig. 10 das Schaftrohr aus Figur 9 in einer perspektivischen Darstellung; und

Fig. 11 eine schematische Ansicht eines mit einer erfindungsgemäßen Gabelkomponenten ausgerüsteten Rennrades;

[0040] Mit Bezug auf die beiliegenden Figuren 1 bis 11 werden im Folgenden Ausführungsbeispiele der Erfindung erläutert.

[0041] In Figur 1 ist eine schematische Darstellung eines Mountainbikes als Fahrrad 100 abgebildet. Das Fahrrad 100 ist mit einem Vorderrad 101 und einem Hinterrad 102 ausgerüstet. Das Fahrrad 100 weist einen Rahmen 103, eine Gabel 104, einen Lenker 106 und einen Sattel 107 auf. Am Vorderrad 101 und am Hinterrad 102 ist jeweils eine Vielzahl an Speichen 109 vorgesehen. Die Felge 110 ist über die Speichen 109 mit der zentralen Nabe verbunden. Am Vorderrad 101 ist hier eine radiale Verspeichung vorgesehen, während an dem Hinterrad 102 die Speichen wenigstens teilweise tangential an der Nabe angeordnet sind, um die Übertragung von Drehmoment zu ermöglichen. Das Vorderrad wird an einer als Federgabel ausgeführten Gabel 104 gefedert gehalten, während für die Dämpfung des Hinterrades ein Dämpfer 105 zur Verfügung steht. Eine Scheibenbremse 111 dient zum Bremsen.

[0042] Die Federgabel 104 umfasst eine Schaftrohreinheit 3 als Gabelkomponente 1. An der Gabelkomponente 1 sind Standrohre 20, 21 befestigt. Die Standrohre wirken beweglich mit Tauchrohren einer Tauchrohreinheit 45 zusammen, die die Bewegung der Federgabel dämpfen.

[0043] Figur 2 zeigt eine perspektivische schematische Darstellung der erfindungsgemäßen Gabelkomponente 1. An der Gabelkomponente 1 werden Standrohre 20 und 21 befestigt, die mit beweglichen Tauchrohren zusammenwirken, sodass eine vollständige Federgabel 104 entsteht, die beispielsweise an dem Fahrrad nach Figur 1 eingesetzt werden kann.

[0044] Es ist erkenntlich, dass der Versteifungsabschnitt 22 in der Längsrichtung 23 eine grössere Abmessung als in der Querrichtung 24 aufweist, um die Steifigkeit dort gezielt zu erhöhen.

[0045] Die Schaftrohreinheit 3 besteht hier im Wesentlichen und praktisch vollständig aus wenigstens einem Faserverbundwerkstoff 2. Es ist möglich, dass einige wenige Metallteile oder dergleichen beispielsweise an dem Lagersitz 30 eingearbeitet sind oder aber später dort angebracht werden. Ansonsten besteht die Gabelkomponente 1 aus Faserverbundwerkstoff oder Faserverbundwerkstoffen.

[0046] Die Schaftrohreinheit 3 besteht aus zwei zunächst separat gefertigten Teilen 4 und 5. Das Teil 4 wird als Schaftrohr 4 ausgebildet und das Teil 5 wird als eine Art von Gabelkrone 5 ausgestaltet, an der das Schaftrohr 4 drehsicher und auch in axialer Richtung 11 fest aufgenommen wird.

[0047] Figur 3 zeigt einen Querschnitt durch die Gabelkomponente 1 nach Fig. 2, die eine Schaftrohreinheit 3 umfasst oder aber aus einer solchen besteht.

[0048] Hier ist das Schaftrohr 4 an der Gabelkrone 5 formschlüssig befestigt, sodass nicht nur eine kraftschlüssige, sondern auch eine formschlüssige Verbindung vorliegt. Des Weiteren werden das Schaftrohr 4 und die Gabelkrone 5 miteinander an der Klebeaufnahme 32 verklebt. An der Klebeaufnahme 32 weist das Schaftrohr 4 einen Aufnahmeabschnitt 6 auf, der mit dem Aufnahmebereich 7 der Gabelkrone zusammenwirkt.

[0049] Um die Klebewirkung und die Steifigkeit der Schaftrohreinheit 3 zu vergrößern, ist an der Gabelkrone 5 noch ein hülsenförmiger Fortsatz 31 vorgesehen, der sich von dem Lagersitz 30 aus nach oben erstreckt. Das bedeutet, dass im normalen bestimmungsgemäßen Gebrauch sich der hülsenförmige Fortsatz 31 von dem Lagersitz aus nach oben in Richtung des Lenkers erstreckt. Durch den hülsenförmigen Fortsatz 31 wird die Kontakt- und Anlagefläche zwischen dem Schaftrohr 4 und der Gabelkrone 5 erheblich vergrößert.

[0050] Im Mittelbereich zwischen 6 und 7 ist insbesondere zur axialen Sicherung des Schaftrohrs 4 in der Krone eine

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Schulter 42 vorgesehen, um auch bei dauerhaft wechselnder Belastung einen festen Sitz zu ermöglichen.

[0051] Dadurch, dass die Schaftrohreinheit 3 aus zwei zunächst separat gefertigten Teilen 4, 5 besteht, kann jedes Teil, nämlich das Schaftrohr 4 und die Gabelkrone 5 einfacher und reproduzierbarer hergestellt werden. Die Fasergewebematten bzw. Faserlagen 38 des Faserverbundwerkstoffes 2 können so für eine ideale Festigkeit des jeweiligen Bauteils positioniert werden. Dadurch, dass das Schaftrohr 4 eine sehr einfache geometrische Form aufweist, ist auch die Positionierung der Faserlagen entsprechend einfach und kann mit hoher Genauigkeit wiederholt werden.

[0052] Wird hingegen eine einteilige Schaftrohreinheit direkt in einem einzigen Fertigungsschritt erzeugt, so müssen alle Wandungen 26 des Schaftrohrs 4 und alle Wandungen 27 der Gabelkrone 5 in einem einzigen Fertigungsschritt positioniert und ausgehärtet werden. Da bei dem Aushärten von Faserverbundwerkstoffen meist Druck auf die Fasergewebelagen ausgeübt wird, um das gewünschte Aushärtungsergebnis zu erzielen, sind einfache Fertigungsformen erheblich vorteilhafter als komplizierte geometrische Formen, bei denen während der Aushärtung einzelne Lagen oder Fasern verrutschen können, sodass eine besonders gut reproduzierbare Fertigung nicht oder nur mit extrem großem Aufwand möglich ist.

[0053] Es wurde nun festgestellt, dass durch aufblasbare Schläuche z. B. im Inneren ein Innendruck erzeugt wird, der aufgrund der flexiblen Wandung bzw. der Flexibilität des Schlauches insgesamt ein Verrutschen der Faserlagen während des Aushärtens und damit unkontrollierte Änderungen der statischen Eigenschaften bewirken kann. Um dennoch eine ausreichende Steifigkeit und Festigkeit des Bauteils gewährleisten zu können, wurde bislang bei der einteiligen Herstellung in der Praxis die Anzahl der verwendeten Fasergewebelagen in den Übergangspartien erhöht. Dadurch konnte auch bei einer gewissen unkontrollierten Verschiebung der Fasern während des Aushärtens die gewünschte Festigkeit gewährleistet werden.

[0054] Dem gegenüber hat die vorliegende Erfindung den Vorteil, dass zwei relativ einfache Bauteile vorgefertigt werden, die einfach und passgenau hergestellt werden können. Nach der Zusammenfügung und dem Verkleben der beiden Teile 4 und 5 wird eine reproduzierbar herstellbare Schaftrohreinheit 3 zur Verfügung gestellt, die durch die formschlüssige Verbindung des Schaftrohrs 4 mit der Gabelkrone 5 auch hohen und höchsten Belastungen zuverlässig standhält. Vorderradgabeln eines Fahrrads sind sicherheitsrelevante Teile, da bei einem Bruch derselben eine hohe Unfallgefahr mit möglicherweise schweren Unfallfolgen vorliegt, weshalb besondere Sorgfalt auf hohe Fertigungskonstanz gelegt werden darf.

[0055] Die vorliegende Erfindung ermöglicht eine reproduzierbare und kostengünstige Fertigung von Gabelkomponenten 1, bei denen zusätzlich das Gesamtgewicht reduzierbar ist, da an dem Schaftrohr 4 und der Gabelkrone 5 jeweils nur die für die Festigkeit benötigte Anzahl an Faserlagen 38 verwendet wird.

[0056] Dabei können Schaftrohreinheiten 3 für Federgabeln 104 sehr stabil und dennoch leicht hergestellt werden. Solche Schaftrohreinheiten 3 weisen meist Gabelkronen 5 mit einer sehr hohen Breite 44 auf. Die Breite 44 muss dabei so gross sein, dass die für Mountainbikes verwendeten breiten (Profil-)Reifen 112 (vgl. Fig. 1) zwischen den Beinen der Gabel hindurchpassen. Auch muss dann immer noch ein ausreichender Sicherheitsabstand für anhaftenden Schmutz etc. zwischen dem Reifen und den Standrohren verbleiben, damit ein Schleifen des Reifens an der Gabel oder gar eine Blockade des Vorderrades verhindert wird. Gerade bei Federgabeln weist der Bereich der Gabelkrone 5 deshalb eine grosse Quererstreckung auf. Die Breite 44 ist vorzugsweise wenigstens vier Mal so gross und insbesondere wenigstens fünf Mal so gross wie der Durchmesser der Gabelbeinaufnahmen 18 bzw. 19. Durch die große Breite wird eine einteilige Fertigung erheblich erschwert, da die Faserverläufe zwei Umbiegungen von etwa 90° aufweisen. Dadurch wird die Problematik von sich verschiebenden Fasern oder Faserlagen in der Form erheblich vergrößert.

[0057] Die Schaftrohreinheit 3 kann in einem mittleren Höhenbereich einen Versteifungsabschnitt 22 aufweisen, der eine höhere Biegesteifigkeit in der Längsrichtung 23 als in Querrichtung 24 aufweist. Die Längsrichtung 23 entspricht bei einer normalen Geradeausfahrt der Fahrtrichtung des Fahrrads. An dem Versteifungsabschnitt 22 liegt somit eine höhere Steifigkeit in der Längsrichtung 23 als in der dazu quer vorgesehenen Querrichtung 24 vor, sodass die Biegesteifigkeit um eine zu der Achse 24 parallele Achse an dem Versteifungsabschnitt 22 erhöht wird.

[0058] Das Schaftrohr 4 wird hier zentral an der Gabelkrone 5 an dem Aufnahmeabschnitt 6 aufgenommen. Die Gabelkrone erstreckt sich im Wesentlichen horizontal und quer zu dem Schaftrohr 4 in der Querrichtung 24. An der Gabelkrone 5 ist wenigstens eine Gabelbeinaufnahme zur Aufnahme eines Gabelbeins vorgesehen. Es ist auch möglich, dass ein oder zwei Gabelbeine einstückig mit der Gabelkrone gefertigt werden. Vorzugsweise werden zwei separate Gabelbeine 20 und 21 (vgl. Figur 3) an Gabelbeinaufnahmen 18 und 19 vorgesehen.

[0059] Um Material und dadurch Gewicht einzusparen, werden in der Gabelkrone 5 Hohlräume vorgesehen, die mit Kernen 28 ausgefüllt sind. Ein Kern 28 kann insbesondere aus einem Schaummaterial 29 bestehen. Es ist auch möglich, dass mit Gas gefüllte Behälter als Kern 28 verwendet werden. Ein solcher Behälter kann beispielsweise eine Wandung aus einem Schlauchmaterial aufweisen.

[0060] Zusätzlich ist in Figur 3 noch eine schematische Abbildung eines Faserverbundwerkstoffes 2 abgebildet, der aus mehreren Lagen 38 von Fasergewebe besteht. Die einzelnen Faserlagen 38 werden vor dem Einlegen in die Form miteinander vernadelt oder über Nähte 39 relativ zueinander fixiert. Dadurch wird sichergestellt, dass in der Form keine Verschiebung der Faserlagen 38 zueinander erfolgt. Dadurch kann die Reproduzierbarkeit erheblich erhöht werden,

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sodass durch eine optimale Platzierung der einzelnen Faserlagen das Gesamtgewicht nochmals reduziert werden kann.

[0061] In Figur 4 ist eine perspektivische Darstellung des unteren Endes des Schaftrohres 4 abgebildet. Im unteren Bereich etwa in der Mitte der Höhe der Gabelkrone ist eine Schulter 42 vorgesehen, die ein Ausziehen aus der Gabelkrone 5 zuverlässig verhindert. Der unrunde Querschnitt 8 ergibt sich durch die Nase 10. Die Nase 10 erstreckt sich hier radial nach aussen und bewirkt eine formschlüssige Verbindung mit der Gabelkrone 5, sodass eine drehfeste Verbindung des Schaftrohres 4 mit der entsprechend ausgestalteten Gabelkrone 5 vorliegt.

[0062] Weiterhin sind die Klebeabschnitte 32 und die Führungsabschnitte 33 erkennbar. Es ist auch der unrunde Querschnitt an dem Versteifungsabschnitt 22 zu erkennen.

[0063] Fig. 5 zeigt einen schematischen Querschnitt durch die Gabelkomponente 1. Klar erkennbar ist die Nase 10, die radial von dem Schaftrohr 4 absteht und eine Verdrehsicherung zur Verfügung stellt.

[0064] In Fig. 5a ist eine Ansicht der Gabelkomponente 1 von unten dargestellt, wobei im Wesentlichen die Gabelkrone 5 mit den Standrohraufnahmen 18 und 19 zu sehen ist. Zentral ist das Schaftrohr 4 fest verbunden. Die verschiedenen abgestuften Durchmesser des sich nach unten erweiternden Schaftrohrs sind erkennbar.

[0065] Fig. 5b zeigt den Querschnitt A-A aus Fig. 5a durch die Standrohraufnahme 19, die insofern analog zur Standrohraufnahme 18 aufgebaut ist. Im Inneren der Standrohraufnahmen erstrecken sich vorzugsweise vier symmetrisch über dem Umfang verteilt angeordnete Vorsprünge 46 jeweils über eine Umfangsbreite von etwa 1 mm bis 3 mm, vorzugsweise etwa 2mm +/- 10%. Die Vorsprünge 46 sind hier vorzugsweise etwa parallel zu der axialen Richtung 11 ausgerichtet und erstrecken sich über eine Länge 48, die vorzugsweise mehr als die Hälfte und insbesondere mehr als 2 / 3 der axialen Länge einer Standrohraufnahme 18, 19 beträgt. Die axiale Länge beträgt hier etwa 38 mm und damit etwa 5 bis 7 mm weniger als eine axiale Länge einer Standrohraufnahme 18, 19.

[0066] In Fig. 5c ist das Detail "Y" aus Fig. 5a dargestellt, in welchem eine Draufsicht auf den Vorsprung 46 erkennbar ist. Der Vorsprung 46 ist in einem horizontalen Querschnitt abgerundet ausgestaltet und weist eine radiale Erstreckung 47 nach innen von zwischen etwa 0,1 mm und 0,2 mm und insbesondere 0,15 mm auf.

[0067] Die Vorsprünge 46 dienen bei der Verklebung der Standrohre mit der Gabelkrone 5 zur definierten Bereitstellung eines Klebespaltes, sodass eine optimale Klebewirkung erzielt wird.

[0068] Fig. 5d zeigt einen Querschnitt durch die Gabelkomponente 1 mit dem sich nach unten hin verbreiternden Schaftrohr 4. In Längsrichtung 23 wird auch die Wandstärke des Schaftrohres nach unten hin stärker. Im untersten Bereich an der Gabelkrone 5 kann die Wandstärke des Schaftrohres 4 in Längsrichtung 23 doppelt so groß sein wie an dem oberen bzw. freien Ende des Schaftrohres 4. Der Wandstärkeunterschied in Längsrichtung 23 kann auch noch größer werden. Dadurch wird eine größere Steifigkeit in der gewünschten Dimension erreicht.

[0069] In Querrichtung 24 hingegen verändert sich die Wandstärke des Schaftrohres 4 weniger oder sogar gar nicht.

[0070] Figur 6 zeigt ein anderes Ausführungsbeispiel einer erfindungsgemäßen Gabelkomponente 1, die eine Schaftrohreinheit 3 mit einem Schaftrohr 4 und einer Gabelkrone 5 umfasst. Zusätzlich sind gestrichelt Standrohre 20 und 21 eingezeichnet, die an Gabelbeinaufnahmen bzw. Standrohraufnahmen 18 und 19 befestigt sind.

[0071] Der Schnitt A-A zeigt einen dort im Wesentlichen runden Querschnitt des Schaftrohres 4.

[0072] Der Querschnitt B-B in Höhe des Versteifungsabschnitts 22 zeigt einen leicht ovalen Querschnitt des Schaftrohres 4, der eine größere Erstreckung in Längsrichtung 23 aufweist.

[0073] Der Querschnitt C-C zeigt den im Bereich des unteren Lagersitzes im Wesentlichen erneut runden Aussenquerschnitt der Einheit 1.

[0074] Durch die formschlüssige Verbindung wird sichergestellt, dass sich das Schaftrohr 4 im Betrieb nicht gegenüber der Gabelkrone 5 verdrehen kann, wodurch die Unfallgefahr erheblich reduziert wird. Durch die Einzelteilfertigung des Schaftrohres 4 und der Gabelkrone 5 und die anschließende Verbindung der beiden Teile zu der Schaftrohreinheit 3 können die einzelnen Wandstärken 26 und 27 ideal angepasst werden, sodass insgesamt eine hohe Stabilität bei geringerem Gewicht erzielt wird.

[0075] Der Schnitt D-D ist im Prinzip schon in Fig. 5 abgebildet. Durch die unrunde Kontur des Schaftrohres 4 mit der nach außen abstehenden Nase 10 sowie der entsprechenden Ausnehmung in der Gabelkrone 5 wird eine drehfeste Verbindung der Schaftrohreinheit 3 gewährleistet.

[0076] Figur 7 zeigt noch ein Ausführungsbeispiel einer erfindungsgemäßen Gabelkomponente 1, die als Schaftrohreinheit 3 ausgeführt ist. Das Schaftrohr 4 ist in dem Aufnahmeabschnitt 6 hier nach unten hin divergierend ausgeführt. Dadurch wird eine höhere Verbindungs- und Klebefläche zwischen dem Schaftrohr 4 und der Gabelkrone 5 ermöglicht.

[0077] Weiterhin liegt in dem Aufnahmeabschnitt 6 ein unrunder Querschnitt 8 des Schaftrohres 4 vor, wobei das Schaftrohr 4 im Bereich des unrunden Querschnitts 8 eine größere Erstreckung in Querrichtung 24 als in Längsrichtung 23 aufweist.

[0078] Wie zuvor kann die Gabelkrone 5 Hohlräume aufweisen, die jeweils mit einem Kern oder mit mehreren Kernen 28 aus z.B. einem Schaummaterial 29 gefüllt sind. Die Kerne 28 können nach der Fertigstellung entfernt werden. Es ist aber auch möglich, dass die Kerne aus z.B. Schaummaterial 29 dauerhaft in der Schaftrohreinheit 3 verbleiben. Die Schaftrohreinheit 3 bzw. das Schaftrohr 4 kann im Bereich des Lagersitzes 30 einen runden Querschnitt 41 aufweisen. Im Bereich des Aufnahmeabschnittes 6 bzw. des Aufnahmebereiches 7 liegen aufeinander angepasste Querschnitte

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des Schaftrohres 4 und der Gabelkrone 5 vor, die, wie der Querschnitt B-B zeigt, unrund ausgeführt sind.

[0079] Figur 8 zeigt mögliche Details der vorhergehenden Ausführungsbeispiele der Gabelkomponente 1, umfassend eine Schaftrohreinheit 3 mit einem Schaftrohr 4 und einer Gabelkrone 5. Insbesondere zeigen die Details A und B von Fig. 8 auch die vergrößerten Ausgestaltungen Aufnahmeabschnitts 6 bzw. des Aufnahmebereiches 7 der Gabelkomponente aus Fig. 3 oder auch Fig. 6 oder Fig. 7.

[0080] Wie das vergrößerte Detail A zeigt, ist im oberen Bereich des Aufnahmeabschnitts 6 bzw. des Aufnahmebereiches 7 eine erste Klebeaufnahme 32 vorgesehen, die einen Führungsabschnitt 33 und zwei Klebeabschnitte 34 und 35 umfasst, die sich oberhalb und unterhalb des Führungsabschnitts 33 erstrecken. An dem Führungsabschnitt 33 liegen die Bauteile 4, 5 vorzugsweise direkt aneinander an. In den Bereichen der Klebeabschnitte 34 und 35 wird ein geringer und definierter Spalt zur Verfügung gestellt, der mit Klebstoff gefüllt ist und für eine besonders zuverlässige Klebung an der Klebeaufnahme 32 sorgt. Die Spaltweite ist insbesondere geringer als eine Wandstärke des Schaftrohres 4 und liegt vorzugsweise zwischen 10 µm und 500 µm und ist insbesondere kleiner als 250 µm.

[0081] Analog zu der oberen Klebeaufnahme 32 ist eine untere Klebeaufnahme 32 vorgesehen, die vergrößert durch das Detail "B" abgebildet ist. Die untere Klebeaufnahme 32 weist einen Führungsabschnitt 33 und benachbart dazu Klebeabschnitte 34 und 35 auf. An den Klebeabschnitten 34 und 35 liegt wiederum ein definierter Spalt vor, der mit Klebstoff gefüllt ist und für eine zuverlässige Verklebung der beiden Bauteile sorgt.

[0082] Um ein Einführen des Schaftrohrs 4 in die Gabelkrone 5 so zu gewährleisten, dass kein Klebstoff von den Klebeabschnitten 34, 35 abgestreift wird, werden die Klebeaufnahmen 32 vorzugsweise leicht konisch ausgeführt. Ein Winkel 37 zwischen einer zentralen Achse des Schaftrohrs 4 und der Gabelkrone 5 und den Kontaktflächen an den Führungsabschnitten 33 und den Klebeabschnitten 34, 35 liegt vorzugsweise zwischen 0° und 10° und insbesondere zwischen 1° und 5° und besonders bevorzugt bei etwa 2 bis 3°.

[0083] Auch bei diesem Ausführungsbeispiel ist es möglich, dass in dem Bereich der Klebeaufnahme 32 wenigstens ein unrunder Außenquerschnitt 8 vorliegt, um eine formschlüssige Verbindung des Schaftrohrs 4 und der Gabelkrone 5 z. B. über nach außen abstehende Nasen zu gewährleisten.

[0084] Figur 9 zeigt ein weiteres Ausführungsbeispiel einer erfindungsgemäßen Gabelkomponente 1, die hier wiederum als Schaftrohreinheit 3 ausgebildet ist. Die einteilige Schaftrohreinheit 3 besteht aus dem Schaftrohr 4 und der Gabelkrone 5, die hier jeweils wieder aus Faserverbundwerkstoff g. Vorzugsweise wird der gleiche Faserverbundwerkstoff für beide Bauteile 4, 5 verwendet.

[0085] In allen Ausführungsbeispielen ist es möglich, dass der gleiche Faserverbundwerkstoff für die Bauteile 4, 5 verwendet wird. Möglich ist es aber auch, dass unterschiedliche Faserverbundwerkstoffe eingesetzt werden. Dabei können teilweise oder vollständig das gleiche Fasermaterial und unterschiedliche Matrixmaterialien und/oder aber unterschiedliche Fasermaterialien und gleiche Matrixmaterialien eingesetzt werden.

[0086] Auch bei dem Ausführungsbeispiel gemäß Figur 9 verbreitert sich das Schaftrohr 4 an dem Aufnahmeabschnitt 6 konusförmig nach unten hin. An dem Aufnahmeabschnitt 6 bzw. dem Aufnahmebereich 7 weisen die Bauteile 4, 5 miteinander zusammenwirkende Gewindeabschnitte 12, 13 auf, sodass an dem Schaftrohr 4 ein Außengewinde 12 und in der Gabelkrone 5 ein Innengewinde 13 vorgesehen sind. Die Gewindeabschnitte 12, 13 sind auf einem Konus 9 angeordnet. Dabei weist der Konus einen solchen Winkel auf, dass insbesondere direkt benachbarte Windungen des Gewindes derartig unterschiedliche Durchmesser aufweisen, dass nur eine halbe oder eine ganze Drehung des Schaftrohrs 4 ausreicht, um nach dem Einführen des Schaftrohrs 4 in die Gabelkrone 5 einen festen Sitz des Schaftrohrs 4 an der Gabelkrone 5 zu gewährleisten. Dadurch wird ebenfalls eine formschlüssige Verbindung hergestellt, die durch zusätzlichen Klebstoff vor einem unabsichtlichen Lösen geschützt werden kann.

[0087] Es ist möglich, dass der Außendurchmesser 14 einer Windung 15 eine kleinere Abmessung aufweist als der Innendurchmesser 16 der übernächsten axial benachbarten Windung 17.

[0088] Auch hier ist es möglich, dass in der Gabelkrone Hohlräume vorgesehen sind, die mit Kernen gefüllt sein können.

[0089] Figur 10 zeigt eine schematische perspektivische Darstellung des mit einem Gewinde versehenen Schaftrohres 4.

[0090] In Figur 11 ist ein als Touren- oder Rennrad ausgeführtes Fahrrad 100 dargestellt, welches mit einem Vorderrad 101 und einem Hinterrad 102 ausgerüstet ist. Das Fahrrad weist einen Rahmen 103, eine Gabel 104, einen Lenker 106 und einen Sattel 107 auf. Am Vorderrad 101 und am Hinterrad 102 ist jeweils eine Vielzahl an Speichen 109 vorgesehen. Die Felge 110 ist jeweils über die Speichen 109 mit der zentralen Nabe verbunden. Am Vorderrad 101 ist hier eine radiale Verspeichung vorgesehen, während an dem Hinterrad 102 die Speichen wenigstens teilweise tangential an der Nabe angeordnet sind, um die Übertragung von Drehmoment zu ermöglichen. Die Gabel 104 umfasst eine Standrohreinheit 3, wie sie zuvor beschrieben wurde. Auch an einem Rennrad kann eine solche Gabelkomponente 1 eingesetzt werden.

Bezugszeichenliste:

1	Gabelkomponente	33	Führungsabschnitt

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(fortgesetzt)

2	Faserverbundwerkstoff	34	Klebeabschnitt
3	Schaftrohreinheit	35	Klebeabschnitt
4	Schaftrohr	36	Außenbereich
5	Gabelkrone	37	Winkel
6	Aufnahmeabschnitt von 5	38	Lage, Fasergewebematte
7	Aufnahmebereich von 4	39	Naht
8	unrunder Querschnitt	40	unrunder Querschnitt
9	Konus	41	runder Querschnitt
10	Nase	42	schulterförmige Erweiterung
11	axiale Richtung		
12	Gewindeabschnitt an 4	43	Grundlage
13	Gewindeabschnitt an 5	44	Breite
14	Außendurchmesser von 15	45	Tauchrohreinheit
15	Windung	46	Vorsprung
16	Innendurchmesser von 17	47	Erstreckung
17	Windung	48	Länge
18	Standrohraufnahme	49	Länge
19	Standrohraufnahme	100	Fahrrad
20	Gabelbein	101	Vorderrad
21	Gabelbein	102	Hinterrad
22	Versteifungsabschnitt	103	Rahmen
23	Längsrichtung	104	Gabel, Federgabel
24	Querrichtung	105	Dämpfer
25	Querschnitt von 22	106	Lenker
26	Wandung	107	Sattel
27	Wandung	108	Nabe
28	Kern	109	Speichen
29	Schaummaterial	110	Felge
30	Lagersitz	111	Scheibenbremse
31	hülsenförmiger Fortsatz	112	Reifen
32	Klebeaufnahme		

Patentansprüche

1. Gabelkomponente (1) für ein wenigstens teilweise muskelbetriebenes Fahrzeug und insbesondere Fahrrad (100) mit einer wenigstens teilweise aus Faserverbundwerkstoff (2) bestehenden Schaftrohreinheit (3),
dadurch gekennzeichnet,
dass die Schaftrohreinheit (3) ein Schaftrohr (4) und eine Gabelkrone (5) umfasst, welche als zwei separate und formschlüssig miteinander zu einer Schaftrohreinheit (3) verbundene Teile ausgebildet sind.

2. Gabelkomponente (1) nach Anspruch 1, wobei relativ zur Längsachse (11) das Schaftrohr (4) und die Gabelkrone (5) verdrehsicher an einem Aufnahmeabschnitt (6) der Gabelkrone (5) miteinander verbunden sind und wobei insbesondere das Schaftrohr (4) in einem Aufnahmebereich (7) einen unrunden und/oder mehreckigen Außenquerschnitt (8) aufweist.

3. Gabelkomponente (1) nach dem vorhergehenden Anspruch, wobei das Schaftrohr (4) an dem Aufnahmebereich (7) wenigstens eine nach außen abstehende Nase (10) aufweist.

4. Gabelkomponente (1) nach einem der drei vorhergehenden Ansprüche, wobei das Schaftrohr (4) an dem Aufnahmebereich (7) und die Gabelkrone (5) an dem Aufnahmeabschnitt (6) aneinander angepasste Querschnitte aufweisen.

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5. Gabelkomponente (1) nach einem der vorhergehenden Ansprüche, wobei das Schaftrohr (4) und die Gabelkrone (5) der Schaftrohreinheit (3) in einer axialen Richtung (11) des Schaftrohrs (4) formschlüssig miteinander verbunden sind.

6. Gabelkomponente (1) nach einem der vorhergehenden Ansprüche, wobei das Schaftrohr (4) an dem Aufnahmebereich (7) in axialer Richtung (11) konisch oder divergierend ausgestaltet ist.

7. Gabelkomponente (1) nach einem der vorhergehenden Ansprüche, wobei das Schaftrohr (4) an dem Aufnahmebereich (7) und die Gabelkrone (5) an dem Aufnahmeabschnitt (6) miteinander zusammenwirkende Gewindeabschnitte (12, 13) aufweisen und wobei insbesondere die Gewindeabschnitte (12, 13) konisch ausgebildet sind, sodass ein Außendurchmesser (14) einer Windung (15) kleiner ist als ein Innendurchmesser (16) einer anderen Windung (17).

8. Gabelkomponente (1) nach einem der vorhergehenden Ansprüche, wobei sich die Gabelkrone (5) quer zu dem Schaftrohr (4) erstreckt und wobei die Gabelkrone (5) wenigstens eine Gabelbeinaufnahme (18, 19) aufweist und/oder wobei die Gabelkrone (5) zwei Gabelbeinaufnahmen (18, 19) umfasst, zwischen denen das Schaftrohr (4) an der Gabelkrone (5) aufgenommen ist.

9. Gabelkomponente (1) nach einem der vorhergehenden Ansprüche, wobei das Schaftrohr (4) oberhalb der Gabelkrone (5) einen Versteifungsabschnitt (22) umfasst, welcher eine höhere Steifigkeit in einer Längsrichtung (23) quer zu der Erstreckung der Gabelkrone (5) aufweist und wobei der Versteifungsabschnitt (22) insbesondere einen ovalen oder länglichen Querschnitt (25) aufweist.

10. Gabelkomponente (1) nach einem der vorhergehenden Ansprüche, wobei das Schaftrohr (4) und/oder die Gabelkrone (5) eine Wandung (26, 27) aus einem Faserverbundwerkstoff (2) und wenigstens einen Kern (28) aus einem leichteren Material aufweist.

11. Gabelkomponente (1) nach einem der vorhergehenden Ansprüche, wobei an dem Schaftrohr (4) eine schulterförmige Erweiterung vorgesehen ist und/oder wobei an der Gabelkrone (5) ein Lagersitz (30) vorgesehen ist und wobei sich radial innerhalb des Lagersitzes (30) ein hülsenförmiger Fortsatz (31) axial nach oben erstreckt.

12. Gabelkomponente (1) nach einem der vorhergehenden Ansprüche, wobei das Schaftrohr (4) und die Gabelkrone (5) als zwei separate Teile ausgebildet sind, die an einer Klebeaufnahme (32) zu der Schaftrohreinheit (3) miteinander verklebt sind, wobei an der Klebeaufnahme (32) ein Führungsabschnitt (33) und wenigstens ein Klebeabschnitt (34, 35) vorgesehen sind und wobei insbesondere das Schaftrohr (4) und/oder die Gabelkrone (5) an der Klebeaufnahme (32) konisch ausgestaltet sind, und wobei insbesondere zumindest abschnittsweise der Außenbereich (36) des Schaftrohres (4) und der Innenbereich (37) der Gabelkrone (5) an der Klebeaufnahme (32) jeweils leicht konisch ausgebildet sind und wobei vorzugsweise ein Winkel (37) der Konizität kleiner 5° beträgt und insbesondere zwischen 1° und 4° liegt.

13. Gabelkomponente (1) nach einem der vorhergehenden Ansprüche, wobei an wenigstens einer Standrohraufnahme (18, 19) wenigstens ein nach innen ragender Vorsprung (46) ausgebildet ist.

14. Gabelkomponente (1) nach einem der vorhergehenden Ansprüche, wobei die Wandungen (26, 27) der Schaftrohreinheit (3) wenigstens zum Teil aus mehreren Lagen (38) von ausgehärteten und mit Harz versehenen Faserlagen bestehen, die miteinander vernadelt oder vernäht sind, wobei die mehreren Lagen (38) der Fasern insbesondere flächig miteinander verbunden sind.

15. Gabelkomponente (1) für wenigstens teilweise muskelbetriebene Fahrzeuge und insbesondere Zweiräder (100) mit einem Schaftrohr (4) und einer Gabelkrone (5),
dadurch gekennzeichnet,
dass das Schaftrohr (4) und die Gabelkrone (5) als zwei separate Teile ausgebildet sind, die zu einer Schaftrohreinheit (3) miteinander verklebt sind, wobei an der Klebeaufnahme ein Führungsabschnitt und ein Klebeabschnitt vorgesehen sind.

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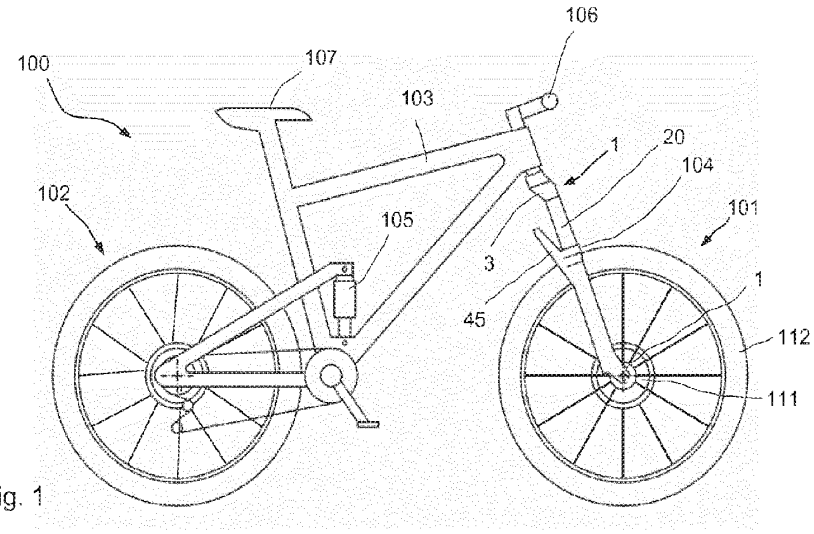


Fig. 1

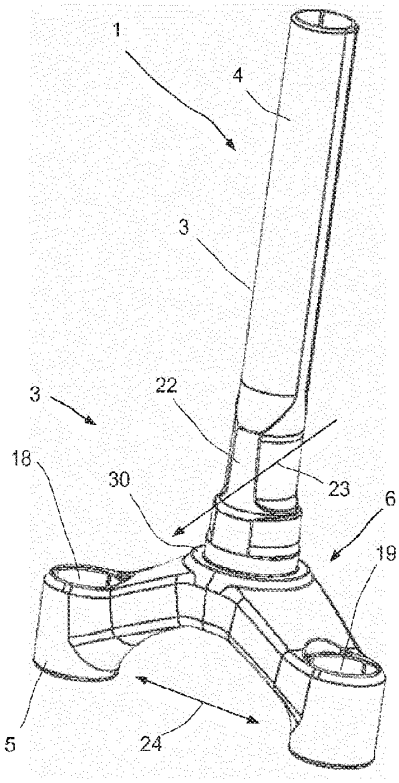


Fig. 2

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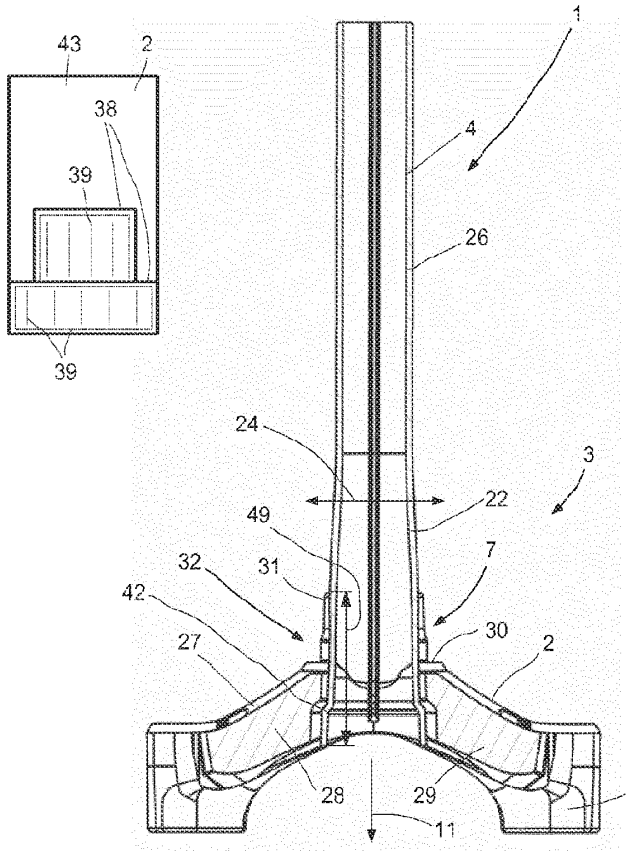


Fig. 3

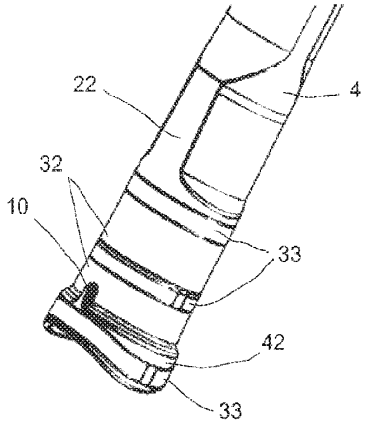


Fig. 4

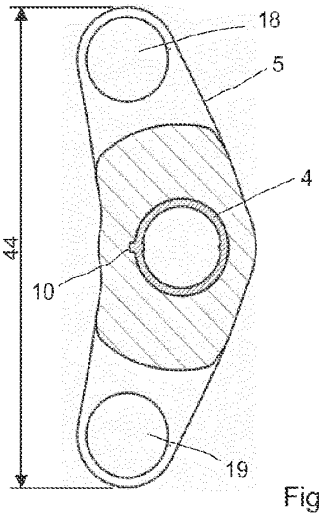


Fig. 5

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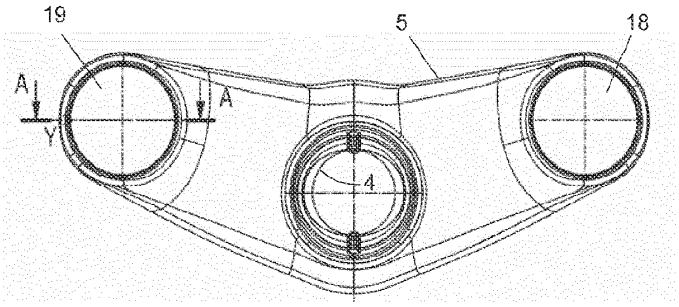


Fig. 5a

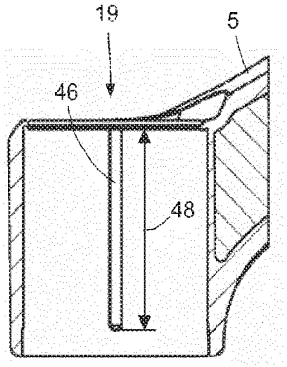


Fig. 5b

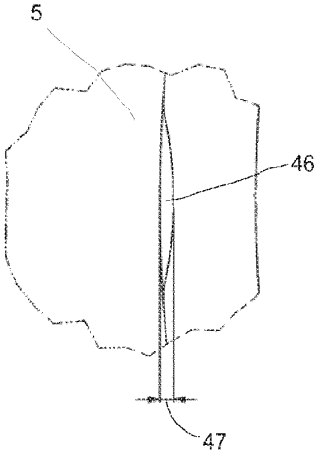


Fig. 5c

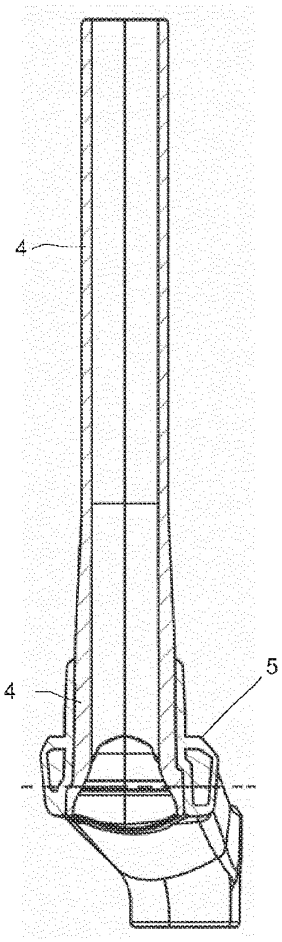


Fig. 5d

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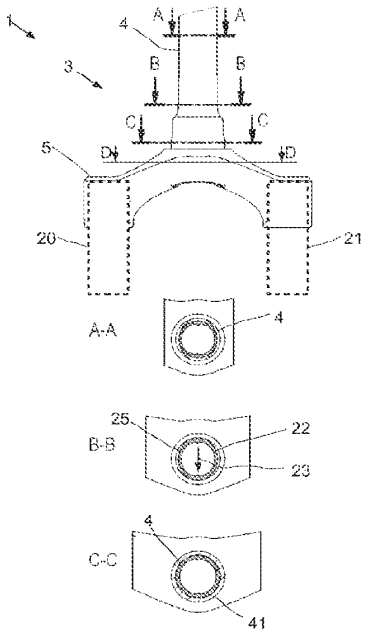

1
3
4
A
A
B
B
C
C
D
D
5
20
21
A-A
4
25
22
B-B
23
4
C-C
41

Fig. 6

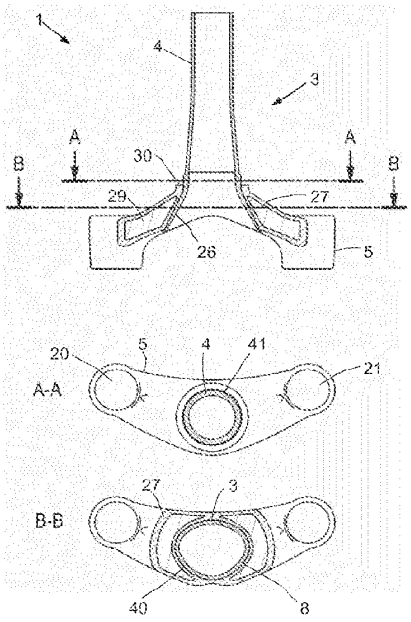

1
4
3
A
A
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B
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B-B
40
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Fig. 7

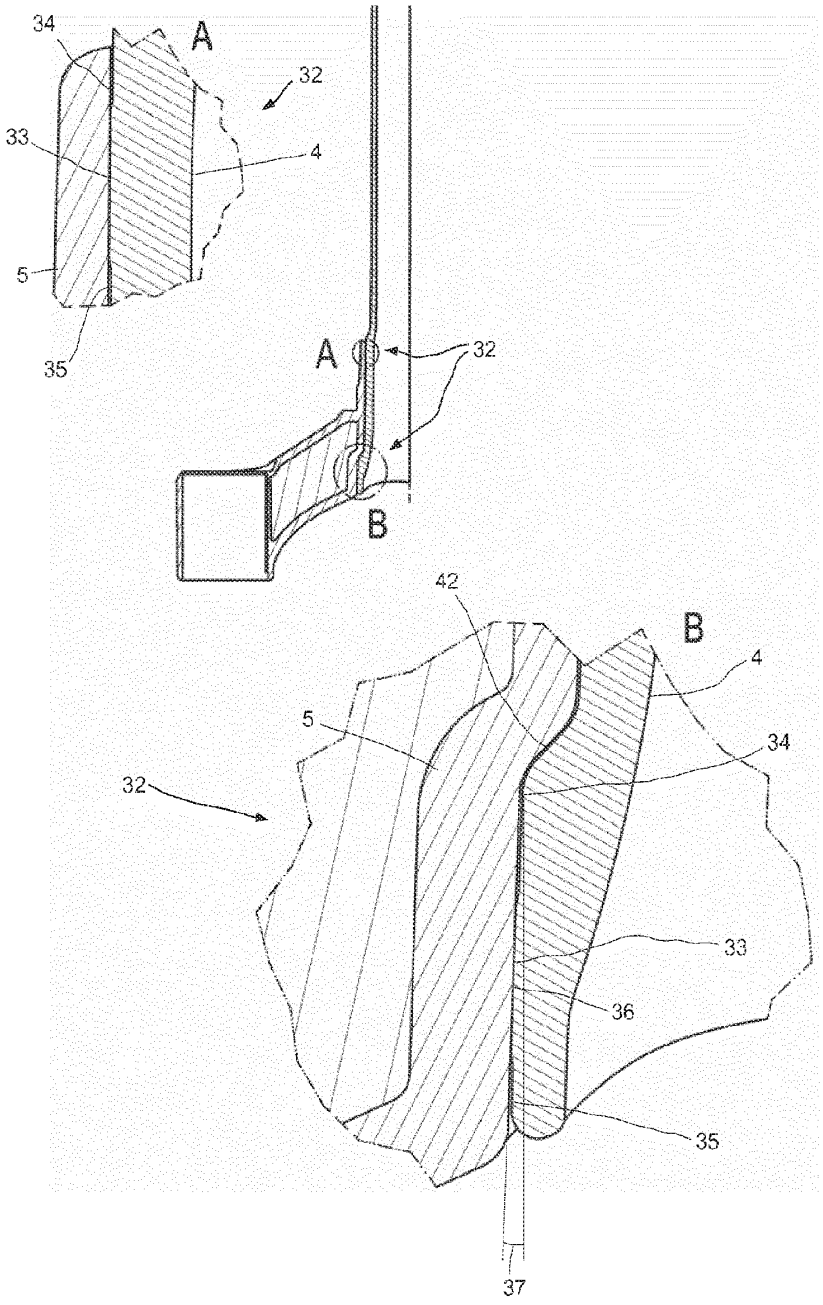


Fig. 8

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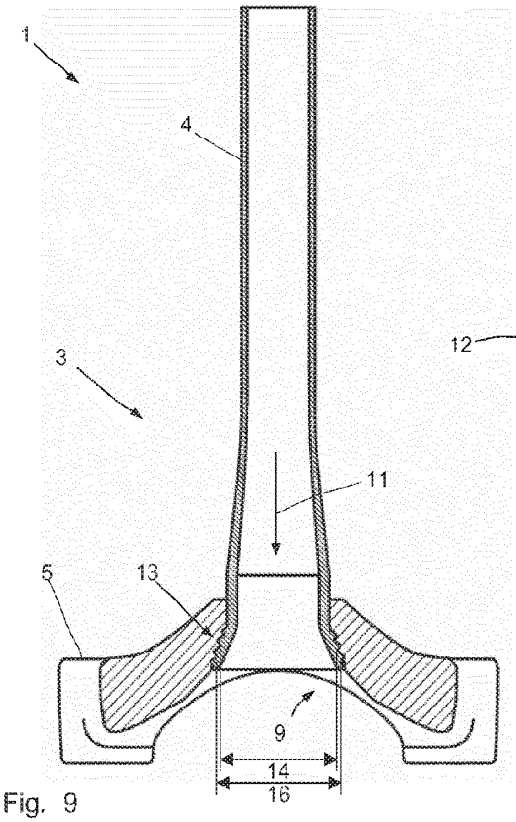


Fig. 9

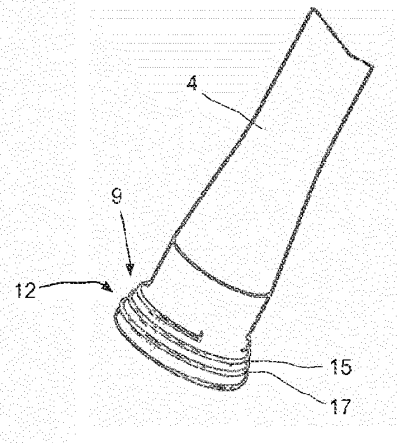


Fig. 10

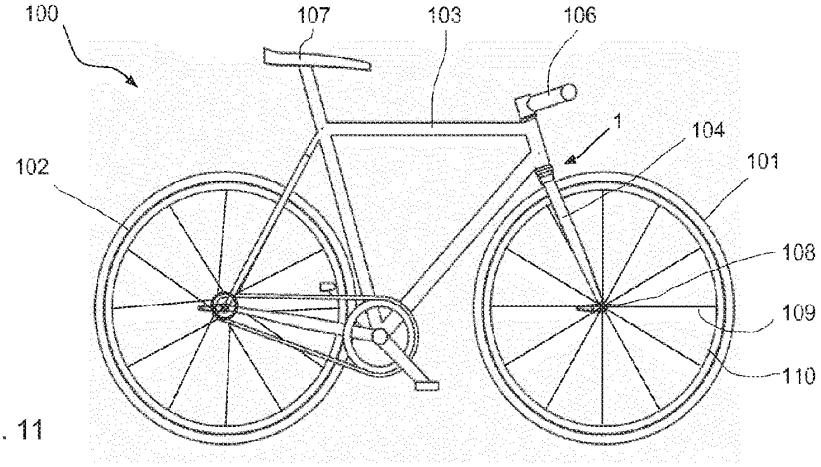


Fig. 11

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EUROPÄISCHER RECHERCHENBERICHT

Nummer der Anmeldung
EP 15 16 2944

EINSCHLÄGIGE DOKUMENTE

Kategorie	Kennzeichnung des Dokuments mit Angabe, soweit erforderlich, der maßgeblichen Teile	Betrifft Anspruch	KLASSIFIKATION DER ANMELDUNG (IPC)
X	US 7 503 576 B1 (SCHROEDER BRADY MATTHEW [US]) 17. März 2009 (2009-03-17)	1-5,8,9, 11,12,15	INV. B62K21/02
A	* Spalte 5, Zeile 63 - Spalte 7, Zeile 44 * * Abbildungen *	6,7,10, 13,14	B62K21/04 B62K19/16 B62K19/22
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A	* Absatz [0033] - Absatz [0038] * * Abbildungen 1-5 *	3,6,9, 10,13,14	
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A	* Seite 1, Zeile 5 - Zeile 16 * * Seite 5, Zeile 13 - Seite 6, Zeile 20 * * Seite 8, Zeile 19 - Seite 9, Zeile 11 * * Abbildungen *	3,7,13	
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A	* Absatz [0054] - Absatz [0058] * * Abbildung 4 *	1	

Der vorliegende Recherchenbericht wurde für alle Patentansprüche erstellt

Recherchenort	Abschlußdatum der Recherche	Prüfer
München	10. Juli 2015	Avisse, Marylène

KATEGORIE DER GENANNTEN DOKUMENTE

X : von besonderer Bedeutung allein betrachtet
Y : von besonderer Bedeutung in Verbindung mit einer anderen Veröffentlichung derselben Kategorie
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ANHANG ZUM EUROPÄISCHEN RECHERCHENBERICHT ÜBER DIE EUROPÄISCHE PATENTANMELDUNG NR. EP 15 16 2944

In diesem Anhang sind die Mitglieder der Patentfamilien der im obengenannten europäischen Recherchenbericht angeführten Patentdokumente angegeben.
Die Angaben über die Familienmitglieder entsprechen dem Stand der Datei des Europäischen Patentamts am
Diese Angaben dienen nur zur Unterrichtung und erfolgen ohne Gewähr.

10-07-2015

Im Recherchenbericht angeführtes Patentdokument	Datum der Veröffentlichung	Mitglied(er) der Patentfamilie	Datum der Veröffentlichung
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EPO FORM P0461

Für nähere Einzelheiten zu diesem Anhang : siehe Amtsblatt des Europäischen Patentamts, Nr.12/82

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Espacenet

Bibliographic data: WO0174654 (A1) — 2001-10-11

BICYCLE FORK AND PIVOT FOR SAME

Inventor(s):	GUEUGNEAUD JEAN-MARC [FR] + (GUEUGNEAUD, JEAN-MARC)
Applicant(s):	TIME SPORT INT [FR]; GUEUGNEAUD JEAN MARC [FR] + (TIME SPORT INTERNATIONAL, ; GUEUGNEAUD, JEAN-MARC)
Classification:	**- international:*B62K19/16; B62K21/04; B62K21/18;*** (IPC1-7): B62K19/16; B62K21/04; B62K21/18 **- cooperative: B62K19/16; B62K21/04; B62K21/18**
Application number:	WO2001FR00960 20010330 Global Dossier
Priority number (s):	FR20000004320 20000405
Also published as:	EP1268265 (A1) EP1268265 (B1) FR2807382 (A1) FR2807382 (B1) US2003038449 (A1) more

Abstract of WO0174654 (A1)

The invention concerns a bicycle fork comprising a fork head (2) from which two sleeves (3a, 3b) branch off and, on the side opposite to the sleeves, a tubular pivot (4) comprising a lower cylindrical portion (4a) integral with the fork head, and an upper cylindrical portion (4b) for fixing a stem. The external diameter (Da) of the lower cylindrical portion (4a) of the pivot is larger than the external diameter (Db) of the upper cylindrical portion (4b) of said pivot, and a transitional zone (4c) links the two parts (4a, 4b) with different diameters.

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DESCRIPTION WO0174654

BICYCLE FORK AND PIVOT FOR SUCH FORK.

The invention relates to a bicycle fork of the type of those comprising a fork head from which two sleeves depart and, on the opposite side to the sleeves, a tubular pivot having a cylindrical lower portion integral with the fork head, and a cylindrical upper part for fixing a stem.

It is known that, in a bicycle, the fork pivot is rotatably mounted in a bushing of the frame of the bicycle, generally by means of two bearings respectively provided at the bottom and at the top of the bushing. The cyclist, acting on a handlebar attached to the end of the stem, can thus orient the fork, and the front wheel, in a desired direction.

The connecting zone between the pivot and the fork head is a neuralgic point, particularly mechanically stressed.

The object of the invention is, above all, to provide a bicycle fork having, in the connection zone of the fork head and the pivot, a satisfactory rigidity, and ensuring a better distribution of the stresses on the bearings, in particular in the lower part. of the pivot, without resulting in a significant increase in the weight of the fork and the steering assembly.

According to the invention, a bicycle fork of the kind defined above is characterized in that the outside diameter of the cylindrical lower part of the pivot is greater than the outside diameter of the cylindrical upper part of this pivot, and a transition zone. ensures the connection between the two parts of different diameters of the pivot.

This solution makes it possible to reinforce the connection zone between the fork head and the pivot, without necessarily causing a significant increase in weight, since the upper part of the pivot retains a reduced outside diameter that does not cause any significant change in the weight of the fork. set of the pivot and the stem.

Preferably, the transition zone of the pivot has a frustoconical outer surface whose outer diameter decreases from the lower part to the upper part.

The fork is advantageously made of composite material, preferably in one piece with the pivot also made of composite material.

By the term "composite material" is meant a material consisting of high strength fibers, especially carbon or glass fibers, embedded in a resin matrix. Parts made of such material are generally molded.

In a variant, the pivot may be made of metal, in particular of light alloy. The fork can also be made of metal.

The pivot can be manufactured separately, and then assembled at the fork head.

Preferably, the diameter of the upper part of the pivot is equal to a standard diameter of bicycle pivot, in particular 25.4 mm or 28.6 mm. The diameter of the lower portion of the pivot is at least 5% (five percent), preferably at least 12% (twelve percent) greater than the diameter of the upper portion.

The pivot may have a cylindrical cavity with a circular section whose diameter remains constant from bottom to top.

The outer surface of the connection zone between the pivot and the fork head advantageously comprises a frustoconical surface for supporting a mating surface of an inner race ring. In the case of a fork and a pivot made of composite material, the fibers of the composite material are continuous in the connection zone.

The invention also relates to a bicycle fork pivot comprising a cylindrical lower part for connection with a fork head and a cylindrical upper part for fixing a bracket, characterized in that the outer diameter of the lower part cylindrical pivot is greater than the outer diameter of the cylindrical upper part of the pivot, and a transition zone provides the connection between the two parts of different diameters.

Advantageously, the transition zone of the pivot has a frustoconical outer surface, whose diameter decreases from bottom to top.

The invention also relates to a bicycle steering, in particular an integrated direction, comprising a fork as defined above.

When the bicycle steering comprises a fork with a connection zone between the pivot and the fork head which has a frustoconical outer surface, the direction comprises in the lower part of the frame bushing, a bearing whose inner ring has a surface of conjugate oblique support of the frustoconical surface of the connection zone.

The invention consists, apart from the arrangements set out above, of a certain number of other arrangements which will be more explicitly discussed hereinafter with regard to exemplary embodiments described in detail with reference to the appended drawings, but which are not in no way limiting. In these drawings: 1 is a schematic perspective view of a bicycle direction.

Fig. 2 is a vertical half-section and an external half-view of the connection zone of the pivot and the fork head according to the invention, partially shown.

Fig. 3 is a vertical section, with parts torn off, the pivot and the fork head and the sleeve of the frame housing the pivot.

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Fig. 4 is a perspective view of a vertical section of the partially shown fork and pivot.

Fig. 5, finally, is a vertical schematic section of a variant of the connecting zone between pivot and head of fork.

Referring to Fig. 1 of the drawings can be seen a bicycle fork 1 comprising a fork head 2 from which two sleeves 3a, 3b partially shown. Usually, each sleeve is provided at its lower end (not visible) with a tab for fixing the axis of the front wheel which passes between the sleeves.

The fork 1 comprises a tubular pivot 4 which, as visible in FIGS. 3 and 4, comprises a cylindrical bottom portion 4a of circular section, integral with the fork head 2 and a cylindrical top portion 4b with a circular section for fixing a bracket P. The outer diameter of the parts 4a, 4b is constant .

The terms "lower part", "upper part", "lower", "high" must of course be understood as applying to a bicycle in the vertical rolling position.

The fork 1 is rotatably mounted in a socket 5 of the bicycle frame C, generally with a first bearing provided at the bottom between the bushing 5 and the pivot 4 and a second bearing (not shown) provided at the top of the socket 5. In the example shown, the first bearing is formed by a bearing 6 schematically shown.

Generally, the second bearing is also formed by a bearing.

The two bearings may, however, be plain bearings.

The connecting zone 7 between the fork head 2 and the pivot 4 is a hotspot for which a distribution of the stresses is desired, as good as possible. The upper part 4b of the pivot, on the other hand, is subjected to lower stresses.

The outside diameter Da of the cylindrical lower part 4a of the pivot is greater than the outside

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diameter Db of the upper part 4b of the pivot. These two different diameters Da, Db, are provided on one and the same piece, the pivot 4.

A transition zone 4c provides the connection between the two parts 4a, 4b. This transition zone 4c has a frustoconical outer surface whose diameter decreases from bottom to top. Zone 4c extends over a relatively long length 1, in particular greater than 5 cm.

Currently, two outer diameters of fork pivot are standard in the field of cycling. A first diameter of 25.4 mm is generally used for road cycling, while a larger diameter of 28.6 mm is used for MTB bikes whose forks are subject to higher stresses. This larger diameter of 28.6 mm allows a better distribution of the stresses on the bearings, and an aspect more in agreement with the frames having oversized tubes.

The diameter Db of the upper part may be equal to one of the standard pivot diameters for cycling, 25.4 mm or 28.6 mm at present. Of course the value of the diameter Db is not fixed and can be chosen according to variable requirements, in particular according to variable standards.

The diameter Da of the lower part is preferably greater than at least 5%, advantageously at least 12%, to the diameter Db of the upper part.

The larger diameter Da allows, in the case of a fork made of composite material, to pass more fibers from the pivot 4 to the fork head 2 in the connecting zone 7 located radially inside the bearing or bearing 6. In the case of a metal pivot 4, the larger diameter Da ensures an increase in inertia and also improves the behavior of the fork.

The pivot 4 comprises a cylindrical inner cavity 8 with a circular inner section whose diameter remains constant along the entire length of the pivot. The thickness variation of the pivot is due solely to the variation of the outside diameter. Toward the lower end of the cylindrical cavity 8, a hole T of axis perpendicular to the mean plane of the fork passes through the fork head, for fixing a brake caliper.

Two diametral partitions at right angles, forming a cross, can be provided in the housing 8 to strengthen the pivot, especially when made of composite material. The average plane of one of the bulkheads is located in the longitudinal plane of symmetry of the fork.

The fork 1 is advantageously provided for an integrated direction, illustrated in FIGS. 1 to 3. The lower and upper bearings, invisible, are housed in the ends 5a, Sb, of greater diameter, of the bushing 5.

An inner bearing 9 (Fig. 2) is machined in the lower end 5a to support the outer ring of the bearing 6. The inner ring of this bearing bears against an inner surface 10 machined on the head 2 at the base of the pivot 4. A minimum clearance 11 exists between the lower edge of the sleeve 5 and the fork head.

The pivot of the invention allows to retain the advantages of the largest diameter at the connection with the fork head, without excessive weighting since it is possible, in the upper part, to mount a bracket corresponding to a smaller diameter of pivot, sufficient for the constraints existing at this place.

The bearing 6 is advantageously manufactured in a compact form so as to make it possible to produce, with the same bearing, a direction using either a constant outer diameter pivot for road cycling, generally 25.4 mm, or a pivot of constant outside diameter. for ATVs, generally 28.6 mm, the pivot according to the invention. For this, the inner ring of the bearing has an inner diameter provided for the pivot of larger diameter, and an outer diameter compatible with a frame sleeve associated with a small diameter pivot, for road cycling.

Referring to Fig. 5, we can see a particularly advantageous embodiment of the connection zone 107 between the pivot 104 and the fork head 102. The various elements playing roles similar to elements already described above are designated by a reference equal to the sum of the previous reference and the number 100.

In Fig. Only the lower portion 104a of the pivot is shown.

The outer diameter of the upper part (not shown) of the pivot 104 is smaller than that of this lower part 104a.

The bearing 106 comprises an inner ring 106a, an outer ring 106b, and rolling members 106c, in

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particular balls, arranged between raceways provided in the rings.

The inner ring 106a has, radially inwardly, a frustoconical oblique lower support surface 12 whose generatrices are inclined on the geometric axis of the bearing, advantageously at an angle of 45.degree. The radially inner surface of the ring 106a extends upwards, beyond the small base of the frustoconical surface 12, by a cylindrical surface 13 whose inside diameter has the same value as the outside diameter of the part 104a. pivot that serves as a guide.

The outer surface of the portion 104a is extended downward by a frustoconical surface 14 whose diameter increases downwardly. The frustoconical surface 14 belongs to the outer surface of the connecting zone 107. The inclination of the generatrices of the surface 14 on the geometric axis of the fork is the same as that of the generatrices of the surface 12 which applies and abuts against the surface 14.

The outer ring 106b has an outer surface, in the radial direction, having an upper portion 15 with an outer frustoconical surface whose diameter decreases upward, and a lower cylindrical portion 16 of the same diameter as the inner cylindrical surface of the sleeve 105. of the frame. The inclination of the generatrices of the surface 15 on the geometric axis of the bearing is advantageously 45. A shoulder 17 projecting inwardly of the sleeve 105 is provided with a frustoconical surface 18 support, conjugate surface 15 which is pressed against.

The connecting zone 107 with oblique surface 14 ensures a gradual transition from the lower part 104a of the pivot to the fork head 102. In the case of a pivot 104 and a fork head 102 of a single piece of composite material it is possible, thanks to the oblique support between the surfaces 12 and 14, to pass many continuous fibers F under the bearing 106, the pivot 104 at the fork head 102. The machining of a span such as in FIG. 2, with fiber cut.

The continuity of the fibers F is favorable to the mechanical strength of the connection between the pivot 104 and the fork head 102. In addition, the bearing surface 14 on the fork head, for the bearing 106, can be obtained directly from molding.

The bearing 106 may be made in compact form, with an inner diameter of the inner ring 106a as large as possible, to allow the passage of a large number of fibers F in the connection zone 107. The stress rate is thus reduced in the fragile section, and the safety is increased. According to an advantageous embodiment, but not limiting, the outer diameter of the bearing 106 is equal to 42

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mm, and its internal diameter equal to 33 mm.

In the case where a plain bearing is installed in place of the bearing 6,106, all that has been indicated previously remains valid.

The fork according to the invention, whose pivot is combined with a compact 6,106 bearing or a plain bearing, offers more freedom for the construction of the bicycle. The fork can be chosen independently of the sleeve 5,105 which allows to establish a range by adjusting the diameter of the sleeve while using the same bearing 6,106. Better mechanical behavior is achieved, and integrated direction can be used on some current frames.

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CLAIMS WO0174654

CLAIMS 1. Bicycle fork comprising a fork head (2) from which two sleeves (3a, 3b) and, on the opposite side to the sleeves, a tubular pivot (4,104) having a cylindrical lower part (4a, 104a) integral with the head fork, and a cylindrical upper part (4b) for fixing a bracket, characterized in that the outer diameter (Da) of the lower cylindrical part (4a, 104a) of the pivot is greater than the outer diameter (Db) the cylindrical upper part (4b) of this pivot, and a transition zone (4c) provides the connection between the two parts (4a, 104a; 4b) of different diameters of the pivot (4,104).

2.

Bicycle fork according to claim 1, characterized in that the transition zone (4c) of the pivot has a frustoconical outer surface whose outer diameter decreases from bottom to top.

3.

Bicycle fork according to claim 1 or 2, characterized in that it is made of composite material, in one piece with the pivot.

4.

Bicycle fork according to one of claims 1 to 3, characterized in that the diameter (Db) of the upper part of the pivot is equal to a standard diameter of a bicycle pivot, in particular to one of the two values 25.4 mm and 28.6 mm.

5.

Bicycle fork according to one of the preceding claims, characterized in that the diameter (Da) of the lower portion (4a, 104a) of the pivot is at least 5% (five per cent) greater than the diameter (Db) from the upper part.

6.

Bicycle fork according to Claim 5, characterized in that the diameter (Da) of the lower part (4a, 104a) of the pivot is at least 12% (12%) greater than the diameter (Db) of the part high.

7.

Bicycle fork according to one of the preceding claims, characterized in that the pivot (4) has a cylindrical cavity (8) of circular section whose diameter remains constant from bottom to top.

8.

Bicycle fork according to one of the preceding claims, characterized in that the outer surface of the connection zone (107) between the pivot (104) and the fork head (102) has a frustoconical surface (14) for support for a combined surface of an inner race ring.

9.

Bicycle fork according to claim 3, characterized in that the outer surface of the connecting zone

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(107) between the pivot (104) and the fork head (102) has a frustoconical surface (14) for supporting to a mating surface of an inner race, and that the fibers (F) of the composite material are continuous in the connecting region (107), from the pivot (104) to the fork head (102).

10.

Bicycle fork pivot having a cylindrical lower portion for connection to a fork head and a cylindrical upper portion for attaching a stem, characterized in that the outer diameter (Da) of the cylindrical lower portion (4a, 104a)) of the pivot is greater than the outer diameter (Db) of the cylindrical upper part (4b) of the pivot, and a transition zone (4c) provides the connection between the two parts of different diameters.

11.

Bicycle fork pivot according to claim 10, characterized in that the transition zone (4c) of the pivot has a frustoconical outer surface, the diameter of which decreases from the lower part to the upper part.

12.

Bicycle fork pivot according to claim 10 or 11, characterized in that it has a cylindrical cavity (8) of circular section whose diameter remains constant.

13.

Bicycle steering, in particular integrated steering, comprising a fork according to one of claims 1 to 9.

14.

Bicycle steering, in particular integrated steering, comprising a fork according to claim 8 or 9,

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characterized in that it comprises, in the lower part of the frame bushing, a bearing (106) whose inner ring (106a) comprises an oblique bearing surface (12) conjugate with the frustoconical surface (14) of the connection zone (107)

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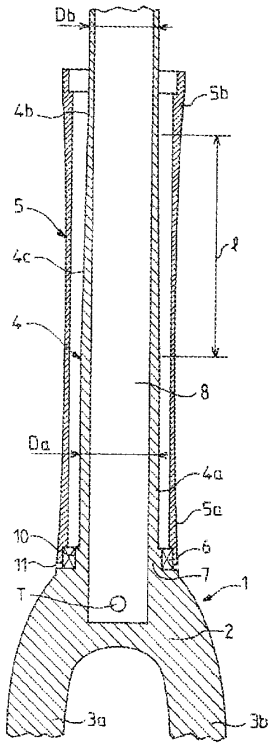
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(54) Title: BICYCLE FORK AND PIVOT FOR SAME

(54) Titre : FOURCHE DE BICYCLETTE ET PIVOT POUR UNE TELLE FOURCHE



(57) Abstract: The invention concerns a bicycle fork comprising a fork head (2) from which two sleeves (3a, 3b) branch off and, on the side opposite to the sleeves, a tubular pivot (4) comprising a lower cylindrical portion (4a) integral with the fork head, and an upper cylindrical portion (4b) for fixing a stem. The external diameter (Da) of the lower cylindrical portion (4a) of the pivot is larger than the external diameter (Db) of the upper cylindrical portion (4b) of said pivot, and a transitional zone (4c) links the two parts (4a, 4b) with different diameters.

(57) Abrégé : Fourche de bicyclette comprenant une tête de fourche (2) d'où partent deux fourreaux (3a, 3b) et, du côté opposé aux fourreaux, unpivot tubulaire (4) comportant une partie basse cylindrique (4a) solidaire de la tête de fourche, et une partie haute cylindrique (4b) pour la fixation d'une potence. Le diamètre extérieur (Da) de la partie basse cylindrique (4a) du pivot est supérieur au diamètre extérieur (Db) de la partie haute cylindrique (4b) de ce pivot, et une zone de transition (4c) assure la liaison entre les deux parties (4a, 4b) de diamètres différents.

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En ce qui concerne les codes à deux lettres et autres abréviations, se référer aux "Notes explicatives relatives aux codes et abréviations" figurant au début de chaque numéro ordinaire de la Gazette du PCT.

FOURCHE DE BICYCLETTE ET PIVOT POUR UNE TELLE FOURCHE.

L'invention est relative à une fourche de bicyclette du genre de celles qui comprennent une tête de fourche d'où partent deux fourreaux et, du côté opposé aux fourreaux, un pivot tubulaire comportant une partie basse cylindrique solidaire de la tête de fourche, et une partie haute cylindrique pour la fixation d'une potence.

On sait que, dans une bicyclette, le pivot de fourche est monté à rotation dans une douille du cadre de la bicyclette, généralement par l'intermédiaire de deux roulements prévus respectivement en bas et en haut de la douille. Le cycliste, en agissant sur un guidon fixé à l'extrémité de la potence, peut ainsi orienter la fourche, et la roue avant, dans une direction souhaitée.

La zone de liaison entre le pivot et la tête de fourche constitue un point névralgique, particulièrement sollicité mécaniquement.

L'invention a pour but, surtout, de procurer une fourche de bicyclette présentant, dans la zone de liaison de la tête de fourche et du pivot, une rigidité satisfaisante, et assurant une meilleure répartition des contraintes sur les roulements, notamment en partie basse du pivot, sans qu'il en résulte une augmentation sensible du poids de la fourche et de l'ensemble de direction.

Selon l'invention, une fourche de bicyclette du genre défini précédemment est caractérisée par le fait que le diamètre extérieur de la partie basse cylindrique du pivot est supérieur au diamètre extérieur de la partie haute cylindrique de ce pivot, et qu'une zone de transition assure la liaison entre les deux parties de diamètres différents du pivot.

Cette solution permet de renforcer la zone de liaison entre la tête de fourche et le pivot, sans pour autant entraîner une augmentation de poids sensible car la partie haute du pivot conserve un diamètre extérieur réduit n'entraînant pas de modification sensible du poids de l'ensemble du pivot et de la potence.

De préférence, la zone de transition du pivot présente une surface extérieure tronconique dont le diamètre extérieur diminue de la partie basse à la partie haute.

La fourche est avantageusement réalisée en matériau composite, de préférence d'une seule pièce avec le pivot également en matériau composite.

On désigne par l'expression "matériau composite" un matériau constitué de fibres à haute résistance mécanique, notamment fibres de carbone ou de verre, noyées dans une matrice de résine. Les pièces fabriquées en un tel matériau sont généralement moulées.

En variante, le pivot peut être réalisé en métal, notamment en alliage léger. La fourche peut également être réalisée en métal.

Le pivot peut être fabriqué séparément, puis être assemblé à la tête de fourche.

De préférence, le diamètre de la partie haute du pivot est égal à un diamètre standard de pivot de bicyclette, en particulier 25,4 mm ou 28,6 mm. Le diamètre de la partie basse du pivot est supérieur d'au moins 5%(cinq pour cent), avantageusement d'au moins 12%(douze pour cent), au diamètre de la partie haute.

Le pivot peut présenter une cavité cylindrique à section circulaire dont le diamètre reste constant de bas en haut.

La surface extérieure de la zone de liaison entre le pivot et la tête de fourche comporte avantageusement une surface tronconique pour servir d'appui à une surface conjuguée d'une bague intérieure de roulement. Dans le cas d'une fourche et d'un pivot en matériau composite , les fibres du matériau composite sont continues dans la zone de liaison .

L'invention est également relative à un pivot de fourche de bicyclette comportant une partie basse cylindrique pour liaison avec une tête de fourche et une partie haute cylindrique pour la fixation d'une potence, caractérisé par le fait que le diamètre extérieur de la partie basse cylindrique du pivot est supérieur au diamètre extérieur de la partie haute cylindrique du pivot, et qu'une zone de transition assure la liaison entre les deux parties de diamètres différents.

Avantageusement, la zone de transition du pivot présente une surface extérieure tronconique, dont le diamètre diminue de bas en haut.

L'invention est également relative à une direction de bicyclette, en particulier une direction intégrée, comportant une fourche telle que définie précédemment.

Lorsque la direction de bicyclette comporte une fourche avec zone de liaison entre le pivot et la tête de fourche qui présente une surface extérieure tronconique , la direction comporte en partie basse de la douille de cadre , un roulement dont la bague intérieure présente une surface d'appui oblique conjuguée de la surface tronconique de la zone de liaison.

L'invention consiste, mises à part les dispositions exposées ci-dessus, en un certain nombre d'autres dispositions dont il sera plus explicitement question ci-après à propos d'exemples de réalisation décrits en détail avec référence aux dessins annexés, mais qui ne sont nullement limitatifs. Sur ces dessins :

Fig.1 est une vue schématique en perspective d'une direction de bicyclette.

Fig. 2 est une demi-coupe verticale et une demi-vue en extérieur de la zone de liaison du pivot et de la tête de fourche selon l'invention , partiellement représentée.

Fig.3 est une coupe verticale, avec parties arrachées, du pivot et de la tête de fourche ainsi que de la douille du cadre logeant le pivot.

Fig. 4 est une vue en perspective d'une coupe verticale de la fourche partiellement représentée et du pivot.

Fig. 5, enfin, est une coupe schématique verticale d'une variante de la zone de liaison entre pivot et tête de fourche.

En se reportant à Fig.1 des dessins on peut voir une fourche de bicyclette 1 comprenant une tête de fourche 2 d'où partent deux fourreaux 3a, 3b partiellement représentés. De manière usuelle, chaque fourreau est muni à son extrémité inférieure (non visible) d'une patte pour la fixation de l'axe de la roue avant qui passe entre les fourreaux.

La fourche 1 comprend un pivot 4 tubulaire qui, comme visible sur les Figs. 3 et 4, comporte une partie basse 4a cylindrique à section circulaire, solidaire de la tête de fourche 2 et une partie haute 4b cylindrique à section circulaire pour la fixation d'une potence P. Le diamètre extérieur des parties 4a, 4b, est constant.

Les expressions "partie basse", "partie haute", "bas", "haut", doivent bien entendu être comprises comme s'appliquant à une bicyclette en position verticale de roulage.

La fourche 1 est montée à rotation dans une douille 5 du cadre C de bicyclette, généralement à l'aide d'un premier palier prévu en partie basse entre la douille 5 et le pivot 4 et d'un second palier (non représenté) prévu en partie haute de la douille 5. Dans l'exemple illustré, le premier palier est formé par un roulement 6 schématiquement représenté. Généralement, le deuxième palier est également formé par un roulement. Les deux paliers peuvent cependant être des paliers lisses.

La zone de liaison 7 entre la tête 2 de fourche et le pivot 4 constitue un point névralgique pour lequel on souhaite une répartition des

contraintes aussi bonne que possible. La partie haute 4b du pivot par contre est soumise à des sollicitations moins fortes.

Le diamètre extérieur Da de la partie basse cylindrique 4a du pivot est supérieur au diamètre extérieur Db de la partie haute 4b du pivot. Ces deux diamètres différents Da, Db, sont prévus sur une seule et même pièce, le pivot 4.

Une zone de transition 4c assure la liaison entre les deux parties 4a, 4b. Cette zone de transition 4c présente une surface extérieure tronconique dont le diamètre diminue de bas en haut. La zone 4c s'étend sur une longueur l relativement grande, en particulier supérieure à 5 cm.

Actuellement, deux diamètres extérieurs de pivot de fourche font office de standard dans le domaine du cyclisme. Un premier diamètre de 25,4 mm est généralement utilisé pour le cyclisme sur route, tandis qu'un diamètre plus fort de 28,6 mm est utilisé pour les bicyclettes VTT dont les fourches sont soumises à des contraintes plus élevées. Ce diamètre plus important de 28,6 mm permet une meilleure répartition des contraintes sur les roulements, et un aspect plus en accord avec les cadres ayant des tubes surdimensionnés.

Le diamètre Db de la partie haute peut être égal à l'un des diamètres standards de pivot pour le cyclisme, soit 25,4 mm ou 28,6 mm actuellement. Bien entendu la valeur du diamètre Db n'est pas figée et peut être choisie selon des exigences variables, en particulier selon des standards variables.

Le diamètre Da de la partie basse est de préférence supérieur d'au moins 5% , avantageusement d'au moins 12%, au diamètre Db de la partie haute.

Le diamètre Da plus important permet, dans le cas d'une fourche réalisée en matériau composite, de faire passer davantage de fibres du pivot 4 à la tête de fourche 2 dans la zone de liaison 7 située radialement à l'intérieur du roulement ou palier 6. Dans le cas d'un pivot 4 métallique, le diamètre Da plus important assure une augmentation de l'inertie et améliore aussi le comportement de la fourche.

Le pivot 4 comporte une cavité intérieure cylindrique 8 à section intérieure circulaire dont le diamètre reste constant suivant toute la longueur du pivot. La variation d'épaisseur du pivot est due uniquement à la variation du diamètre extérieur. Vers l'extrémité inférieure de la cavité cylindrique 8 , un trou T d'axe perpendiculaire au plan moyen de la fourche traverse la tête de fourche , pour la fixation d'un étrier de frein.

Deux cloisons diamétrales à angle droit, formant une croix, peuvent être prévues dans le logement 8 pour renforcer le pivot, notamment lorsqu'il est réalisé en matériau composite. Le plan moyen de l'une des cloisons est situé dans le plan longitudinal de symétrie de la fourche.

La fourche 1 est avantageusement prévue pour une direction intégrée, illustrée sur Figs. 1 à 3. Les cuvettes de direction des roulements inférieur et supérieur, invisibles, sont logées dans les extrémités 5a, 5b, de plus fort diamètre, de la douille 5.

Une portée intérieure 9 (Fig.2) est usinée dans l'extrémité inférieure 5a pour l'appui de la bague extérieure du roulement 6. La bague intérieure de ce roulement est en appui contre une portée intérieure 10 usinée sur la tête 2 à la base du pivot 4. Un jeu minimum 11 existe entre le bord inférieur de la douille 5 et la tête de fourche.

Le pivot de l'invention permet de conserver les avantages du plus fort diamètre au niveau de la liaison avec la tête de fourche, sans alourdissement excessif puisqu'il est possible, en partie haute, de monter une potence correspondant à un plus petit diamètre de pivot, suffisant pour les contraintes existant à cet endroit.

Le roulement 6 est avantageusement fabriqué sous forme compacte de manière à permettre de réaliser, avec un même roulement, une direction utilisant soit un pivot de diamètre extérieur constant pour cyclisme sur route, généralement de 25,4 mm, soit un pivot de diamètre extérieur constant pour VTT, généralement de 28,6 mm, soit le pivot selon l'invention. Pour cela, la bague interne du roulement présente un diamètre intérieur prévu pour le pivot de plus fort diamètre, et un diamètre extérieur compatible avec une douille de cadre associé à un pivot de petit diamètre, pour le cyclisme sur route.

En se reportant à Fig. 5, on peut voir une variante de réalisation particulièrement avantageuse de la zone de liaison 107 entre le pivot 104 et la tête de fourche 102. Les différents éléments jouant des rôles semblables à des éléments déjà décrits précédemment sont désignés par une référence égale à la somme de la référence précédente et du nombre 100.

Sur Fig. 5 seule la partie basse 104a du pivot est représentée. Le diamètre extérieur de la partie haute (non représentée) du pivot 104 est inférieur à celui de cette partie basse 104a.

Le roulement 106 comprend une bague intérieure 106a, une bague extérieure 106b, et des organes de roulement 106c, en particulier des billes, disposés entre des chemins de roulement prévus dans les bagues.

La bague intérieure 106a présente, vers l'intérieur dans le sens radial, une surface d'appui inférieure oblique 12 tronconique dont les génératrices sont inclinées sur l'axe géométrique du roulement, avantageusement suivant un angle de 45°. La surface intérieure dans le sens radial de la bague 106a se prolonge vers le haut, au-delà de la petite base de la surface tronconique 12, par une surface cylindrique 13 dont le diamètre intérieur a même valeur que le diamètre extérieur de la partie 104a du pivot qui sert de guide.

La surface extérieure de la partie 104a est prolongée vers le bas par une surface tronconique 14 dont le diamètre augmente vers le bas. La surface tronconique 14 appartient à la surface extérieure de la zone de liaison 107. L'inclinaison des génératrices de la surface 14 sur l'axe géométrique de la fourche est la même que celle des génératrices de la surface 12 qui s'applique et bute contre la surface 14.

La bague extérieure 106b présente une surface extérieure, dans le sens radial, comportant une partie haute 15 avec une surface tronconique extérieure dont le diamètre diminue vers le haut, et une partie basse 16 cylindrique de même diamètre que la surface cylindrique interne de la douille 105 du cadre. L'inclinaison des génératices de la surface 15 sur l'axe géométrique du roulement est avantageusement de 45°. Un épaulement 17 faisant saillie vers l'intérieur de la douille 105 est prévu avec une surface tronconique 18 d'appui, conjuguée de la surface 15 qui vient s'appliquer contre.

La zone de liaison 107 avec surface oblique 14 assure une transition progressive de la partie basse 104a du pivot à la tête de fourche 102. Dans le cas d'un pivot 104 et d'une tête de fourche 102 d'une seule pièce en matériau composite il est possible, grâce à l'appui oblique entre les surfaces 12 et 14, de faire passer de nombreuses fibres continues F sous le roulement 106, du pivot 104 à la tête de fourche 102. On évite l'usinage d'une portée telle que 10 sur Fig.2, avec coupure de fibres.

La continuité des fibres F est favorable à la résistance mécanique de la liaison entre le pivot 104 et la tête de fourche 102. En outre, la surface d'appui 14 sur la tête de fourche, pour le roulement 106, peut être obtenue directement de moulage.

Le roulement 106 peut être réalisé sous forme compacte, avec un diamètre intérieur de la bague intérieure 106a aussi grand que possible, pour permettre le passage d'un nombre élevé de fibres F dans la zone de liaison 107. Le taux de contrainte est ainsi diminué dans la section fragile, et la sécurité est augmentée. Selon un exemple de réalisation avantageux, mais non limitatif, le diamètre extérieur du roulement 106 est égal à 42 mm , et son diamètre intérieur égal à 33 mm.

Dans le cas où un palier lisse est installé en lieu et place du roulement 6, 106, tout ce qui a été indiqué précédemment reste valable.

La fourche selon l'invention, dont le pivot est combiné avec un roulement 6, 106 compact ou un palier lisse, offre davantage de libertés pour la construction de la bicyclette. La fourche peut être choisie indépendamment de la douille 5, 105 ce qui permet d'établir une gamme en jouant sur le diamètre de la douille tout en utilisant le même roulement 6, 106. On obtient un meilleur comportement mécanique, et on peut utiliser la direction intégrée sur certains cadres actuels.

REVENDICATIONS

1. Fourche de bicyclette comprenant une tête de fourche (2) d'où partent deux fourreaux (3a,3b) et, du côté opposé aux fourreaux, un pivot tubulaire (4, 104) comportant une partie basse cylindrique (4a, 104a) solidaire de la tête de fourche, et une partie haute cylindrique (4b) pour la fixation d'une potence, caractérisée par le fait que le diamètre extérieur (Da) de la partie basse cylindrique (4a, 104a) du pivot est supérieur au diamètre extérieur (Db) de la partie haute cylindrique (4b) de ce pivot, et qu'une zone de transition (4c) assure la liaison entre les deux parties (4a, 104a ; 4b) de diamètres différents du pivot (4, 104).

2. Fourche de bicyclette selon la revendication 1, caractérisée par le fait que la zone de transition (4c) du pivot présente une surface extérieure tronconique dont le diamètre extérieur diminue de bas en haut.

3. Fourche de bicyclette selon la revendication 1 ou 2, caractérisée par le fait qu'elle est réalisée en matériau composite , d'une seule pièce avec le pivot.

4. Fourche de bicyclette selon l'une des revendications 1 à 3, caractérisée par le fait que le diamètre (Db) de la partie haute du pivot est égal à un diamètre standard d'un pivot de bicyclette , en particulier à l'une des deux valeurs 25,4 mm et 28,6 mm .

5. Fourche de bicyclette selon l'une des revendications précédentes, caractérisée par le fait que le diamètre (Da) de la partie basse (4a, 104a) du pivot est supérieur d'au moins 5%(cinq pour cent) au diamètre (Db) de la partie haute.

6. Fourche de bicyclette selon la revendication 5, caractérisée par le fait que le diamètre (Da) de la partie basse (4a, 104a) du pivot est supérieur d'au moins 12%(douze pour cent) au diamètre (Db) de la partie haute.

7. Fourche de bicyclette selon l'une des revendications précédentes, caractérisée par le fait que le pivot (4) présente une cavité cylindrique (8) à section circulaire dont le diamètre reste constant de bas en haut.

8. Fourche de bicyclette selon l'une des revendications précédentes,

caractérisée par le fait que la surface extérieure de la zone de liaison (107) entre le pivot (104) et la tête de fourche (102) comporte une surface tronconique (14) pour servir d'appui à une surface conjuguée d'une bague intérieure de roulement.

9. Fourche de bicyclette selon la revendication 3, caractérisée par le fait que la surface extérieure de la zone de liaison (107) entre le pivot (104) et la tête de fourche (102) comporte une surface tronconique (14) pour servir d'appui à une surface conjuguée d'une bague intérieure de roulement, et que les fibres (F) du matériau composite sont continues dans la zone de liaison (107), du pivot (104) à la tête de fourche (102).

10. Pivot de fourche de bicyclette comportant une partie basse cylindrique pour liaison à une tête de fourche et une partie haute cylindrique pour la fixation d'une potence, caractérisé par le fait que le diamètre extérieur (Da) de la partie basse cylindrique (4a, 104a) du pivot est supérieur au diamètre extérieur (Db) de la partie haute cylindrique (4b) du pivot, et qu'une zone de transition (4c) assure la liaison entre les deux parties de diamètres différents.

11. Pivot de fourche de bicyclette selon la revendication 10, caractérisé par le fait que la zone de transition (4c) du pivot présente une surface extérieure tronconique, dont le diamètre diminue de la partie basse vers la partie haute.

12. Pivot de fourche de bicyclette selon la revendication 10 ou 11, caractérisé par le fait qu'il présente une cavité cylindrique (8) à section circulaire dont le diamètre reste constant.

13. Direction de bicyclette, en particulier direction intégrée, comportant une fourche selon l'une des revendications 1 à 9.

14. Direction de bicyclette, en particulier direction intégrée, comportant une fourche selon la revendication 8 ou 9, caractérisée par le fait qu'elle comporte, en partie basse de la douille de cadre , un roulement (106) dont la bague intérieure (106a) comporte une surface d'appui oblique (12) conjuguée de la surface tronconique (14) de la zone de liaison (107)

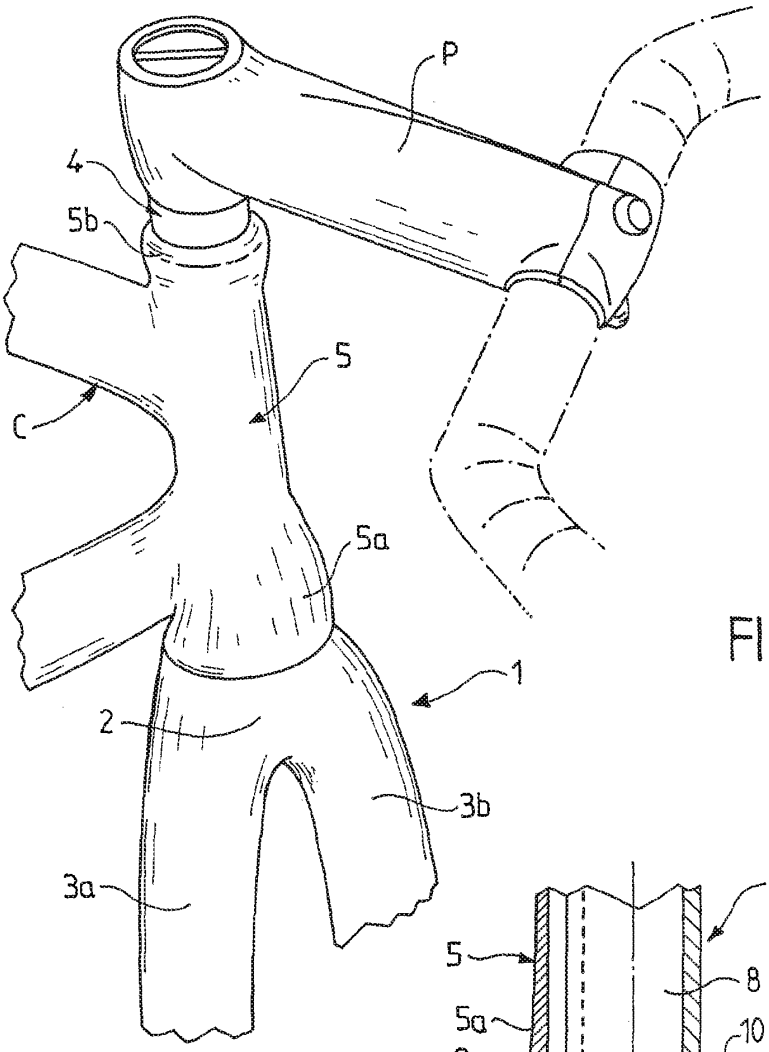


FIG.1

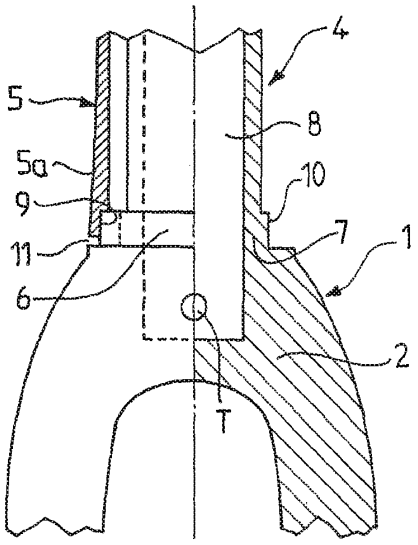


FIG.2

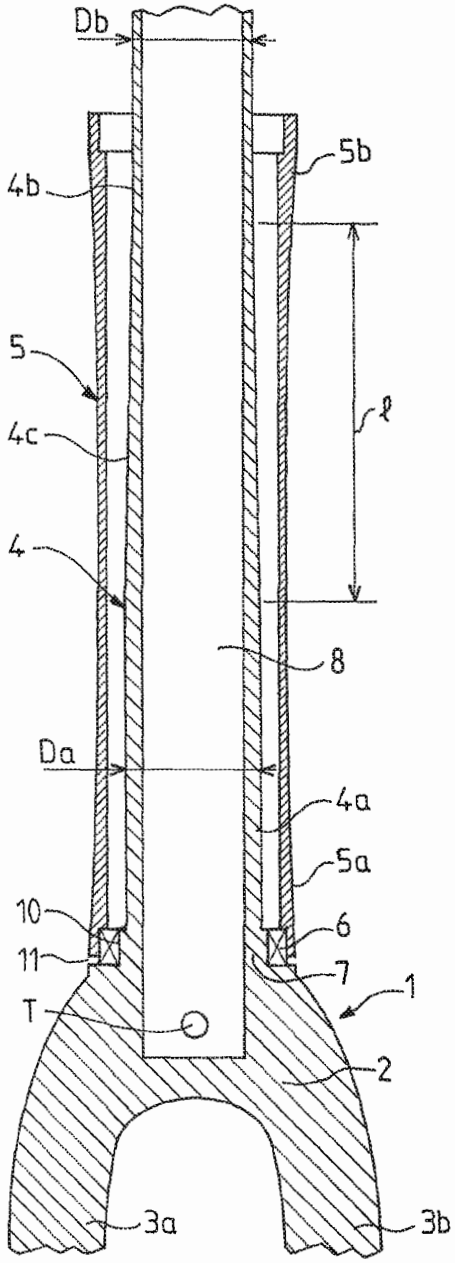


FIG. 3

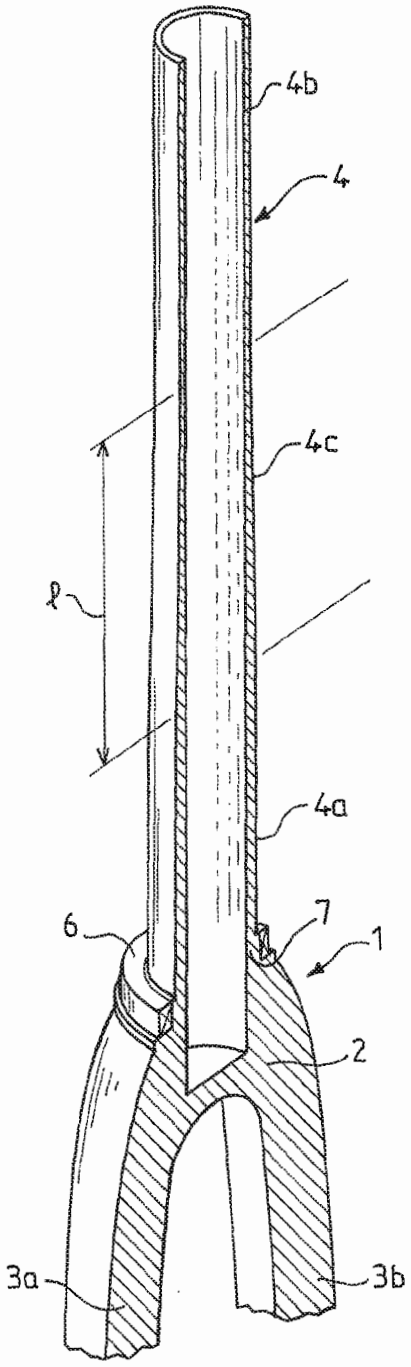


FIG. 4

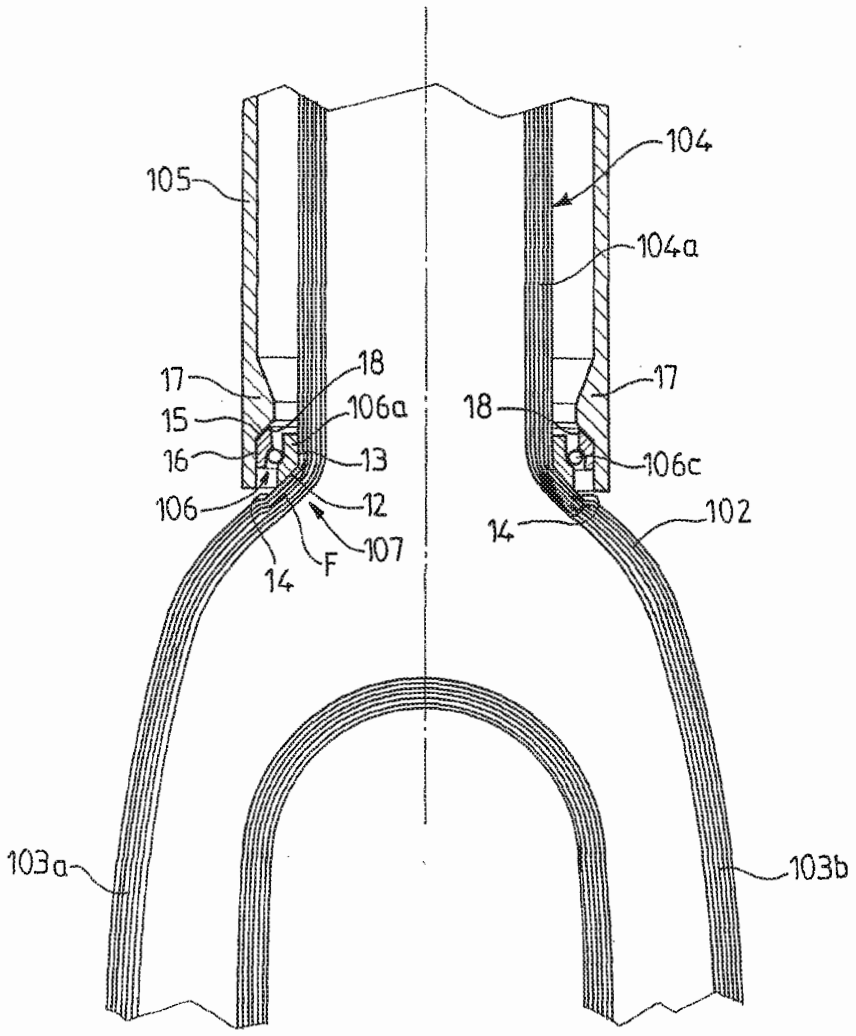

105
104
104a
17
18
15
106a
16
13
106
12
107
14
F
18
17
106c
14
102
103a
103b

FIG.5

INTERNATIONAL SEARCH REPORT

Inte onal Application No
PCT/FR 01/00960

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 B62K21/18 B62K19/16 B62K21/04

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 B62K

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

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	DE 38 04 342 A (KLAUE HERMANN) 24 August 1989 (1989-08-24) column 2, line 24 - line 52; figures 4,5	1,2,4-7, 10-13 3,8,14
Y A	US 4 828 285 A (FORET REGIS ET AL) 9 May 1989 (1989-05-09) column 3, line 37 -column 4, line 36; figures	3 9
Y A	DE 299 20 238 U (CHI YI CHEN) 10 February 2000 (2000-02-10) figures 2,3	8,14 9

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

☒ Patent family members are listed in annex.

° Special categories of cited documents :

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

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

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

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
15 June 2001	02/08/2001

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Grunfeld, M

1

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

formation on patent family members

Int ional Application No
PCT/FR 01/00960

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 3804342 A	24-08-1989	DE 3812510 A	26-10-1989
US 4828285 A	09-05-1989	FR 2589121 A	30-04-1987
		CA 1278589 A	02-01-1991
		DE 3670057 D	10-05-1990
		EP 0230839 A	05-08-1987
		JP 63002786 A	07-01-1988
DE 29920238 U	10-02-2000	NONE	

Form PCT/ISA/210 (patent family annex) (July 1992)

RAPPORT DE RECHERCHE INTERNATIONALE

Demande internationale No
PCT/FR 01/00960

A. CLASSEMENT DE L'OBJET DE LA DEMANDE
CIB 7 B62K21/18 B62K19/16 B62K21/04

Selon la classification internationale des brevets (CIB) ou à la fois selon la classification nationale et la CIB

B. DOMAINES SUR LESQUELS LA RECHERCHE A PORTE

Documentation minimale consultée (système de classification suivi des symboles de classement)
CIB 7 B62K

Documentation consultée autre que la documentation minimale dans la mesure où ces documents relèvent des domaines sur lesquels a porté la recherche

Base de données électronique consultée au cours de la recherche internationale (nom de la base de données, et si réalisable, termes de recherche utilisés)
EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERES COMME PERTINENTS

Catégorie °	Identification des documents cités, avec, le cas échéant, l'indication des passages pertinents	no. des revendications visées
X Y	DE 38 04 342 A (KLAUE HERMANN) 24 août 1989 (1989-08-24) colonne 2, ligne 24 - ligne 52; figures 4,5	1,2,4-7, 10-13 3,8,14
Y A	US 4 828 285 A (FORET REGIS ET AL) 9 mai 1989 (1989-05-09) colonne 3, ligne 37 -colonne 4, ligne 36; figures	3 9
Y A	DE 299 20 238 U (CHI YI CHEN) 10 février 2000 (2000-02-10) figures 2,3	8,14 9

☐ Voir la suite du cadre C pour la fin de la liste des documents

☒ Les documents de familles de brevets sont indiqués en annexe

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Date à laquelle la recherche internationale a été effectivement achevée	Date d'expédition du présent rapport de recherche internationale
15 juin 2001	02/08/2001

Nom et adresse postale de l'administration chargée de la recherche internationale	Fonctionnaire autorisé
Office Européen des Brevets, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Grunfeld, M

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Formulaire PCT/ISA/210 (deuxième feuille) (juillet 1992)

RAPPORT DE RECHERCHE INTERNATIONALE

Renseignements relatifs membres de familles de brevets

De le internationale No
PCT/FR 01/00960

Document brevet cité au rapport de recherche		Date de publication	Membre(s) de la famille de brevet(s)		Date de publication
DE 3804342	A	24-08-1989	DE	3812510 A	26-10-1989
US 4828285	A	09-05-1989	FR	2589121 A	30-04-1987
			CA	1278589 A	02-01-1991
			DE	3670057 D	10-05-1990
			EP	0230839 A	05-08-1987
			JP	63002786 A	07-01-1988
DE 29920238	U	10-02-2000	AUCUN		

Formulaire PCT/ISA/210 (annexe familles de brevets) (juillet 1992)

Electronic Patent Application Fee Transmittal					
Application Number:	14585629				
Filing Date:	30-Dec-2014				
Title of Invention:	Bicycle Steerer Tube with Variant Stiffness				
First Named Inventor/Applicant Name:	Jonathan Blair Watt				
Filer:	Brian Thomas Gause/Billie Hinnen				
Attorney Docket Number:	RS180US				
Filed as Large Entity					
Filing Fees for Utility under 35 USC 111(a)					
Description		**Fee Code**	**Quantity**	**Amount**	**Sub-Total in USD($)**
Basic Filing:					
Pages:					
Claims:					
Miscellaneous-Filing:					
Petition:					
Patent-Appeals-and-Interference:					
Post-Allowance-and-Post-Issuance:					
Extension-of-Time:					

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension - 1 month with $0 paid	1251	1	200	200
Miscellaneous:				
		Total in USD ($)		**200**

Electronic Acknowledgement Receipt	
EFS ID:	32324241
Application Number:	14585629
International Application Number:	
Confirmation Number:	8583
Title of Invention:	Bicycle Steerer Tube with Variant Stiffness
First Named Inventor/Applicant Name:	Jonathan Blair Watt
Customer Number:	23470
Filer:	Brian Thomas Gause/Billie Hinnen
Filer Authorized By:	Brian Thomas Gause
Attorney Docket Number:	RS180US
Receipt Date:	12-APR-2018
Filing Date:	30-DEC-2014
Time Stamp:	16:17:34
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$200
RAM confirmation Number	041318INTEFSW00002857600322
Deposit Account	600322
Authorized User	Billie Hinnen
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37 CFR 1.19 (Document supply fees)

37 CFR 1.20 (Post Issuance fees)

37 CFR 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		RS180_20180417_NFOAR_Final.pdf	550864 9758f321e88832be8e5c871b527320deaac74f56	yes	16
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Amendment/Req. Reconsideration-After Non-Final Reject		1	1	
	Claims		2	13	
	Applicant Arguments/Remarks Made in an Amendment		14	16	
Warnings:					
Information:					
2	Information Disclosure Statement (IDS) Form (SB08)	RS180US_18-04-12_IDS_Submitted.pdf	1035280 7f2403e57a6b9585420629b48d69b0ae02048278	no	4
Warnings:					
Information:					
3	Foreign Reference	CN2228046.pdf	4130301 5f43ff6941b114930dda43facaf7b9e91933580f	no	14
Warnings:					
Information:					
4	Foreign Reference	CN202557710.pdf	1497718 b9ec5ee099783c92cd0370bfd8476e4f25b1fe93	no	9
Warnings:					
Information:					
5	Foreign Reference	EP2930094.pdf	8374731 b2641bbf2043d08dc509ae473680d2aa3d1b6bbd	no	46

Warnings:					
Information:					
6	Foreign Reference	WO0174654.pdf	4983522 7fb1a0f4333b3089a2db213862f5ddc8f9fe4a80	no	31
Warnings:					
Information:					
7	Fee Worksheet (SB06)	fee-info.pdf	30661 6cddf2096ebede423510d1dc1366554296f585a4	no	2
Warnings:					
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		Total Files Size (in bytes):	20603077		

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If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.
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If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
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PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 14/585,629	Filing Date 12/30/2014	☐ To be Mailed

ENTITY: ☒ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED – PART I

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

APPLICATION AS AMENDED – PART II

AMENDMENT **04/12/2018**

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	* 67	Minus	** 67	= 0	X $100 =	0
Independent (37 CFR 1.16(h))	* 1	Minus	***3	= 0	X $460 =	0
☐ Application Size Fee (37 CFR 1.16(s))						
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
					TOTAL ADD'L FEE	0

AMENDMENT

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =	
☐ Application Size Fee (37 CFR 1.16(s))						
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
					TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
ERIC V. BURNS

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

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

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14/585,629	Watt et al.
	Examiner	Art Unit
	Marlon A Arce	3611

CPC - Searched*		
Symbol	Date	Examiner
b62k21/04, b62k19/32, b62k21/18, b62k19/02	07/07/2017	MAA
update	01/11/2018	MAA

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
conducted applicant search	06/29/2017	MAA

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/585,629	12/30/2014	Jonathan Blair Watt	RS180US	8583

23470 7590 01/17/2018

SRAM, LLC
1000 W. Fulton Market, 4th Floor
CHICAGO, ILLINOIS 60607

EXAMINER	
ARCE, MARLON ALEXANDER	

ART UNIT	PAPER NUMBER
3611	

NOTIFICATION DATE	DELIVERY MODE
01/17/2018	ELECTRONIC

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

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

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

bgause@sram.com
bhinnen@sram.com
lserdynski@sram.com

Office Action Summary	Application No. 14/585,629	Applicant(s) Watt et al.	
	Examiner Marlon A Arce	Art Unit 3611	AIA Status Yes

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

Period for Reply

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

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

Status

1)☑ Responsive to communication(s) filed on 10/3/17 .

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____ .

2a)☐ This action is **FINAL.** 2b) ☑ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5) ☑ Claim(s) 1-5,7-9,11-25,27-29 and 31-40 is/are pending in the application.

5a) Of the above claim(s) 6,10,26,30 and 41-67 is/are withdrawn from consideration.

6) ☐ Claim(s) _____ is/are allowed.

7) ☑ Claim(s) 1-2,11-13 and 17-20 is/are rejected.

8) ☑ Claim(s) 3-5,7-9,14-16,21-25,27-29 and 31-40 is/are objected to.

9) ☐ Claim(s) _____ are subject to restriction and/or election requirement

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

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

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

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

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

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

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

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

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

4) ☐ Other: _____.

Notice of Pre-AIA or AIA Status

The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Response to Arguments

1. Applicant's arguments, see remarks, filed 10/3/17, with respect to the rejection of claims 1-5,7,8,11,12,14-25,27-29,31,32 and 34-40 in view of Moechnig (US 7909346) have been fully considered and are persuasive. The rejection of the claims has been withdrawn. However, the claims are being rejected in view of Murphy (US 2007/0257466). Examiner apologizes for the misunderstanding of the last paragraph in claim 1.

Claim Rejections - 35 USC § 102

2. In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a)(1) the claimed invention was patented, described in a printed publication, or in public use, on sale or otherwise available to the public before the effective filing date of the claimed invention.

4. Claim(s) 1,2,11,12 and 17-20 is/are rejected under 35 U.S.C. 102(a)(1) as being anticipated by Murphy (US 2007/0257466). Murphy discloses a bicycle fork assembly and steer tube comprising:

> an elongate hollow body (14) arranged around a steering axis (axis going vertically through the center of tube 14 in figure 1) located in a vertical plane of travel of the bicycle,

the body having upper (40,section closer to the where the handlebar stem would be placed, see Para. 0016) and lower (42,closer to the crown 20) sections, a segment of the upper section adapted to be joined to a bicycle handlebar (Para. 0016), a segment of the lower section adapted to be joined to a crown of a front wheel fork of the bicycle (see figure 2), the lower section joined to the upper section, and

the body formed by a wall (wall of body 14), a thickness of the wall at any point in the lower section of the body varying as a function of the cross-sectional angle of the point relative to the plane of travel (see Para. 0033), the wall thickness being at a maximum in the plane of travel of the bicycle (also as disclosed in Para. 0033, and seen in figure 7 specifically where lower section 42 is seen and the front and back walls 72,74 of socket 24 are seen).

Regarding claim 2, the outer surfaces of the upper and lower sections of the body are circular in cross-section.

Regarding claim 11, the inner surface of the upper section is circular in cross-section.

Regarding claims 12 and 28, wherein the inner and outer surfaces of the upper section are substantially circularly cylindrical and the outer surface of the second portion of the lower section is substantially circularly cylindrical (see figures 1 and 3).

Regarding claims 17,19, wherein the segment of the lower section of the body is formed as one piece with the crown of the front wheel fork once the body and crown have been assembled together (as seen in figure 1).

Regarding claims 18 and 38, wherein the segment of the lower section of the body is joined to the crown of the front wheel fork, the body formed of a material different from the crown of the front wheel fork (see Para. 0012).

Regarding claim 20, the body is formed from aluminum (see Para. 0012).

Claim Rejections - 35 USC § 103

5. In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

6. The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:

> A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claim 13 is/are rejected under 35 U.S.C. 103 as being unpatentable over Murphy.

Regarding claim 13, Murphy does not mention a ratio. However, one of ordinary skill in the art would find it obvious to modify the thickness of the wall, wherein the difference in ration between the inner diameter of the upper section and the outer diameter of the upper section is equal to the thickness of the cylindrical wall of the body, wherein the thickness of the wall can be adjusted in order to increase the strength of the body and therefore the strength of the steerer tube.

Allowable Subject Matter

8. Claims 3-5,7-9,14-16,21-25,27-29 and 31-40 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marlon A Arce whose telephone number is (571)272-1341. The examiner can normally be reached on 8AM - 4:30PM.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph Rocca can be reached on 571-272-5191. 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.

/MARLON A ARCE/
Examiner, Art Unit 3611
1/11/18

/ANNE MARIE M BOEHLER/
Primary Examiner, Art Unit 3611

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 14/585,629	Filing Date 12/30/2014	☐ To be Mailed

ENTITY: ☒ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED – PART I

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

APPLICATION AS AMENDED – PART II

AMENDMENT **10/03/2017**

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	* 67	Minus	** 67	= 0	X $80 =	0
Independent (37 CFR 1.16(h))	* 1	Minus	***3	= 0	X $420 =	0
☐ Application Size Fee (37 CFR 1.16(s))						
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
					TOTAL ADD'L FEE	0

AMENDMENT

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =	
☐ Application Size Fee (37 CFR 1.16(s))						
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
					TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
RAMONA WILSON

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

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

REMARKS

Claims 1-67 were pending. No new claims are presented. Claim 32 has been amended. Claims 6, 10, 26, 30, and 41-67 are withdrawn. Thus, claims 1-67 are pending, with claims 1-5, 7-9, 11-25, 27-29, and 31-40 currently at issue, including independent claim 1.

Claim 32 was rejected under 35 U.S.C. § 112(b). Claims 1-5, 7, 8, 11, 12, 14-25, 27-29, 31, 32, and 34-40 were rejected under 35 U.S.C. § 102(a)(1) as being anticipated by U.S. Patent Grant No. 7,909,346 ("Moechnig"). Claims 9, 13, 29, and 33 were rejected under 35 U.S.C. § 103as being unpatentable over Moechnig.

Applicant respectfully traverses the rejections and requests reconsideration of the claims, the specification, and the drawings in view of the present amendments and the following remarks.

I. Interview Request

Applicant hereby requests a telephone interview with the Examiner prior to the next office action if that next action is not a notice of allowance. The Examiner is respectfully requested to call the undersigned to schedule the interview at a mutually convenient date and time.

II. Rejections under 35 U.S.C. § 112(b)

Claim 32 was rejected under 35 U.S.C. § 112(b) as having insufficient antecedent basis. Claim 32 is currently amended in response and is in condition for allowance.

III. Rejections under 35 U.S.C. §§ 102 and 103

Claims 1-5, 7, 8, 11, 12, 14-25, 27-29, 31, 32, and 34-40 were rejected under 35 U.S.C. § 102(a)(1) as being anticipated by Moechnig. Claim 1 recites, in relevant part, an elongate hollow body arranged around a steering axis located in a vertical plane of travel of the bicycle, the body formed by a wall, a thickness of the wall at any point in the lower section of the body varying as a function of the cross-sectional angle of the point relative to the plane of travel.

Moechnig relates to "a lightweight steerer tube and head tube assembly that provide improved handling and comfort performance." (Moechnig, col. 1, ln. 7-9). Specifically, Moechnig discloses that "[a] steerer tube extends upward from the fork crown and into the head tube and includes a portion with an oblong cross section." (Moechnig, col. 2, ln. 65-67). Moechnig discloses a cross section having a consistent wall thickness. (*See* Moechnig, col. 7, ln 49-51; *see also* Moechnig, Figs. 4-6). Moechnig does not disclose varying thickness of a wall. Therefore, Moechnig does not disclose a thickness of the wall at any point in the lower section of the body varying as a function of the cross-sectional angle of the point relative to the plane of travel.

Moechnig does not disclose each and every limitation of claim 1. Claim 1 is allowable over Moechnig. Claims 1-5, 7-9, 11-25, 27-29, and 31-40 depend from claim 1 and are allowable for at least the same reasons.

Claims 9, 13, 29, and 33 were rejected under 35 U.S.C. § 103as being unpatentable over Moechnig. Moechnig is described above and does not teach or disclose a thickness of the wall at any point in the lower section of the body varying as a function of the cross-sectional angle of the point relative to the plane of travel. Claims 9, 13, 29, and 33 are allowable for at least the same reasons as claim 1, from which they depend.

CONCLUSION

Each of the rejections and/or required actions in the Office Action has been addressed and no new matter has been added. Applicant submits that all of the pending claims are in condition for allowance and notice to this effect is respectfully requested. The Examiner is invited to call the undersigned if it would expedite the prosecution of this application.

Respectfully submitted,

Dated: October 3, 2017

/Brian Gause/

Brian Gause
Registration No. 67,660
Attorney for Applicants

SRAM. LLC
1000 W. Fulton Market, 4th Flr.
Chicago, IL 60607
(312) 664-8800 x1336

Electronic Acknowledgement Receipt	
EFS ID:	30550552
Application Number:	14585629
International Application Number:	
Confirmation Number:	8583
Title of Invention:	Bicycle Steerer Tube with Variant Stiffness
First Named Inventor/Applicant Name:	Jonathan Blair Watt
Customer Number:	23470
Filer:	Brian Thomas Gause/Drew Coelho
Filer Authorized By:	Brian Thomas Gause
Attorney Docket Number:	RS180US
Receipt Date:	03-OCT-2017
Filing Date:	30-DEC-2014
Time Stamp:	17:15:25
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		RS180_20170711_nfoar.pdf	144410 4ebbfea331da6abef62e8edfa9ff853e2efc90ee	yes	16

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Applicant Arguments/Remarks Made in an Amendment	1	1
	Claims	2	13
	Amendment/Req. Reconsideration-After Non-Final Reject	14	16
Warnings:			
Information:			
	Total Files Size (in bytes):	144410	

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

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.
National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

CERTIFICATE OF ELECTRONIC TRANSMISSION

I hereby certify that this correspondence is being electronically deposited with the United States Patent and Trademark Office through the Electronic Filing System, on the below date:
Date: October 3, 2017 Name: Brian Gause (Reg. No. 67,660) Signature: /Brian Gause/

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Appln. of:	WATT	
Appln. No.:	14/585,629	Examiner: Marlon A. Arce
Filed:	December 20, 2014	Group Art Unit: 3611
For:	BICYCLE STEERER TUBE WITH VARIANT STIFFNESS	Confirmation No. 8583
Attorney Docket No:	RS180US	

RESPONSE

Mail Stop: AMENDMENT
Commissioner for Patents
Post Office Box 1450
Alexandria, VA 22313-1450

Dear Sir:

This communication is in response to the Office Action dated July 11, 2017. Please enter and consider the following amendments and remarks:

Listing of the claims begin on page 2.

Remarks begin on page 14.

LISTING OF THE CLAIMS

Please amend the claims as follows:

1. (Original) A steerer tube for a bicycle, the steerer tube comprising:

an elongate hollow body arranged around a steering axis located in a vertical plane of travel of the bicycle,

the body having upper and lower sections, a segment of the upper section adapted to be joined to a bicycle handlebar, a segment of the lower section adapted to be joined to a crown of a front wheel fork of the bicycle, the lower section joined to the upper section, and

the body formed by a wall, a thickness of the wall at any point in the lower section of the body varying as a function of the cross-sectional angle of the point relative to the plane of travel, the wall thickness being at a maximum in the plane of travel of the bicycle.

2. (Original) The steerer tube of claim 1, wherein outer surfaces of the upper and lower sections of the body are circular in cross section.

3. (Original) The steerer tube of claim 2, wherein an outer diameter of the lower section of the body is greater than an outer diameter of the upper section of the body.

4. (Original) The steerer tube of claim 3, wherein the lower section of the body has first and second portions, the first portion adjoining the upper section of the body, an outer diameter of the first portion of the lower section being greater than an outer diameter of the upper section and less than an outer diameter of the second portion of the lower section.

5. (Original) The steerer tube of claim 4, wherein the outer diameter of the first portion of the lower section gradually tapers from the second portion of the lower section to the upper section of the body.

6. (Withdrawn) The steerer tube of claim 5, wherein an inner surface of the upper section forms an ellipse in cross section, a major diameter of the ellipse formed to be perpendicular to the plane of travel, a minor diameter of the ellipse formed to be in the plane of travel of the bicycle.

7. (Original) The steerer tube of claim 5, wherein an inner surface of the upper section is circular in cross section.

8. (Original) The steerer tube of claim 7, wherein the inner and outer surfaces of the upper section are substantially circularly cylindrical and the outer surface of the second portion of the lower section is substantially circularly cylindrical.

9. (Original) The steerer tube of claim 7, wherein a ratio of an inner diameter of the upper section of the body to an outer diameter of the upper section of the body is within the range of 0.75 to 0.95, inclusive.

10. (Withdrawn) The steerer tube of claim 2, wherein an outer diameter of the lower section of the body is substantially the same as an outer diameter of the upper section of the body.

11. (Original) The steerer tube of claim 2, wherein an inner surface of the upper section is circular in cross section.

12. (Original) The steerer tube of claim 11, wherein the inner and outer surfaces of the upper section are substantially circularly cylindrical and the outer surface of the lower section is substantially circularly cylindrical.

13. (Original) The steerer tube of claim 11, wherein a ratio of an inner diameter of the upper section of the body to an outer diameter of the upper section of the body is within the range of 0.75 to 0.95, inclusive.

14. (Original) The steerer tube of claim 1, wherein an outer diameter of the lower section of the body is greater than an outer diameter of the upper section of the body.

15. (Original) The steerer tube of claim 14, wherein the lower section of the body has first and second portions, the first portion adjoining the upper section of the body, an outer diameter of the first portion of the lower section being greater than an outer diameter of the upper section and less than an outer diameter of the second portion of the lower section.

16. (Original) The steerer tube of claim 15, wherein the outer diameter of the first portion of the lower section gradually tapers from the second portion of the lower section to the upper section of the body.

17. (Original) The steerer tube of claim 1, wherein the segment of the lower section of the body is formed as one piece with the crown of the front wheel fork.

18. (Original) The steerer tube of claim 1, wherein the segment of the lower section of the body is joined to the crown of the front wheel fork, the body formed of a material different from the crown of the front wheel fork.

19. (Original) The steerer tube of claim 18, wherein the segment of the lower section of the body is formed as one piece with the crown of the front wheel fork.

20. (Original) The steerer tube of claim 1, wherein the body is formed from a material selected from the group consisting of steel, carbon fiber reinforced composite, aluminum, titanium and magnesium.

21. (Original) The steerer tube of claim 1, wherein the wall thickness is at a minimum in a plane containing the steering axis and orthogonal to the plane of travel of the bicycle.

22. (Original) The steerer tube of claim 21, wherein outer surfaces of the upper and lower sections of the body are circular in cross section.

23. (Original) The steerer tube of claim 22, wherein an outer diameter of the lower section of the body is greater than an outer diameter of the upper section of the body.

24. (Original) The steerer tube of claim 23, wherein the lower section of the body has first and second portions, the first portion adjoining the upper section of the body, an outer diameter of the first portion of the lower section being greater than an outer diameter of the upper section and less than an outer diameter of the second portion of the lower section.

25. (Original) The steerer tube of claim 24, wherein the outer diameter of the first portion of the lower section gradually tapers from the second portion of the lower section of the body to the upper section of the body.

26. (Withdrawn) The steerer tube of claim 25, wherein an inner surface of the upper section forms an ellipse in cross section, a major diameter of the ellipse formed to be perpendicular to the plane of travel, a minor diameter of the ellipse formed to be in the plane of travel of the bicycle.

27. (Original) The steerer tube of claim 25, wherein an inner surface of the upper section is circular in cross section.

28. (Original) The steerer tube of claim 27, wherein the inner and outer surfaces of the upper section are substantially circularly cylindrical and the outer surface of the second portion of the lower section is substantially circularly cylindrical.

29. (Original) The steerer tube of claim 27, wherein a ratio of an inner diameter of the upper section of the body to an outer diameter of the upper section of the body is within the range of 0.75 to 0.95, inclusive.

30. (Withdrawn) The steerer tube of claim 21, wherein an outer diameter of the lower section of the body is substantially the same as an outer diameter of the upper section of the body.

31. (Original) The steerer tube of claim 21, wherein an inner surface of the upper section is circular in cross section.

32. (Currently Amended) The steerer tube of claim 31, wherein the inner surface and an outer ~~surfaces~~surface of the upper section are substantially circularly cylindrical and [[the]]an outer surface of [[the]]a portion of the lower section is substantially circularly cylindrical.

33. (Original) The steerer tube of claim 31, wherein a ratio of an inner diameter of the upper section of the body to an outer diameter of the upper section of the body is within the range of 0.75 to 0.95, inclusive.

34. (Original) The steerer tube of claim 21, wherein an outer diameter of the lower section of the body is greater than an outer diameter of the upper section of the body.

35. (Original) The steerer tube of claim 34, wherein the lower section of the body has first and second portions, the first portion adjoining the upper section of the body, an outer diameter of the first portion of the lower section being greater than an outer diameter of the upper section and less than an outer diameter of the second portion of the lower section.

36. (Original) The steerer tube of claim 35, wherein the outer diameter of the first portion of the lower section gradually tapers from the second portion of the lower section of the body to the upper section of the body.

37. (Original) The steerer tube of claim 21, wherein the segment of the lower section of the body is formed as one piece with the crown of the front wheel fork.

38. (Original) The steerer tube of claim 21, wherein the segment of the lower section of the body is joined to the crown of the front wheel fork, the body formed of a material different from the crown of the front wheel fork.

39. (Original) The steerer tube of claim 38, wherein the segment of the lower section of the body is formed as one piece with the crown of the front wheel fork.

40. (Original) The steerer tube of claim 21, wherein the body is formed from a material selected from the group consisting of steel, carbon fiber reinforced composite, aluminum, titanium and magnesium.

41. (Withdrawn) The steerer tube of claim 21, wherein an inner surface of the wall within the lower section of the body is formed as an ellipse in cross section, a major diameter of the ellipse formed to be perpendicular to the plane of travel, a minor diameter of the ellipse formed to be in the plane of travel of the bicycle.

42. (Withdrawn) The steerer tube of claim 41, wherein outer surfaces of the upper and lower sections of the body are circular in cross section.

43. (Withdrawn) The steerer tube of claim 42, wherein an outer diameter of the lower section of the body is greater than an outer diameter of the upper section of the body.

44. (Withdrawn) The steerer tube of claim 43, wherein the lower section of the body has first and second portions, the first portion adjoining the upper section of the body, an outer diameter of the first portion of the lower section being greater than an outer diameter of the upper section and less than an outer diameter of the second portion of the lower section.

45. (Withdrawn) The steerer tube of claim 44, wherein the outer diameter of the first portion of the lower section gradually tapers from the second portion of the lower section of the body to the upper section of the body.

46. (Withdrawn) The steerer tube of claim 45, wherein an inner surface of the upper section forms an ellipse in cross section, a major diameter of the ellipse formed to be perpendicular to the plane of travel, a minor diameter of the ellipse formed to be in the plane of travel of the bicycle.

47. (Withdrawn) The steerer tube of claim 45, wherein an inner surface of the upper section is circular in cross section.

48. (Withdrawn) The steerer tube of claim 47, wherein the inner and outer surfaces of the upper section are substantially circularly cylindrical and the outer surface of the second portion of the lower section is substantially circularly cylindrical.

49. (Withdrawn) The steerer tube of claim 47, wherein a ratio of an inner diameter of the upper section of the body to an outer diameter of the upper section of the body is within the range of 0.75 to 0.95, inclusive.

50. (Withdrawn) The steerer tube of claim 41, wherein an outer diameter of the lower section of the body is substantially the same as an outer diameter of the upper section of the body.

51. (Withdrawn) The steerer tube of claim 41, wherein an inner surface of the upper section is circular in cross section.

52. (Withdrawn) The steerer tube of claim 51, wherein the inner and outer surfaces of the upper section are substantially circularly cylindrical and the outer surface of the second portion of the lower section is substantially circularly cylindrical.

53. (Withdrawn) The steerer tube of claim 51, wherein a ratio of an inner diameter of the upper section of the body to an outer diameter of the upper section of the body is within the range of 0.75 to 0.95, inclusive.

54. (Withdrawn) The steerer tube of claim 41, wherein an outer diameter of the lower section of the body is greater than an outer diameter of the upper section of the body.

55. (Withdrawn) The steerer tube of claim 54, wherein the lower section of the body has first and second portions, the first portion adjoining the upper section of the body, an outer diameter of the first portion of the lower section being greater than an outer diameter of the upper section and less than an outer diameter of the second portion of the lower section.

56. (Withdrawn) The steerer tube of claim 55, wherein the outer diameter of the first portion of the lower section gradually tapers from the second portion of the lower section of the body to the upper section of the body.

57. (Withdrawn) The steerer tube of claim 41, wherein the segment of the lower section of the body is formed as one piece with the crown of the front wheel fork.

58. (Withdrawn) The steerer tube of claim 41, wherein the segment of the lower section of the body is joined to the crown of the front wheel fork, the body formed of a material different from the crown of the front wheel fork.

59. (Withdrawn) The steerer tube of claim 58, wherein the segment of the lower section of the body is formed as one piece with the crown of the front wheel fork.

60. (Withdrawn) The steerer tube of claim 41, wherein the body is formed from a material selected from the group consisting of steel, carbon fiber reinforced composite, aluminum, titanium and magnesium.

61. (Withdrawn) The steerer tube of claim 41, wherein an inner surface of the upper section is circular in cross section, an inner diameter of the upper section being substantially the same as the minor diameter of the lower section.

62. (Withdrawn) The steerer tube of claim 41, wherein the lower section has an axial length, the minor diameter remaining substantially the same along the axial length of the lower section.

63. (Withdrawn) The steerer tube of claim 41, wherein the minor diameter decreases as a function of proximity to the upper section of the body.

64. (Withdrawn) The steerer tube of claim 41, wherein a ratio of the major diameter to the minor diameter taken at a lower end of the lower section is within the range of 1.05 to 1.3, inclusive.

65. (Withdrawn) The steerer tube of claim 64, wherein the ratio is within the range of 1.10 to 1.25, inclusive.

66. (Withdrawn) The steerer tube of claim 41, wherein the major diameter of the lower section tapers from the second portion of the lower section to the first portion of the lower section.

67. (Withdrawn) The steerer tube of claim 41, wherein a ratio of the major diameter to the minor diameter decreases as a function of proximity to the upper section of the body.

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	7	("7909346" | "6805372" | "5649738" | "7503576" | "8128112" | "6893037" | "8366130").PN.	US-PGPUB; USPAT	OR	OFF	2017/06/29 09:09
L2	33	("0624182" | "1511350" | "20040050202" | "20050012299" | "20050248119" | "20070210554" | "20070257466" | "20080073870" | "20080303240" | "2669463" | "3933373" | "5002297" | "5181732" | "5273301" | "5279137" | "5540457" | "5609349" | "5680798" | "5782479" | "5927740" | "5944932" | "6049982" | "6167780" | "6634251" | "6655707" | "6955371" | "7052028" | "7520520" | "7537231" | "7543835").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/06/29 09:09
L3	187	b62k21/04, b62k19/32, b62k21/18, b62k19/02.cpc.	USPAT	OR	OFF	2017/06/29 09:14
L4	0	Jonathan near2 watt.cpc.	USPAT	OR	OFF	2017/06/29 09:15
L5	13	Jonathan near2 watt.in.	USPAT	OR	OFF	2017/06/29 09:15
L6	27	Jonathan near2 watt.in.	US-PGPUB; USPAT	OR	OFF	2017/06/29 09:16

EAST Search History (Interference)

<This search history is empty>

6/29/2017 9:19:03 AM

Notice of References Cited	Application/Control No. 14/585,629	Applicant(s)/Patent Under Reexamination Watt et al.	
	Examiner Marlon A Arce	Art Unit 3611	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-7537231-B2	05-2009	Callahan; Jean-Luc	B62K19/32	280/276
*	B	US-20050012299-A1	01-2005	Schuman, Brian E.	B62K25/00	280/288.3
*	C	US-20070210554-A1	09-2007	Callahan; Jean-Luc	B62K21/06	280/279
*	D	US-20070257466-A1	11-2007	Murphy; Roger Paul	B62K19/16	280/276
*	E	US-20080303240-A1	12-2008	Lewis; Barry	B62K19/16	280/276
	F					
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FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
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	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
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	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	14585629
Filing Date	2014-12-30
First Named Inventor	Jonathan Blair Watt
Art Unit	3611
Examiner Name	n/a
Attorney Docket Number	RS180US

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	5649738		1997-07-22	Thomson et al.	
	2	6893037		2005-05-17	Galasso	
	3	7503576		2009-17-03	Schroeder	
	4	7909346		2011-03-22	Moeching	
	5	8128112		2012-03-06	Moeching	
	6	8366130		2013-02-05	Galasso et al.	

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	14585629
	Filing Date	2014-12-30
	First Named Inventor	Jonathan Blair Watt
	Art Unit	3611
	Examiner Name	n/a
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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1		☐

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EXAMINER SIGNATURE

Examiner Signature	/MARLON A ARCE/	Date Considered	06/29/2017

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

EFS Web 2.1.17

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	14585629
	Filing Date	2014-12-30
	First Named Inventor	Jonathan Blair Watt
	Art Unit	3611
	Examiner Name	n/a
	Attorney Docket Number	RS180US

CERTIFICATION STATEMENT

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

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

OR

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

☐ See attached certification statement.

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

☒ A certification statement is not submitted herewith.

SIGNATURE

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

Signature	/Lisa Serdynski/	Date (YYYY-MM-DD)	2015-06-18
Name/Print	Lisa Serdynski	Registration Number	40307

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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

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

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3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

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BIB DATA SHEET

CONFIRMATION NO. 8583

SERIAL NUMBER	FILING or 371(c) DATE RULE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
14/585,629	12/30/2014	280	3611	RS180US

APPLICANTS
SRAM, LLC, Chicago, IL;

INVENTORS
Jonathan Blair Watt, Colorado Springs, CO;
Robert Powell, Colorado Springs, CO;

**** CONTINUING DATA ***************************

**** FOREIGN APPLICATIONS ***************************

**** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ****
01/21/2015

Foreign Priority claimed ☐ Yes ☑ No 35 USC 119(a-d) conditions met ☐ Yes ☑ No Verified and Acknowledged /MARLON ALEXANDER ARCE/ Examiner's Signature	☐ Met after Allowance MAA Initials	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
		CO	17	67	1

ADDRESS
SRAM, LLC
1000 W. Fulton Market, 4th Floor
CHICAGO, IL 60607
UNITED STATES

TITLE
Bicycle Steerer Tube with Variant Stiffness

FILING FEE RECEIVED		
5360	FEES: Authority has been given in Paper No._____ to charge/credit DEPOSIT ACCOUNT No._____ for following:	☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/585,629	12/30/2014	Jonathan Blair Watt	RS180US	8583

23470 7590 07/11/2017

SRAM, LLC
1000 W. Fulton Market, 4th Floor
CHICAGO, IL 60607

EXAMINER	
ARCE, MARLON ALEXANDER	

ART UNIT	PAPER NUMBER
3611	

NOTIFICATION DATE	DELIVERY MODE
07/11/2017	ELECTRONIC

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

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

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

lserdynski@sram.com
bgause@sram.com

Office Action Summary	**Application No.** 14/585,629	**Applicant(s)** Watt et al.	
	Examiner Marlon A Arce	**Art Unit** 3611	**AIA Status** Yes

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

Period for Reply

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

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

Status

1)☑ Responsive to communication(s) filed on 4/7/17 .

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____ .

2a)☐ This action is **FINAL.** 2b) ☑ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5)☑ Claim(s) 1-67 is/are pending in the application.

5a) Of the above claim(s) 6,10,26,30 and 41-67 is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☑ Claim(s) 1-5,7-9,11-25,27-29 and 31-40 is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

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

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

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

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

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

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

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

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

Attachment(s)

1) ☑ Notice of References Cited (PTO-892)

2) ☑ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____ .

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____ .

4) ☐ Other: _____ .

DETAILED CORRESPONDENCE

Notice of Pre-AIA or AIA Status

The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Election/Restrictions

a. Claims 6,10,26,30 and 41-67 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected Species, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on 4/7/17. Claim 41 will be withdrawn as it is similar to the species mentioned in claim 6, also, applicant is reminded that claim 42-67 are a dependent of claim 41, wherein claims 42-67 are being dependent of a non-elected claim and will be withdrawn. Applicant states that all claims should be examined as they are related to similar technologies. However, applicant figures show different variants of a steerer tube that is not commonly used in prior art, wherein, those variants would require searches in different areas (specifically for the shapes of the steerer tube) that are not similar to the areas of the rest of the claims.

Examiner note

b. Applicant is reminded that claim 42-67 are a dependent of claim 41 and therefore will be withdrawn as being part of a different species.

Claim Rejections - 35 USC § 112

c. The following is a quotation of 35 U.S.C. 112(b):

> (b) CONCLUSION.—The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.

The following is a quotation of 35 U.S.C. 112 (pre-AIA), second paragraph:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

d. Claim 32 recites the limitation "outer surfaces”" in line 1. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

e. In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

f. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a)(1) the claimed invention was patented, described in a printed publication, or in public use, on sale or otherwise available to the public before the effective filing date of the claimed invention.

g. Claim(s) 1-5,7,8,11,12,14-25,27-29, 31, 32 and 34-40 is/are rejected under 35 U.S.C. 102(a)(1) as being anticipated by Moechnig (US 7909346). Moechnig discloses a steerer tube for a bicycle comprising: an elongate hollow body (30) arranged around a steering axis (102) located in a vertical plane of travel of the bicycle,

the body having upper and lower sections, a segment of the upper section adapted to be joined to a bicycle handlebar (fig 1), a segment of the lower section adapted to be joined to a crown (32) of a front wheel fork of the bicycle, the lower section joined to the upper section (as it is just one elongated hollow body), and

the body formed by a wall (wall of the steerer tube), a thickness of the wall at any point in the lower section of the body varying as a function of the cross-sectional angle of the point relative to the plane of travel (the steerer tube gets wider as is gets closer to the lower section), the wall thickness being at a maximum in the plane of travel of the bicycle.

Regarding claims 2 and 22, the outer surfaces of the upper and lower sections of the body are circular in cross-section.

Regarding claims 3 and 23 wherein an outer diameter of the lower section of the body is greater than an outer dimeter of the upper section of the body (see figure 6).

Regarding claims 4,15,24 and 35, wherein the lower section of the body has first and second portions (see figure below), the first portion adjoining the upper section of the body, an outer diameter of the first portion of the lower section being greater than an outer diameter of the upper section and less than an outer diameter of the second portion of the lower section (see figure below).

Regarding claims 5,16,25 and 36, wherein the outer diameter of the first portion of the lower section gradually tapers from the second portion of the lower section to the upper section of the body (see figure below).

Regarding claims 7,11,27,31 and 32, wherein an inner surface of the upper section is circular in cross section.

Regarding claims 8,12 and 28, wherein the inner and outer surfaces of the upper section are substantially circularly cylindrical and the outer surface of the second portion of the lower section is substantially circularly cylindrical (see figure below).

Regarding claims 14 and 34, wherein an outer diameter of the lower section of the body is greater than an outer diameter of the upper section of the body.

Regarding claims 17,19,37 and 39, wherein the segment of the lower section of the body is formed as one piece with the crown of the front wheel fork (see figures 3 and 6).

Regarding claims 18 and 38, wherein the segment of the lower section of the body is joined to the crown of the front wheel fork, the body formed of a material different from the crown of the front wheel fork (see Col. 4, lines 9-12).

Regarding claims 20 and 40, see Col. 4, lines 9-12 where it states that the steerer tube can be formed from materials such as aluminum, and carbon type materials.

Regarding claim 21, wherein the wall thickness is at a minimum in a plane containing the steering axis and orthogonal to the plane of travel of the bicycle.

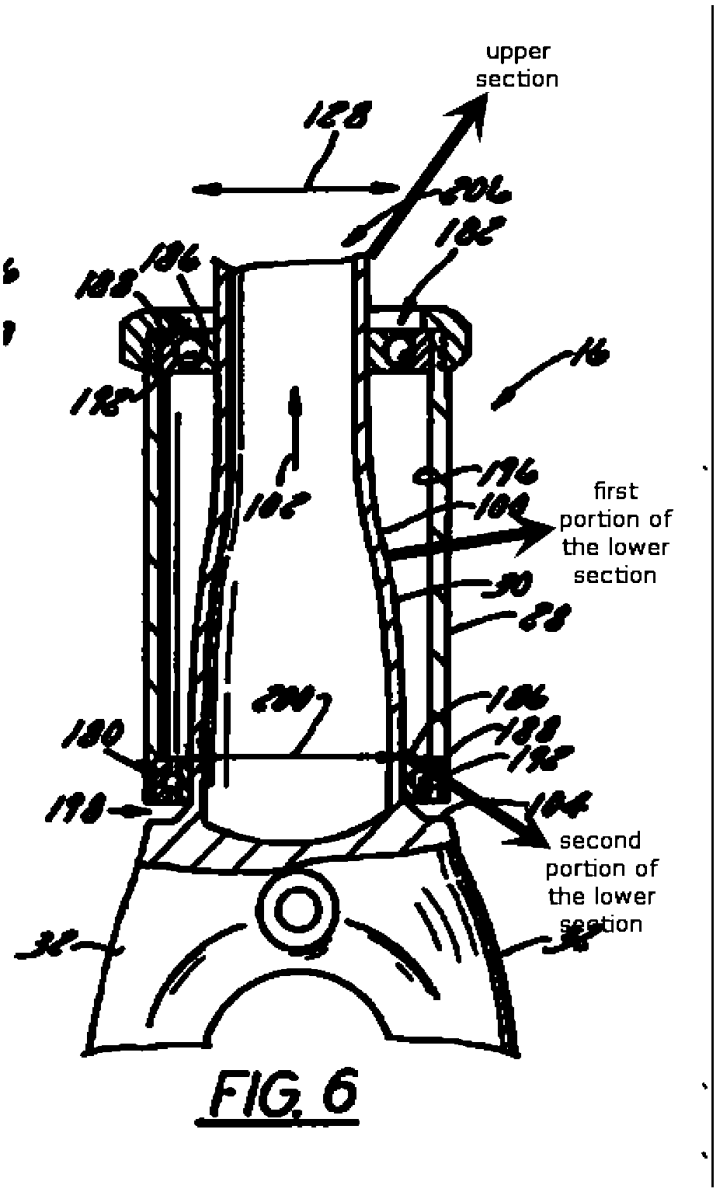


FIG. 6

Claim Rejections - 35 USC § 103

h. In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior

art relied upon, and the rationale supporting the rejection, would be the same under either status.

i. Claims 9,13,29 and 33 is/are rejected under 35 U.S.C. 103 as being unpatentable over Moechnig.

Regarding claims 9,13,29,33, Moechnig does not mention a ratio. However, one of ordinary skill in the art would find it obvious to modify the thickness of the wall, wherein the difference in ration between the inner diameter of the upper section and the outer diameter of the upper section is equal to the thickness of the cylindrical wall of the body, wherein the thickness of the wall can be adjusted in order to increase the strength of the body and therefore the strength of the steerer tube.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marlon A Arce whose telephone number is (571)272-1341. The examiner can normally be reached on 8AM - 4:30PM.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph Rocca can be reached on 571-272-5191. 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.

/MARLON A ARCE/
Examiner, Art Unit 3611
6/29/17
MAA

/ANNE MARIE M BOEHLER/
Primary Examiner, Art Unit 3611

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	14585629
Filing Date	2014-12-30
First Named Inventor	Jonathan Blair Watt
Art Unit	3611
Examiner Name	Conan D. Duda
Attorney Docket Number	RS180US

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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.A.A/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	14585629
	Filing Date	2014-12-30
	First Named Inventor	Jonathan Blair Watt
	Art Unit	3611
	Examiner Name	Conan D. Duda
	Attorney Docket Number	RS180US

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EXAMINER SIGNATURE

Examiner Signature	/MARLON A ARCE/	Date Considered	06/29/2017

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.A.A/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	14585629
	Filing Date	2014-12-30
	First Named Inventor	Jonathan Blair Watt
	Art Unit	3611
	Examiner Name	Conan D. Duda
	Attorney Docket Number	RS180US

CERTIFICATION STATEMENT

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

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

OR

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

See attached certification statement.

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

☒ A certification statement is not submitted herewith.

SIGNATURE

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

Signature	/Lisa Serdynski/	Date (YYYY-MM-DD)	2016-11-29
Name/Print	Lisa Serdynski	Registration Number	40307

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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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.

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2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14/585,629	Watt et al.
	Examiner	Art Unit
	Marlon A Arce	3611

CPC - Searched		
Symbol	Date	Examiner
b62k21/04, b62k19/32, b62k21/18, b62k19/02		

CPC Combination Sets - Searched		
Symbol	Date	Examiner

US Classification - Searched			
Class	Subclass	Date	Examiner

Search Notes		
Search Notes	Date	Examiner
conducted applicant search	06/29/2017	MAA

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner

CERTIFICATE OF ELECTRONIC TRANSMISSION

I hereby certify that this correspondence is being electronically deposited with the United States Patent and Trademark Office through the Electronic Filing System, on the below date:
Date: April 7, 2017 Name: Brian Gause (Reg. No. 67,660) Signature: /Brian Gause/

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Appln. of:	WATT	
Appln. No.:	14/585,629	Examiner: Marlon A. Arce
Filed:	December 20, 2014	Group Art Unit: 3611
For:	BICYCLE STEERER TUBE WITH VARIANT STIFFNESS	Confirmation No. 8583
Attorney Docket No:	RS180US	

RESPONSE

Commissioner for Patents
Post Office Box 1450
Alexandria, VA 22313-1450

Dear Sir:

This communication is in response to the Restriction/Election Requirement dated February 9, 2017. Please enter and consider the following amendments and remarks:

Listing of the claims begin on page 2.

Remarks begin on page 14.

Electronic Acknowledgement Receipt	
EFS ID:	28867105
Application Number:	14585629
International Application Number:	
Confirmation Number:	8583
Title of Invention:	Bicycle Steerer Tube with Variant Stiffness
First Named Inventor/Applicant Name:	Jonathan Blair Watt
Customer Number:	23470
Filer:	Brian Thomas Gause
Filer Authorized By:	
Attorney Docket Number:	RS180US
Receipt Date:	07-APR-2017
Filing Date:	30-DEC-2014
Time Stamp:	15:26:39
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		RS180_02092017_ResReq.pdf	104314 bf8f2cf0b0f12c4d3611bf006efaaab7ac352a5e	yes	15

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Applicant Arguments/Remarks Made in an Amendment	14	15
	Claims	2	13
	Response to Election / Restriction Filed	1	1
Warnings:			
Information:			
	Total Files Size (in bytes):	104314	

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

<u>New Applications Under 35 U.S.C. 111</u>
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

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

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

REMARKS

Claims 1-67 were pending. No new claims are presented. The Examiner issued a species election requirement between six allegedly distinct species as follows: Species A – Figures 2; Species B – Figure 12; Species C – Figure 13; Species D – Figure 19; Species E – Figure 25; Species F – Figure 31. The Examiner asserts that these species are independent or distinct because they comprise different features and/or configurations. Applicant respectfully elects Species A with traverse. Claims 6, 10, 26, 30, 46, 50 are withdrawn. Thus, claims 1-67 are pending, with claims 1-5, 7-9, 11-25, 27-29, 31-45, 47-49, and 51-67 currently at issue, including independent claim 1.

The Applicant respectfully submits that all claims presented in the application are directed to related and similar technologies and may be searched and examined without serious burden by the Examiner. Further, any feature or configuration variation between indicated species would not add serious burden by the Examiner.

CONCLUSION

Each of the rejections and/or required actions in the Office Action has been addressed and no new matter has been added. Applicant submits that all of the pending claims are in condition for allowance and notice to this effect is respectfully requested. The Examiner is invited to call the undersigned if it would expedite the prosecution of this application.

Respectfully submitted,

Dated: April 7, 2017

/Brian Gause/

Brian Gause
Registration No. 67,660
Attorney for Applicants

SRAM. LLC
1000 W. Fulton Market, 4th Flr.
Chicago, IL 60607
(312) 664-8800 x1336

LISTING OF THE CLAIMS

Please amend the claims as follows:

1. (Original) A steerer tube for a bicycle, the steerer tube comprising:

an elongate hollow body arranged around a steering axis located in a vertical plane of travel of the bicycle,

the body having upper and lower sections, a segment of the upper section adapted to be joined to a bicycle handlebar, a segment of the lower section adapted to be joined to a crown of a front wheel fork of the bicycle, the lower section joined to the upper section, and

the body formed by a wall, a thickness of the wall at any point in the lower section of the body varying as a function of the cross-sectional angle of the point relative to the plane of travel, the wall thickness being at a maximum in the plane of travel of the bicycle.

2. (Original) The steerer tube of claim 1, wherein outer surfaces of the upper and lower sections of the body are circular in cross section.

3. (Original) The steerer tube of claim 2, wherein an outer diameter of the lower section of the body is greater than an outer diameter of the upper section of the body.

4. (Original) The steerer tube of claim 3, wherein the lower section of the body has first and second portions, the first portion adjoining the upper section of the body, an outer diameter of the first portion of the lower section being greater than an outer diameter of the upper section and less than an outer diameter of the second portion of the lower section.

5. (Original) The steerer tube of claim 4, wherein the outer diameter of the first portion of the lower section gradually tapers from the second portion of the lower section to the upper section of the body.

6. (Withdrawn) The steerer tube of claim 5, wherein an inner surface of the upper section forms an ellipse in cross section, a major diameter of the ellipse formed to be perpendicular to the plane of travel, a minor diameter of the ellipse formed to be in the plane of travel of the bicycle.

7. (Original) The steerer tube of claim 5, wherein an inner surface of the upper section is circular in cross section.

8. (Original) The steerer tube of claim 7, wherein the inner and outer surfaces of the upper section are substantially circularly cylindrical and the outer surface of the second portion of the lower section is substantially circularly cylindrical.

9. (Original) The steerer tube of claim 7, wherein a ratio of an inner diameter of the upper section of the body to an outer diameter of the upper section of the body is within the range of 0.75 to 0.95, inclusive.

10. (Withdrawn) The steerer tube of claim 2, wherein an outer diameter of the lower section of the body is substantially the same as an outer diameter of the upper section of the body.

11. (Original) The steerer tube of claim 2, wherein an inner surface of the upper section is circular in cross section.

12. (Original) The steerer tube of claim 11, wherein the inner and outer surfaces of the upper section are substantially circularly cylindrical and the outer surface of the lower section is substantially circularly cylindrical.

13. (Original) The steerer tube of claim 11, wherein a ratio of an inner diameter of the upper section of the body to an outer diameter of the upper section of the body is within the range of 0.75 to 0.95, inclusive.

14. (Original) The steerer tube of claim 1, wherein an outer diameter of the lower section of the body is greater than an outer diameter of the upper section of the body.

15. (Original) The steerer tube of claim 14, wherein the lower section of the body has first and second portions, the first portion adjoining the upper section of the body, an outer diameter of the first portion of the lower section being greater than an outer diameter of the upper section and less than an outer diameter of the second portion of the lower section.

16. (Original) The steerer tube of claim 15, wherein the outer diameter of the first portion of the lower section gradually tapers from the second portion of the lower section to the upper section of the body.

17. (Original) The steerer tube of claim 1, wherein the segment of the lower section of the body is formed as one piece with the crown of the front wheel fork.

18. (Original) The steerer tube of claim 1, wherein the segment of the lower section of the body is joined to the crown of the front wheel fork, the body formed of a material different from the crown of the front wheel fork.

19. (Original) The steerer tube of claim 18, wherein the segment of the lower section of the body is formed as one piece with the crown of the front wheel fork.

20. (Original) The steerer tube of claim 1, wherein the body is formed from a material selected from the group consisting of steel, carbon fiber reinforced composite, aluminum, titanium and magnesium.

21. (Original) The steerer tube of claim 1, wherein the wall thickness is at a minimum in a plane containing the steering axis and orthogonal to the plane of travel of the bicycle.

22. (Original) The steerer tube of claim 21, wherein outer surfaces of the upper and lower sections of the body are circular in cross section.

23. (Original) The steerer tube of claim 22, wherein an outer diameter of the lower section of the body is greater than an outer diameter of the upper section of the body.

24. (Original) The steerer tube of claim 23, wherein the lower section of the body has first and second portions, the first portion adjoining the upper section of the body, an outer diameter of the first portion of the lower section being greater than an outer diameter of the upper section and less than an outer diameter of the second portion of the lower section.

25. (Original) The steerer tube of claim 24, wherein the outer diameter of the first portion of the lower section gradually tapers from the second portion of the lower section of the body to the upper section of the body.

26. (Withdrawn) The steerer tube of claim 25, wherein an inner surface of the upper section forms an ellipse in cross section, a major diameter of the ellipse formed to be perpendicular to the plane of travel, a minor diameter of the ellipse formed to be in the plane of travel of the bicycle.

27. (Original) The steerer tube of claim 25, wherein an inner surface of the upper section is circular in cross section.

28. (Original) The steerer tube of claim 27, wherein the inner and outer surfaces of the upper section are substantially circularly cylindrical and the outer surface of the second portion of the lower section is substantially circularly cylindrical.

29. (Original) The steerer tube of claim 27, wherein a ratio of an inner diameter of the upper section of the body to an outer diameter of the upper section of the body is within the range of 0.75 to 0.95, inclusive.

30. (Withdrawn) The steerer tube of claim 21, wherein an outer diameter of the lower section of the body is substantially the same as an outer diameter of the upper section of the body.

31. (Original) The steerer tube of claim 21, wherein an inner surface of the upper section is circular in cross section.

32. (Original) The steerer tube of claim 31, wherein the inner and outer surfaces of the upper section are substantially circularly cylindrical and the outer surface of the second portion of the lower section is substantially circularly cylindrical.

33. (Original) The steerer tube of claim 31, wherein a ratio of an inner diameter of the upper section of the body to an outer diameter of the upper section of the body is within the range of 0.75 to 0.95, inclusive.

34. (Original) The steerer tube of claim 21, wherein an outer diameter of the lower section of the body is greater than an outer diameter of the upper section of the body.

35. (Original) The steerer tube of claim 34, wherein the lower section of the body has first and second portions, the first portion adjoining the upper section of the body, an outer diameter of the first portion of the lower section being greater than an outer diameter of the upper section and less than an outer diameter of the second portion of the lower section.

36. (Original) The steerer tube of claim 35, wherein the outer diameter of the first portion of the lower section gradually tapers from the second portion of the lower section of the body to the upper section of the body.

37. (Original) The steerer tube of claim 21, wherein the segment of the lower section of the body is formed as one piece with the crown of the front wheel fork.

38. (Original) The steerer tube of claim 21, wherein the segment of the lower section of the body is joined to the crown of the front wheel fork, the body formed of a material different from the crown of the front wheel fork.

39. (Original) The steerer tube of claim 38, wherein the segment of the lower section of the body is formed as one piece with the crown of the front wheel fork.

40. (Original) The steerer tube of claim 21, wherein the body is formed from a material selected from the group consisting of steel, carbon fiber reinforced composite, aluminum, titanium and magnesium.

41. (Original) The steerer tube of claim 21, wherein an inner surface of the wall within the lower section of the body is formed as an ellipse in cross section, a major diameter of the ellipse formed to be perpendicular to the plane of travel, a minor diameter of the ellipse formed to be in the plane of travel of the bicycle.

42. (Original) The steerer tube of claim 41, wherein outer surfaces of the upper and lower sections of the body are circular in cross section.

43. (Original) The steerer tube of claim 42, wherein an outer diameter of the lower section of the body is greater than an outer diameter of the upper section of the body.

44. (Original) The steerer tube of claim 43, wherein the lower section of the body has first and second portions, the first portion adjoining the upper section of the body, an outer diameter of the first portion of the lower section being greater than an outer diameter of the upper section and less than an outer diameter of the second portion of the lower section.

45. (Original) The steerer tube of claim 44, wherein the outer diameter of the first portion of the lower section gradually tapers from the second portion of the lower section of the body to the upper section of the body.

46. (Withdrawn) The steerer tube of claim 45, wherein an inner surface of the upper section forms an ellipse in cross section, a major diameter of the ellipse formed to be perpendicular to the plane of travel, a minor diameter of the ellipse formed to be in the plane of travel of the bicycle.

47. (Original) The steerer tube of claim 45, wherein an inner surface of the upper section is circular in cross section.

48. (Original) The steerer tube of claim 47, wherein the inner and outer surfaces of the upper section are substantially circularly cylindrical and the outer surface of the second portion of the lower section is substantially circularly cylindrical.

49. (Original) The steerer tube of claim 47, wherein a ratio of an inner diameter of the upper section of the body to an outer diameter of the upper section of the body is within the range of 0.75 to 0.95, inclusive.

50. (Withdrawn) The steerer tube of claim 41, wherein an outer diameter of the lower section of the body is substantially the same as an outer diameter of the upper section of the body.

51. (Original) The steerer tube of claim 41, wherein an inner surface of the upper section is circular in cross section.

52. (Original) The steerer tube of claim 51, wherein the inner and outer surfaces of the upper section are substantially circularly cylindrical and the outer surface of the second portion of the lower section is substantially circularly cylindrical.

53. (Original) The steerer tube of claim 51, wherein a ratio of an inner diameter of the upper section of the body to an outer diameter of the upper section of the body is within the range of 0.75 to 0.95, inclusive.

54. (Original) The steerer tube of claim 41, wherein an outer diameter of the lower section of the body is greater than an outer diameter of the upper section of the body.

55. (Original) The steerer tube of claim 54, wherein the lower section of the body has first and second portions, the first portion adjoining the upper section of the body, an outer diameter of the first portion of the lower section being greater than an outer diameter of the upper section and less than an outer diameter of the second portion of the lower section.

56. (Original) The steerer tube of claim 55, wherein the outer diameter of the first portion of the lower section gradually tapers from the second portion of the lower section of the body to the upper section of the body.

57. (Original) The steerer tube of claim 41, wherein the segment of the lower section of the body is formed as one piece with the crown of the front wheel fork.

58. (Original) The steerer tube of claim 41, wherein the segment of the lower section of the body is joined to the crown of the front wheel fork, the body formed of a material different from the crown of the front wheel fork.

59. (Original) The steerer tube of claim 58, wherein the segment of the lower section of the body is formed as one piece with the crown of the front wheel fork.

60. (Original) The steerer tube of claim 41, wherein the body is formed from a material selected from the group consisting of steel, carbon fiber reinforced composite, aluminum, titanium and magnesium.

61. (Original) The steerer tube of claim 41, wherein an inner surface of the upper section is circular in cross section, an inner diameter of the upper section being substantially the same as the minor diameter of the lower section.

62. (Original) The steerer tube of claim 41, wherein the lower section has an axial length, the minor diameter remaining substantially the same along the axial length of the lower section.

63. (Original) The steerer tube of claim 41, wherein the minor diameter decreases as a function of proximity to the upper section of the body.

64. (Original) The steerer tube of claim 41, wherein a ratio of the major diameter to the minor diameter taken at a lower end of the lower section is within the range of 1.05 to 1.3, inclusive.

65. (Original) The steerer tube of claim 64, wherein the ratio is within the range of 1.10 to 1.25, inclusive.

66. (Original) The steerer tube of claim 41, wherein the major diameter of the lower section tapers from the second portion of the lower section to the first portion of the lower section.

67. (Original) The steerer tube of claim 41, wherein a ratio of the major diameter to the minor diameter decreases as a function of proximity to the upper section of the body.

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 14/585,629	Filing Date 12/30/2014	☐ To be Mailed

ENTITY: ☒ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED – PART I

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

APPLICATION AS AMENDED – PART II

AMENDMENT **04/07/2017**

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	* 67	Minus	** 67	= 0	X $80 =	0
Independent (37 CFR 1.16(h))	* 1	Minus	***3	= 0	X $420 =	0
☐ Application Size Fee (37 CFR 1.16(s))						
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
					TOTAL ADD'L FEE	0

AMENDMENT

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =	
☐ Application Size Fee (37 CFR 1.16(s))						
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
					TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
/SANDRA F. GARNETT/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/585,629	12/30/2014	Jonathan Blair Watt	RS180US	8583

23470 7590 02/09/2017

SRAM, LLC
1000 W. Fulton Market, 4th Floor
CHICAGO, IL 60607

EXAMINER	
ARCE, MARLON ALEXANDER	

ART UNIT	PAPER NUMBER
3611	

NOTIFICATION DATE	DELIVERY MODE
02/09/2017	ELECTRONIC

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

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

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

mm@sram.com
lserdynski@sram.com
bgause@sram.com

Office Action Summary	Application No. 14/585,629	Applicant(s) WATT ET AL.	
	Examiner MARLON A. ARCE	Art Unit 3611	AIA (First Inventor to File) Status Yes

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

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *2* MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

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

Status

1)☒ Responsive to communication(s) filed on *12/30/14*.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5)☒ Claim(s) *1-67* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☐ Claim(s) _____ is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☒ Claim(s) *1-67* are subject to restriction and/or election requirement.

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

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

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

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

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

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

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

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

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

4) ☐ Other: _____.

1. The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

DETAILED ACTION

Election/Restrictions

2. Claim(s) 1 is/are generic to the following disclosed patentably distinct species:

- Species A shown in figure 2;
- Species B shown in figure 12;
- Species C shown in figure 13;
- Species D shown in figure 19;
- Species E shown in figure 25;
- Species F shown in figure 31.

3. The species are independent or distinct because as disclosed the different species have mutually exclusive characteristics for each identified species. In addition, these species are not obvious variants of each other based on the current record.

Applicant is required under 35 U.S.C. 121 to elect a single disclosed species, or a single grouping of patentably indistinct species, for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable.

There is a search and/or examination burden for the patentably distinct species as set forth above because at least the following reason(s) apply:

There is many variations of a steerer tube shown in the figures, wherein one variation would be met by a single prior reference while others would require further searching to meet.

Applicant is advised that the reply to this requirement to be complete must include (i) an election of a species or a grouping of patentably indistinct species to be examined even though the requirement may be traversed (37 CFR 1.143) **and (ii) identification of the claims encompassing the elected species** or grouping of patentably indistinct species, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered nonresponsive unless accompanied by an election.

The election may be made with or without traverse. To preserve a right to petition, the election must be made with traverse. If the reply does not distinctly and specifically point out supposed errors in the election of species requirement, the election shall be treated as an election without traverse. Traversal must be presented at the time of election in order to be considered timely. Failure to timely traverse the requirement will result in the loss of right to petition under 37 CFR 1.144. If claims are added after the election, applicant must indicate which of these claims are readable on the elected species or grouping of patentably indistinct species.

Should applicant traverse on the ground that the species, or groupings of patentably indistinct species from which election is required, are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the species to be obvious variants or clearly admit on the record that this is the case. In

either instance, if the examiner finds one of the species unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103 or pre-AIA 35 U.S.C. 103(a) of the other species.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which depend from or otherwise require all the limitations of an allowable generic claim as provided by 37 CFR 1.141.

4. A telephone call was made to Lisa Serdynski on 2/3/17 to request an oral election to the above restriction requirement, but did not result in an election being made.

5. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be corrected in compliance with 37 CFR 1.48(a) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. A request to correct inventorship under 37 CFR 1.48(a) must be accompanied by an application data sheet in accordance with 37 CFR 1.76 that identifies each inventor by his or her legal name and by the processing fee required under 37 CFR 1.17(i).

6. The examiner has required restriction between product or apparatus claims and process claims. Where applicant elects claims directed to the product/apparatus, and all product/apparatus claims are subsequently found allowable, withdrawn process claims that include all the limitations of the allowable product/apparatus claims should be considered for rejoinder. All claims directed to a nonelected process invention must

include all the limitations of an allowable product/apparatus claim for that process invention to be rejoined.

In the event of rejoinder, the requirement for restriction between the product/apparatus claims and the rejoined process claims will be withdrawn, and the rejoined process claims will be fully examined for patentability in accordance with 37 CFR 1.104. Thus, to be allowable, the rejoined claims must meet all criteria for patentability including the requirements of 35 U.S.C. 101, 102, 103 and 112. Until all claims to the elected product/apparatus are found allowable, an otherwise proper restriction requirement between product/apparatus claims and process claims may be maintained. Withdrawn process claims that are not commensurate in scope with an allowable product/apparatus claim will not be rejoined. See MPEP § 821.04. Additionally, in order for rejoinder to occur, applicant is advised that the process claims should be amended during prosecution to require the limitations of the product/apparatus claims. **Failure to do so may result in no rejoinder.** Further, note that the prohibition against double patenting rejections of 35 U.S.C. 121 does not apply where the restriction requirement is withdrawn by the examiner before the patent issues. See MPEP § 804.01.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MARLON A. ARCE whose telephone number is (571)272-1341. The examiner can normally be reached on Mon-Fri 9:00 am to 5:00 pm.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph Rocca can be reached on (571) 272-5191. 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.

/MARLON A ARCE/
Examiner, Art Unit 3611
2/2/17
MAA

/Anne Marie M. Boehler/
Primary Examiner, Art Unit 3611

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**		
	Application Number	14585629
	Filing Date	2014-12-30
	First Named Inventor	Jonathan Blair Watt
	Art Unit	3611
	Examiner Name	Conan D. Duda
	Attorney Docket Number	RS180US

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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	6805372		2004-10-19	Gueugneaud	

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	1	902315	FR	A	1945-08-28	Vaillen		X

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

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	14585629
	Filing Date	2014-12-30
	First Named Inventor	Jonathan Blair Watt
	Art Unit	3611
	Examiner Name	Conan D. Duda
	Attorney Docket Number	RS180US

	1		

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EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	14585629
	Filing Date	2014-12-30
	First Named Inventor	Jonathan Blair Watt
	Art Unit	3611
	Examiner Name	Conan D. Duda
	Attorney Docket Number	RS180US

CERTIFICATION STATEMENT

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

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

OR

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

See attached certification statement.

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

☒ A certification statement is not submitted herewith.

SIGNATURE

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

Signature	/Lisa Serdynski/	Date (YYYY-MM-DD)	2016-11-29
Name/Print	Lisa Serdynski	Registration Number	40307

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

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

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

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

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BREVET D'INVENTION.

Gr. 10. — Cl. 5. **N° 902.315**

Dispositif de renforcement des fourreaux de pivotement de fourche avant pour cycle et motocycle.

M. Paul VAILLEN résidant en France (Rhône).

Demandé le 9 septembre 1943, à 11h 40m, à Lyon.
Délivré le 4 décembre 1944. — Publié le 28 août 1945.

Brevet d'invention dont la délivrance a été ajournée en exécution de l'art. 11, § 7, de la loi du 5 juillet 1844 modifiée par la loi du 7 avril 1902.]

La présente invention a pour but de remédier aux ruptures des fourches avant des cycles et motocycles si fréquentes dans la conception actuelle de l'organe de direction de ces véhicules et causant des accidents souvent mortels.

Les fourches avant présentent un point faible situé à l'endroit où la pièce d'assemblage des fourreaux appelée ordinairement tête de fourche est prolongée par un tube servant de pivot de direction.

La fixation de ce tube obtenue, soit par brasage, soit par soudure autogène, après goupillage préalable, laisse subsister une section d'encastrement qui reçoit tous les efforts normaux ou anormaux dus, tant aux chocs d'obstacles naturels de la route, qu'aux chocs accidentels, lesquels par leur violence, sont susceptibles de déterminer la rupture de la fourche en cet endroit.

L'invention consiste à renforcer ce point faible commun à presque toutes les fabrications, au moyen d'une pièce métallique rapportée à l'intérieur du tube pivot de direction, augmentant ainsi la section en cet endroit.

Les tubes pivots de direction sont généralement forés coniques, la partie la plus forte pénétrant dans la tête de fourche telle que le représente la figure 1.

La partie faible est située en 1 à la jonction de la tête de fourche 2 et du tube pivot de direction 3, tous deux goupillés en 4 et brasés.

La pièce de renfort 5 objet de l'invention est figurée en place. Sa forme extérieure conique épouse le cone intérieur du tube 3.

Les figures 2 et 3 représentent cette pièce 5, on a ménagé, en 6, une mortaise destinée à laisser le passage de la goupille de montage 4, et en 7 un trou d'allègement.

Cette pièce est completée, d'une part, par l'écrou 8 servant au blocage de la pièce renfort à la place prévue dans le tube 3 et par la vis 9 destinée à empêcher la déformation de la partie fendue 6, au cours du blocage de l'ensemble par l'écrou 8, déformation qui aurait pour résultat de faire échapper les filets en prise de l'écrou 8 avec l'extrémité 10 de la pièce renfort.

La mise en place s'opère par l'introduction de la pièce 5 sans la vis 9, dans l'extrémité supérieure du tube pivot 3 au préalable libéré du plongeur du guidon du cycle.

Les parties coniques viennent en contact et le blocage s'opère par le serrage de l'écrou

Prix du fascicule : 15 francs.

FOX Exhibit 1002, Page 253 of 348

8 contre la partie inférieure de la tête de fourche (2) après avoir bloqué la vis 9 à sa place.

La fente 6 a permis à la pièce 5 de venir en contact intime avec le cône du tube 3 sans être gênée par la goupille 4.

La même fente 6 assure également l'arrêt contre la goupille 4 de la pièce 5, qui, de ce fait, ne peut tourner au cours du serrage de l'écrou 8.

RÉSUMÉ.

L'invention consiste dans le renforcement de la partie faible de la fourche avant des cycles ou motocycles à l'endroit où la tête de fourche, assemblée au tube de direction par goupille et brasure, donne lieu dans les fabrications courantes à une section d'encombrement sujette à se rompre sous l'effort d'un choc accidentel ou même des chocs normaux dus aux irrégularités de la route,

Ce renforcement est obtenu par l'introduction dans l'intérieur du tube de direction d'une pièce métallique conique, fixée par un écrou venant prendre appui contre la partie inférieure de la tête de fourche, cette pièce étant fendue pour laisser le passage de la goupille d'assemblage et cette dernière fente étant consolidée par une vis destinée à éviter la déformation au moment du serrage de l'écrou sur la partie fendue.

PAUL VAILLEN.

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Fig. 1

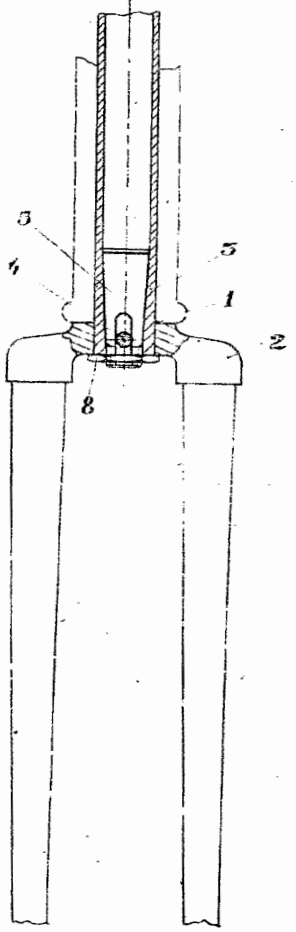


Fig. 2

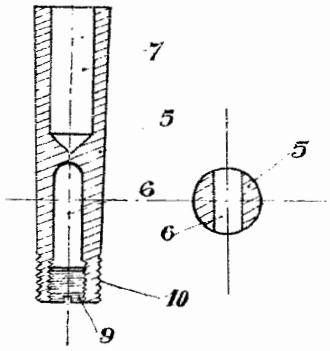
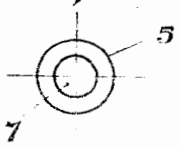


Fig. 3



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DESCRIPTION FR902315

Reinforcement device fork pivot sleeves prior to cycle and motorcycle. The present invention aims to address the failures of the front forks of so frequent cycles and motorcycles in the current design of the management board of these vehicles and often causing fatal accidents. The front forks have a low point at the place where the assembly part of the sleeves usually called steering head is extended by a tube serving as the steering pivot. Fixing this tube obtained either by brazing or by autogenous welding, pinning after screening, leaves an embedding section that receives all the normal and abnormal forces due both to the impact of natural obstacles in the road, that accidental impact, which by their violence, are likely to determine the breakdown of the fork there. The invention is to strengthen this weak point common to almost all manufacturing, using a metal insert inside the steering head tube, increasing the section in this place.

The steering pivots are generally drilled conical tubes, the strongest part penetrating -the steering head such that & is in Figure 1. The small portion is located 1 to the junction of the fork head 2 and swivel head tube 3, both pinned in 4 and brazed. The reinforcing member 5 according to the invention is represented in place. Its conical outer shape matches the inside cone of the tube 3 .. Figures 2 and 3 show this part 5 was formed in 6, a tenon intended to allow the passage of the mounting pin 4, and 7-one lightening hole. This part is completed, on the one hand, by the nut 8 for the locking of the part reinforcing instead provided in the tube, and 3 by the screw 9 for preventing the deformation. the slotted portion 6, during the locking of the assembly by the nut 8, which deformation would result to escape the engaging threads of the nut 8 with the end 10 of the reinforcing piece.

The implementation is done by the introduction of part 5 without the screw 9, in the end the upper pivot tube 3 first released diver handlebar of the cycle. The parties' conical come into contact and the blocking is done by tightening the nut 8 against the bottom of the fork crown (2) after locking the screw 9 in its place. The slot 6 has enabled the piece 5 come into intimate contact with the cone of the tube 3 without being obstructed by the pin 4. The same slot 6 also ensures the stop against the pin 4 of the room. 5, which, therefore, can not rotate during tightening of the nut 8.

FOX Exhibit 1002, Page 257 of 348

Electronic Acknowledgement Receipt	
EFS ID:	27632121
Application Number:	14585629
International Application Number:	
Confirmation Number:	8583
Title of Invention:	Bicycle Steerer Tube with Variant Stiffness
First Named Inventor/Applicant Name:	Jonathan Blair Watt
Customer Number:	23470
Filer:	Lisa J Wunderlich
Filer Authorized By:	
Attorney Docket Number:	RS180US
Receipt Date:	29-NOV-2016
Filing Date:	30-DEC-2014
Time Stamp:	11:00:01
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

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Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	updated_IDS2.pdf	612251 9ad6756ac145f9cc3cb5d7c3090df1afdc83bcb1	no	4
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2	Foreign Reference	FR902315A.pdf	115638 9343fad862aecddeef6e34e0a5e0d208efcd94d8	no	3
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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
14/585,629	12/30/2014	Jonathan Blair Watt	RS180US

CONFIRMATION NO. 8583

23470
SRAM, LLC
1000 W. Fulton Market, 4th Floor
CHICAGO, IL 60607

PUBLICATION NOTICE



Title: Bicycle Steerer Tube with Variant Stiffness

Publication No.US-2016-0185414-A1
Publication Date:06/30/2016

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Application Number	14585629
Filing Date	2014-12-30
First Named Inventor	Jonathan Blair Watt
Art Unit	3611
Examiner Name	n/a
Attorney Docket Number	RS180US

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	2	6893037		2005-05-17	Galasso	
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	Application Number	14585629
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	Application Number	14585629
	Filing Date	2014-12-30
	First Named Inventor	Jonathan Blair Watt
	Art Unit	3611
	Examiner Name	n/a
	Attorney Docket Number	RS180US

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Name/Print	Lisa Serdynski	Registration Number	40307

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Electronic Acknowledgement Receipt	
EFS ID:	22672188
Application Number:	14585629
International Application Number:	
Confirmation Number:	8583
Title of Invention:	Bicycle Steerer Tube with Variant Stiffness
First Named Inventor/Applicant Name:	Jonathan Blair Watt
Customer Number:	23470
Filer:	Lisa J Wunderlich
Filer Authorized By:	
Attorney Docket Number:	RS180US
Receipt Date:	18-JUN-2015
Filing Date:	30-DEC-2014
Time Stamp:	14:39:26
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	updated_IDS.pdf	612250 765a7d2162a58f90082a87f565e9ef3c210adfc8	no	4

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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
14/585,629	12/30/2014	3611	5360	RS180US	67	1

CONFIRMATION NO. 8583

UPDATED FILING RECEIPT

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SRAM, LLC
1333 N. KINGSBURY, 4TH FLOOR
CHICAGO, IL 60642

OC000000073927227

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Inventor(s)

Jonathan Blair Watt, Colorado Springs, CO;
Robert Powell, Colorado Springs, CO;

Applicant(s)

SRAM, LLC, Chicago, IL

Assignment For Published Patent Application

SRAM, LLC, Chicago, IL

Power of Attorney: None

Domestic Applications for which benefit is claimed - None.
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Early Publication Request: No

Title

Bicycle Steerer Tube with Variant Stiffness

Preliminary Class

280

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

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

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

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

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

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

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

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

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NOT GRANTED

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SelectUSA

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PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 14/585,629

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	280
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	600
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	720
TOTAL CLAIMS (37 CFR 1.16(i))	67 minus 20 =	* 47			OR	x 80 =	3760
INDEPENDENT CLAIMS (37 CFR 1.16(h))	1 minus 3 =	*				x 420 =	0.00
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						0.00
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0.00
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	5360

APPLICATION AS AMENDED - PART II

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT A	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT B	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.

PATENT

Attorney Docket No. RS180US

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

WATT et al.

Serial No. 14/585,629

Filed: December 30, 2014

For: Bicycle Steerer Tube with Variant Stiffness

Group Art Unit 3611

RESPONSE TO NOTICE TO FILE MISSING PARTS OF APPLICATION

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

Sir:

In response to the Notice to File Missing Parts of Application mailed on January 22, 2015, replacement drawings are enclosed.

Respectfully submitted,

WATT et al.



Lisa Serdynski, Attorney
Registration No. 40,307
SRAM, LLC
1333 N. Kingsbury, 4th Floor
Chicago, IL 60642
(312)664-3652

Replacement
US 14/585,629

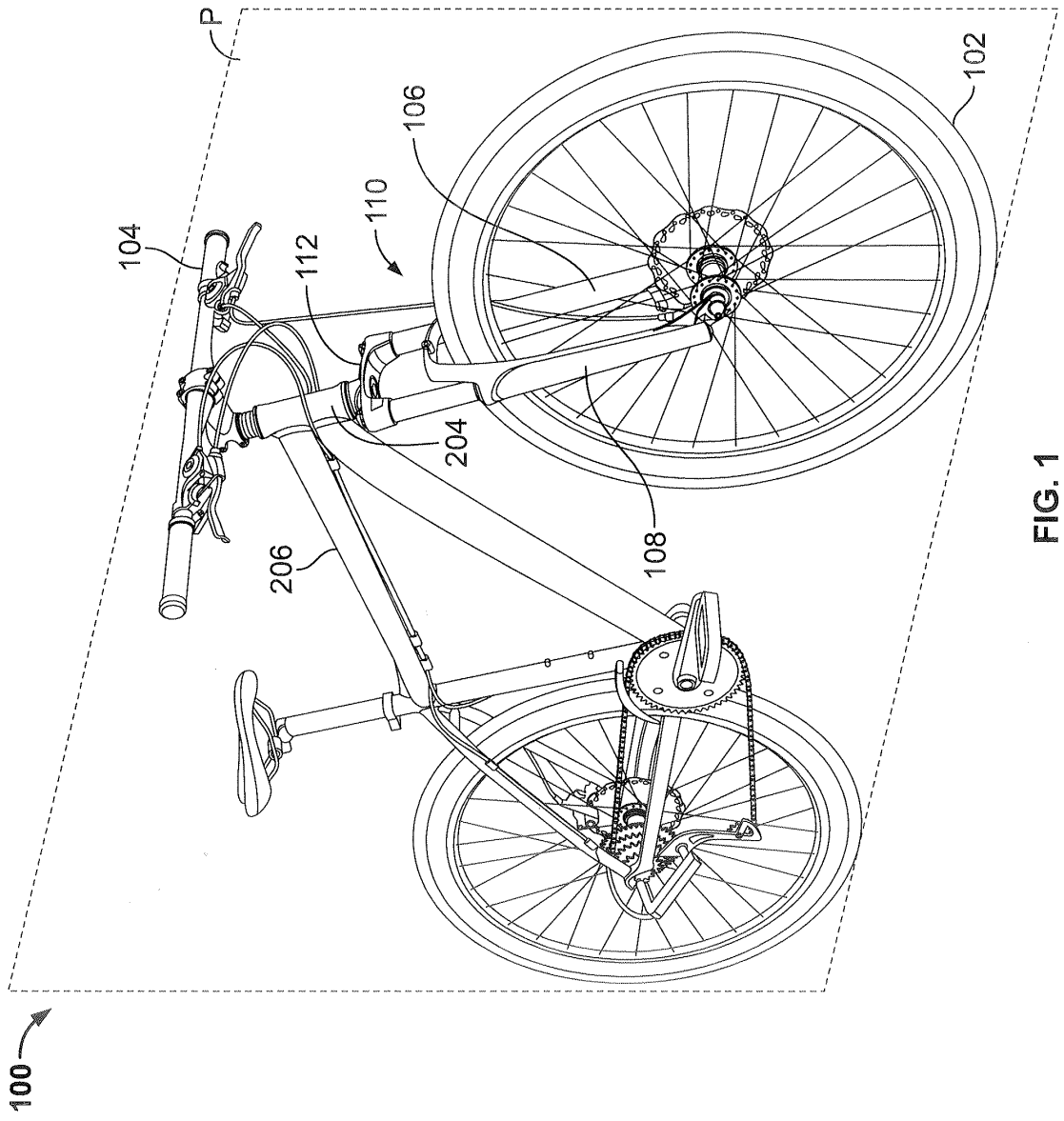


FIG. 1

Replacement
US 14/585,629

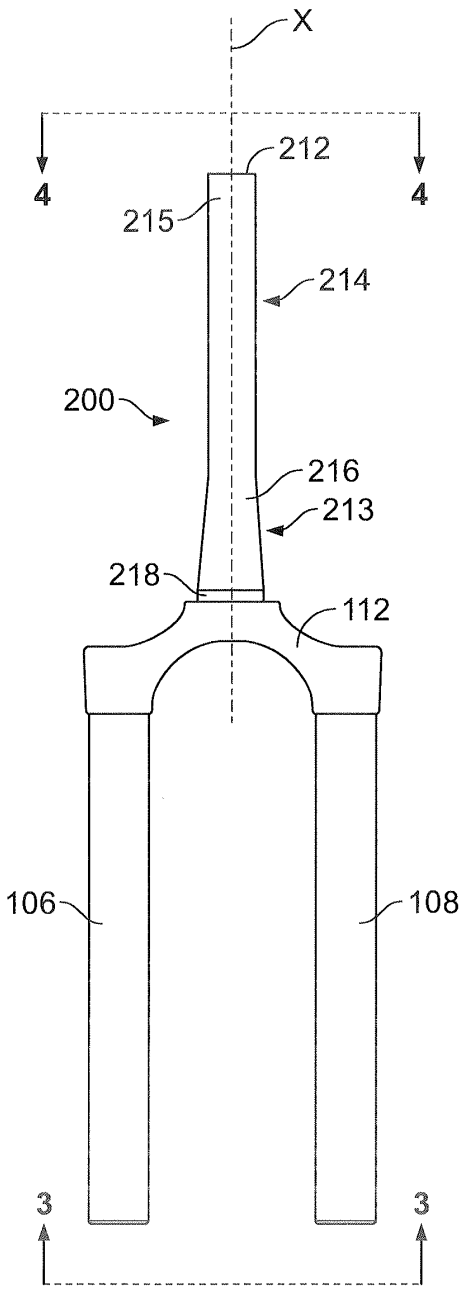


FIG. 2

Replacement
US 14/885,629

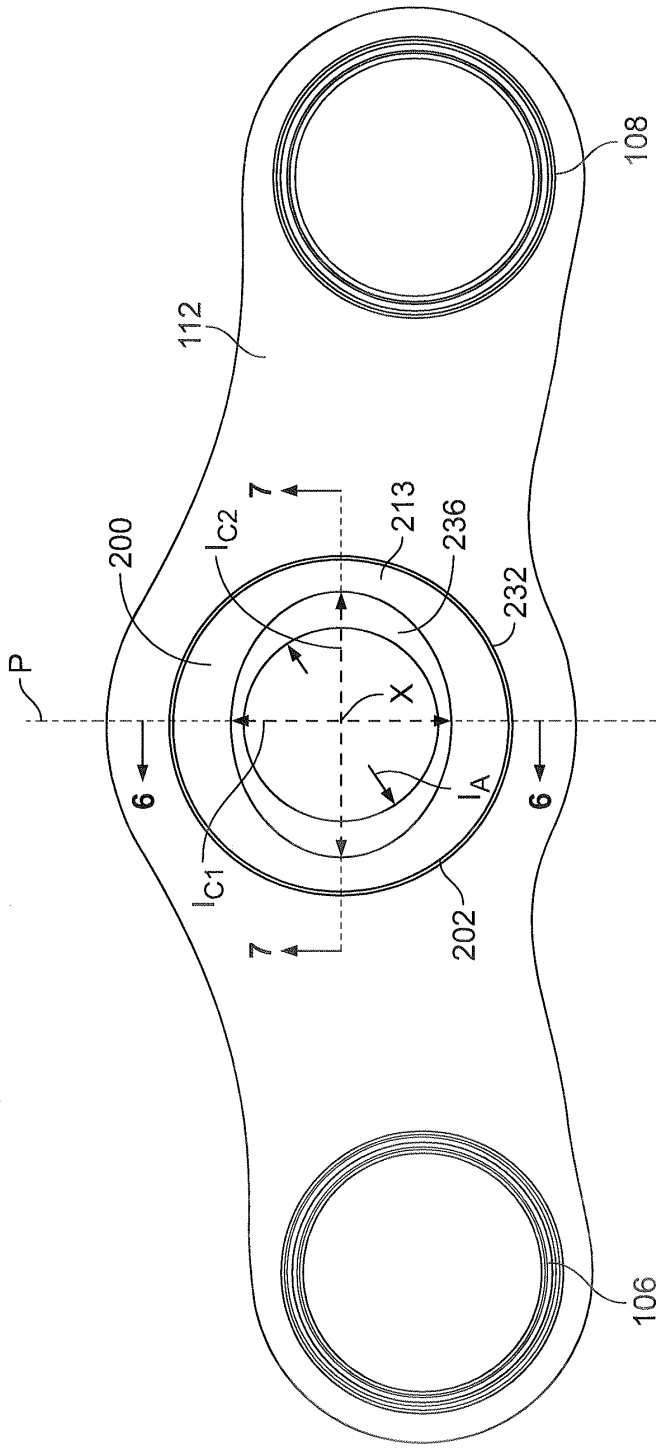


FIG. 3

Replacement
US 14/585,629

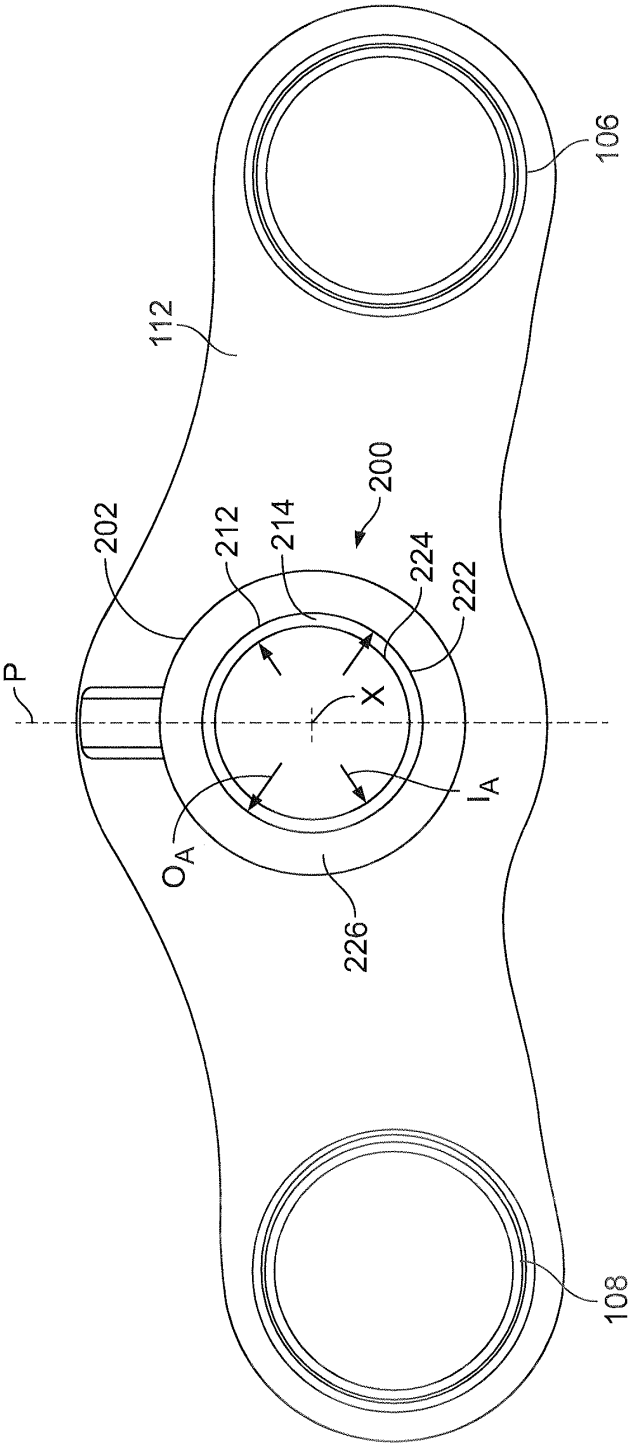


FIG. 4

Replacement
US 14/585,629

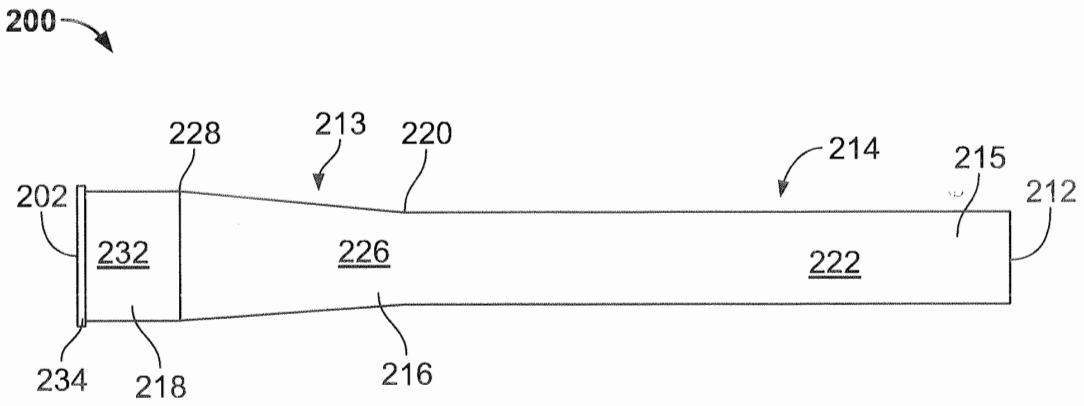


FIG. 5A

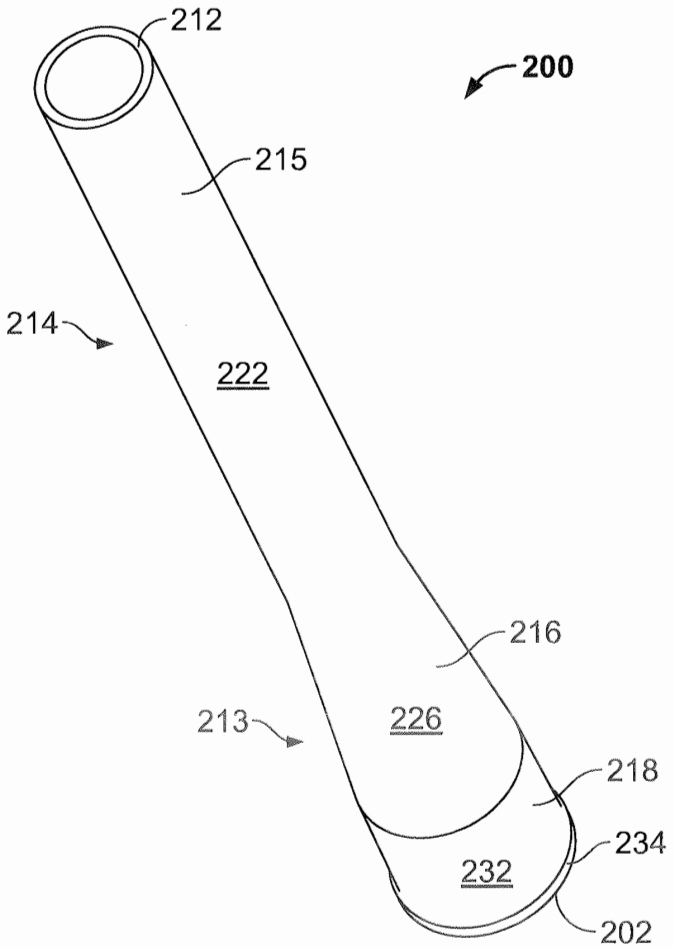


FIG. 5B

Replacement
US 14/585,629

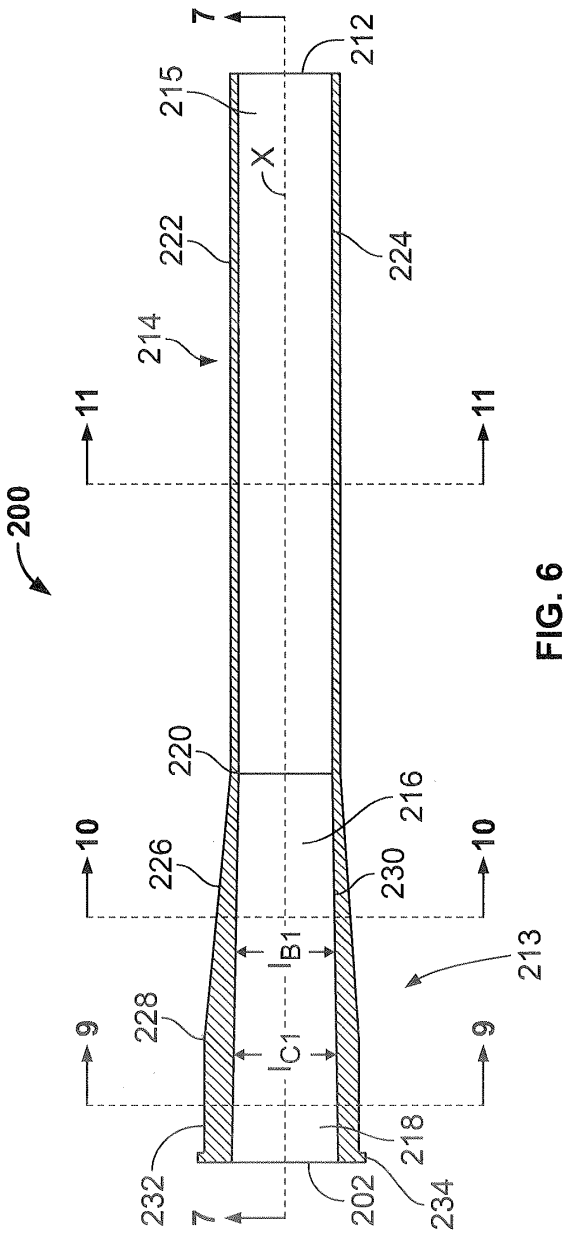


FIG. 6

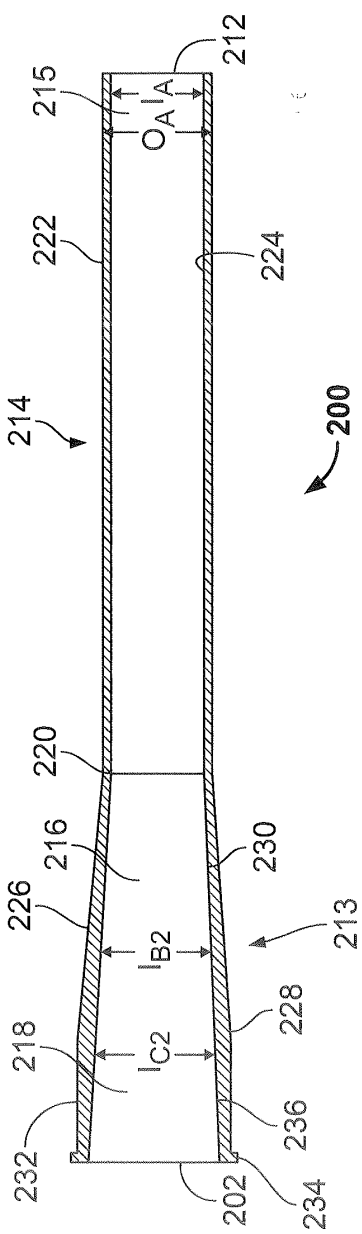


FIG. 7

Replacement
US 14/585,629

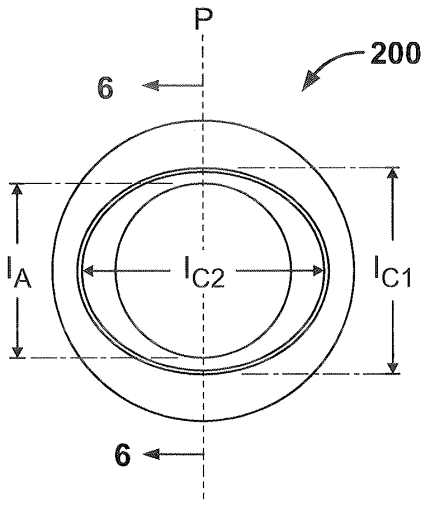


FIG. 8

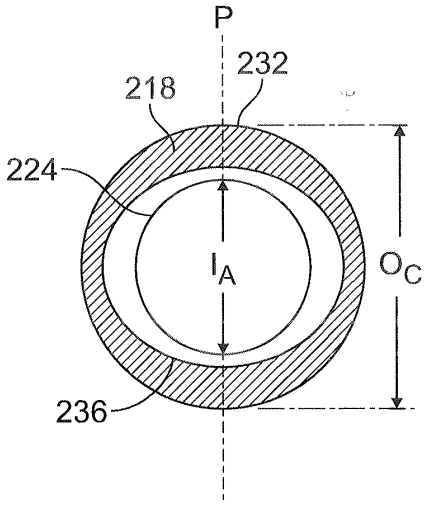


FIG. 9

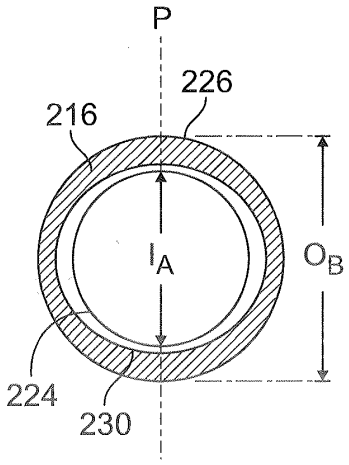


FIG. 10

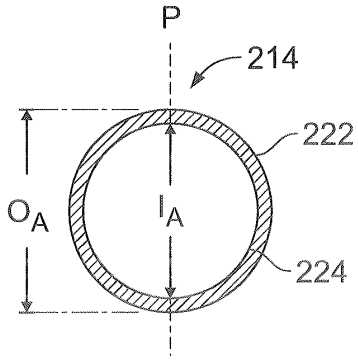


FIG. 11

Replacement
US 14/585,629

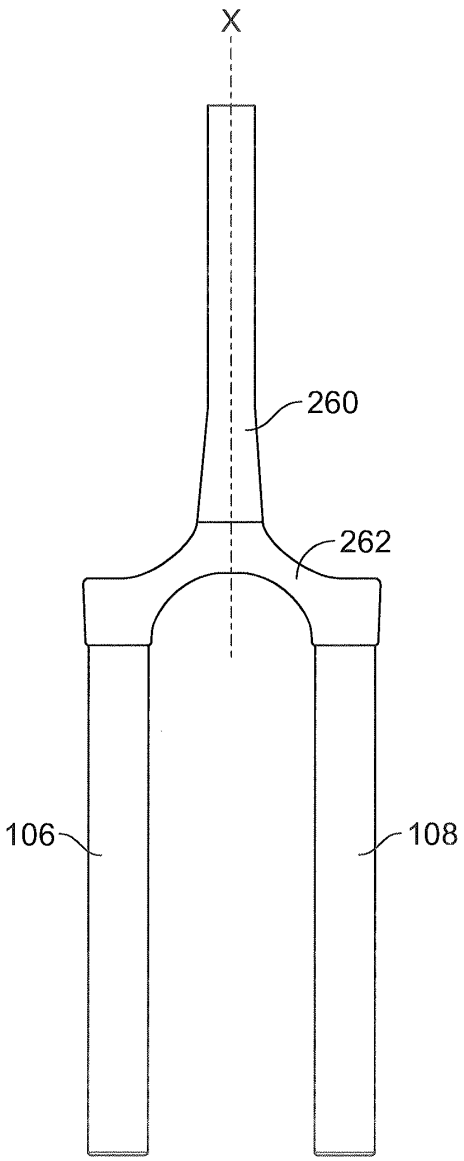


FIG. 12

Replacement
US 14/585,629

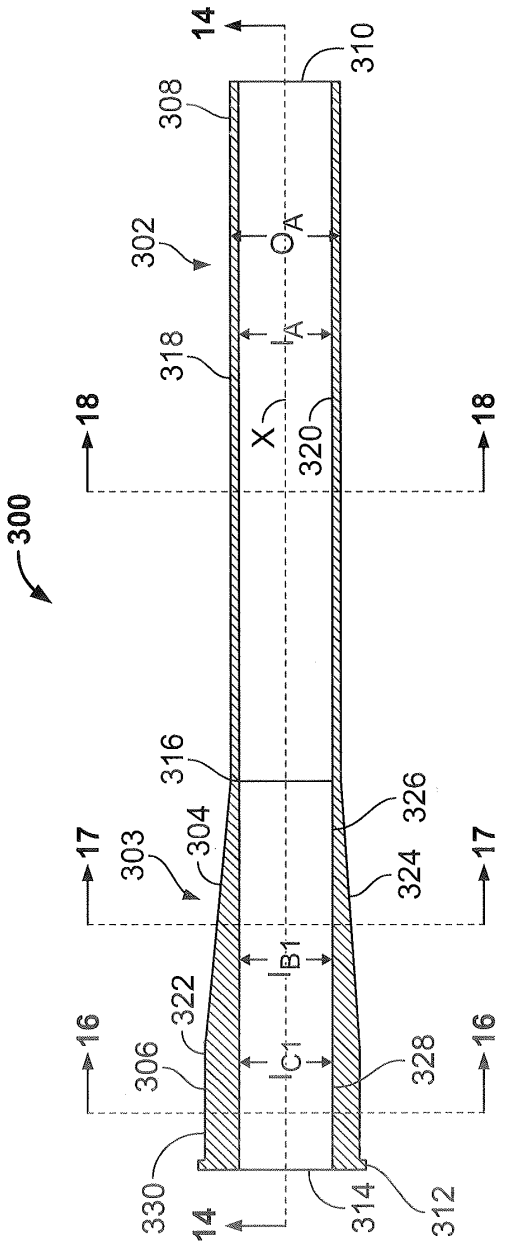


FIG. 13

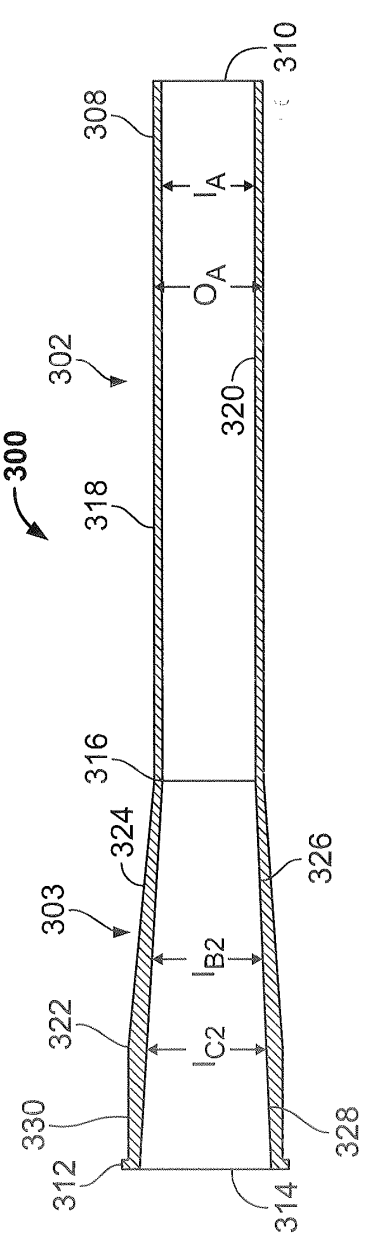


FIG. 14

Replacement
US 14/585,629

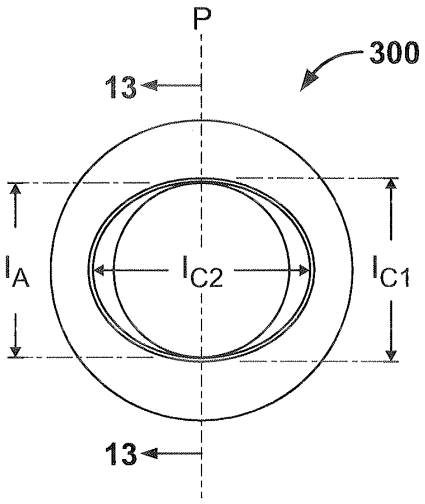


FIG. 15

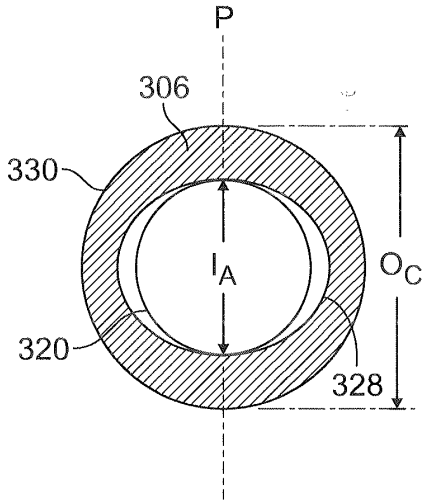


FIG. 16

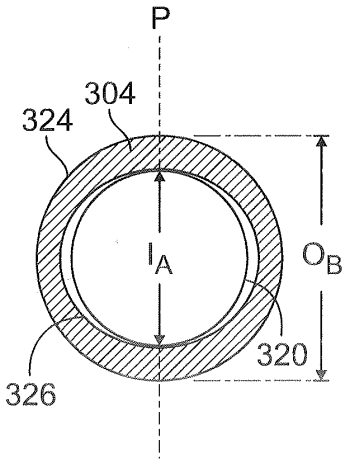


FIG. 17

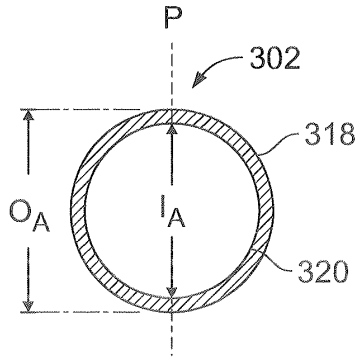


FIG. 18

Replacement
US 14/585,629

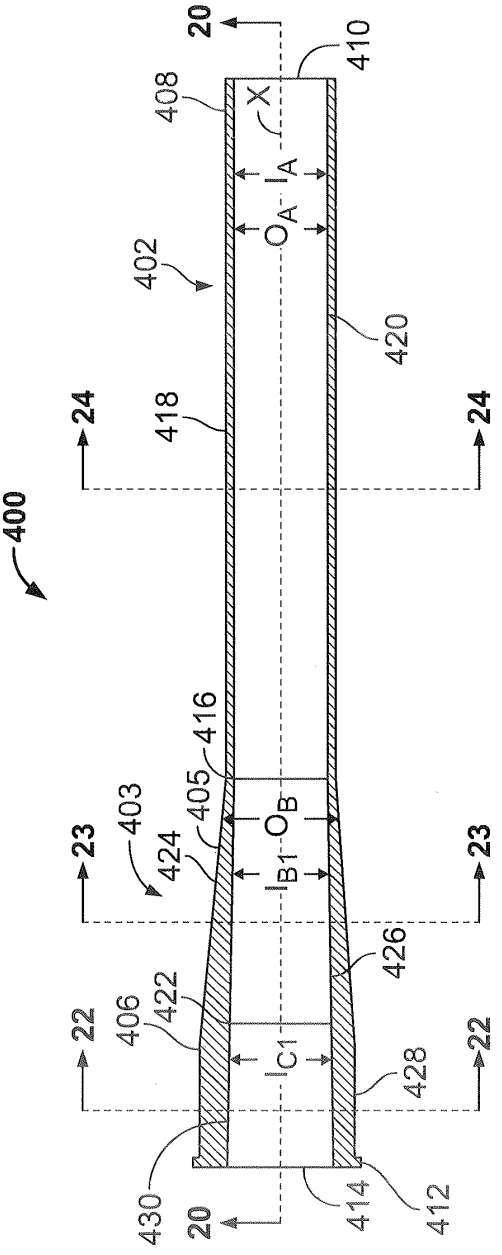


FIG. 19

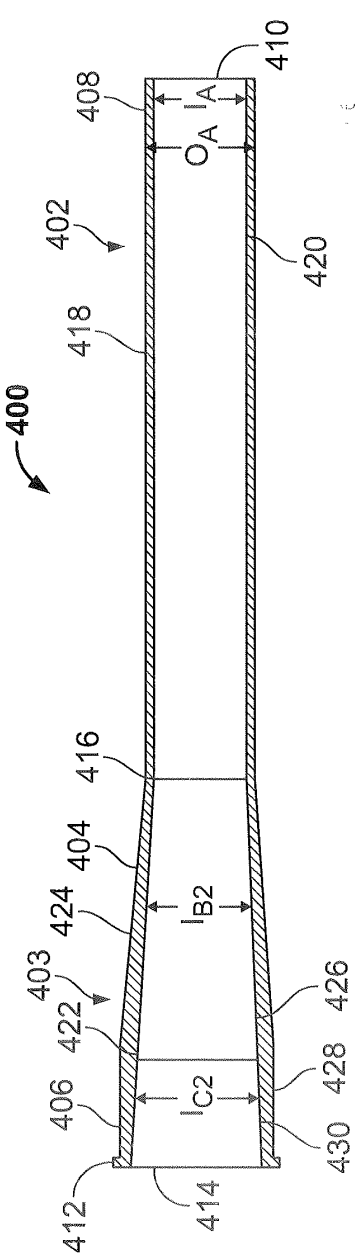


FIG. 20

Replacement
US 14/585,629

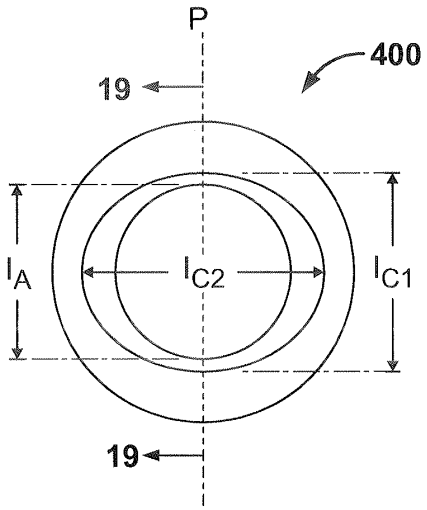


FIG. 21

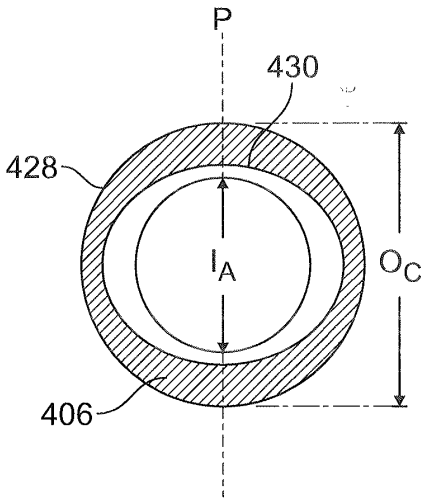


FIG. 22

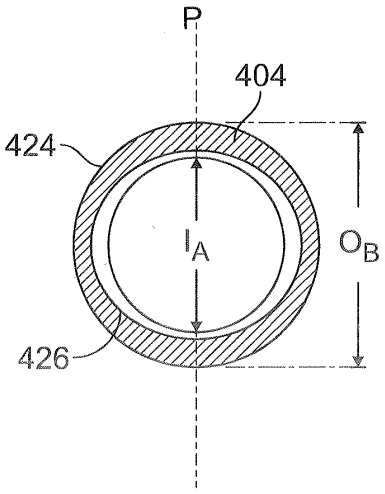


FIG. 23

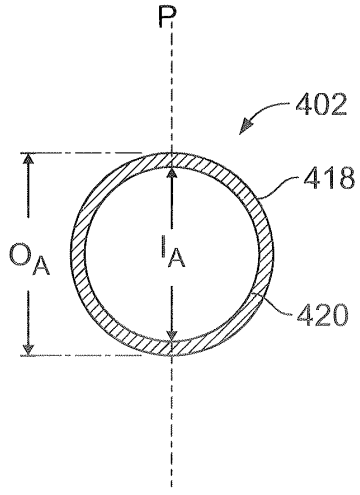


FIG. 24

Replacement
US 14/585,629

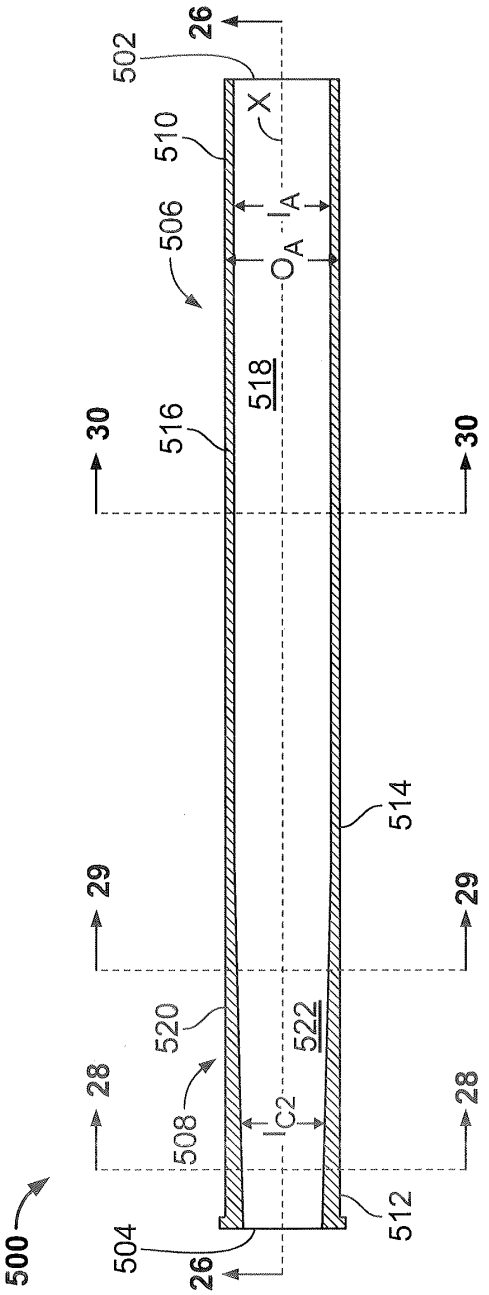


FIG. 25

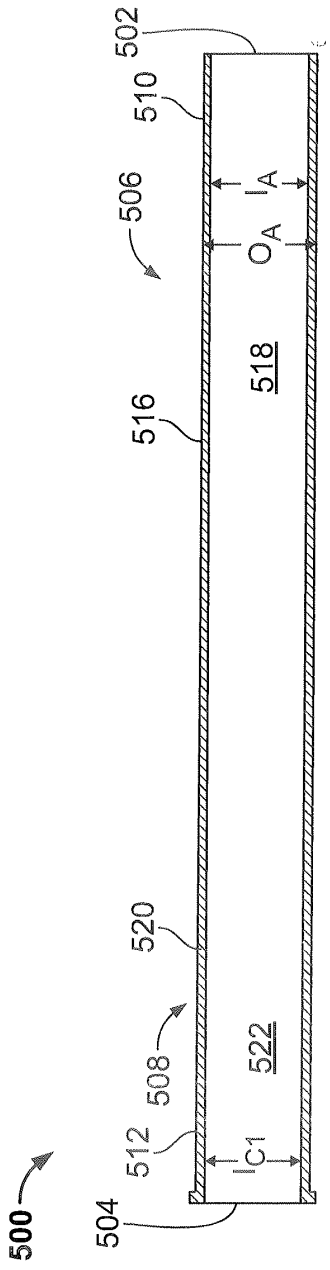


FIG. 26

Replacement
US 14/585,629

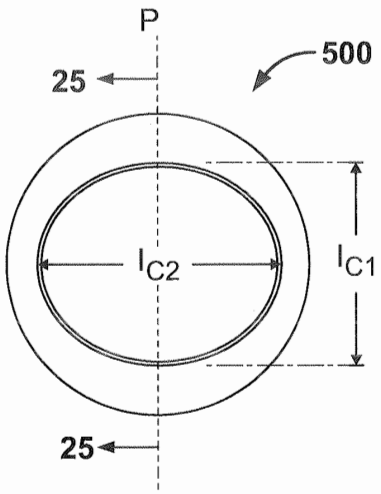


FIG. 27

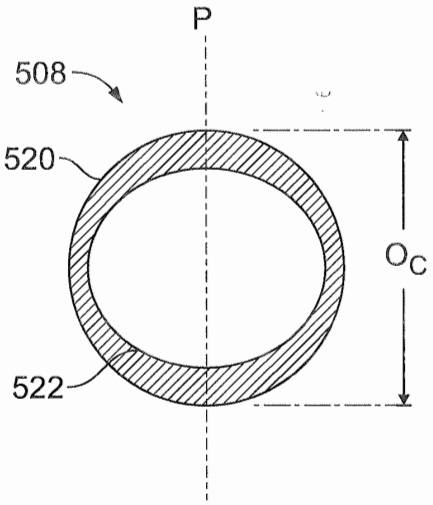


FIG. 28

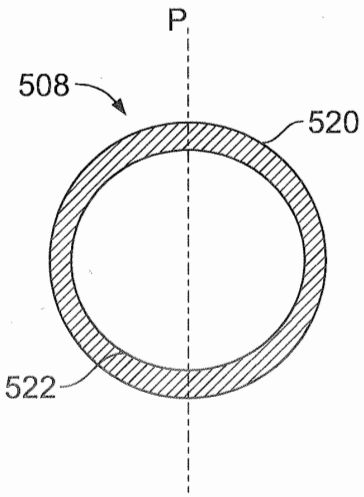


FIG. 29

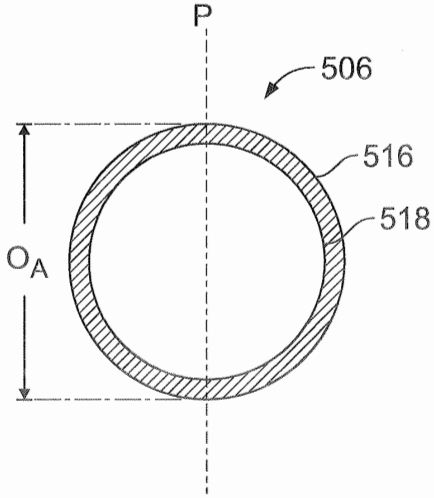


FIG. 30

Replacement
US 14/585,629

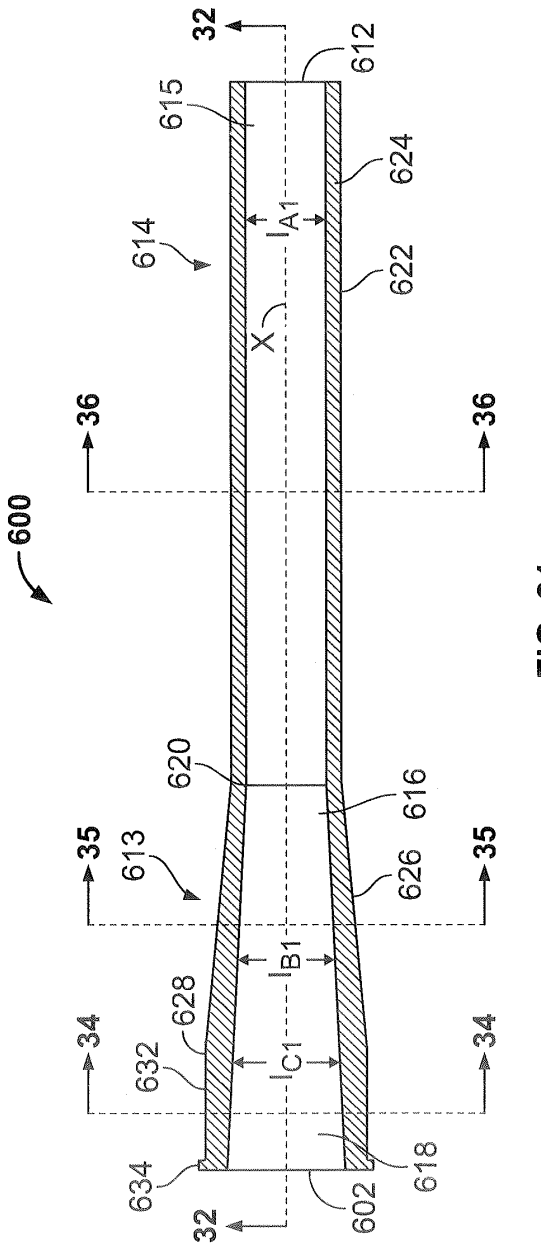


FIG. 31

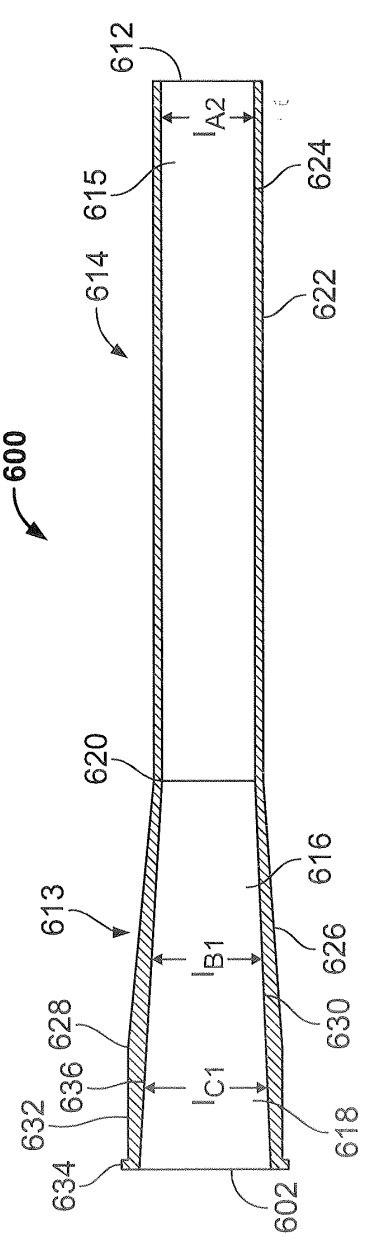


FIG. 32

Replacement
US 14/585,629

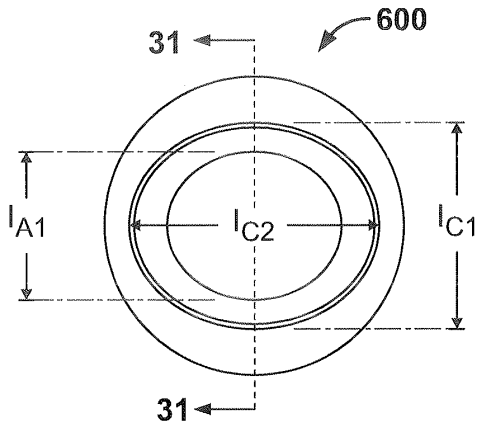


FIG. 33

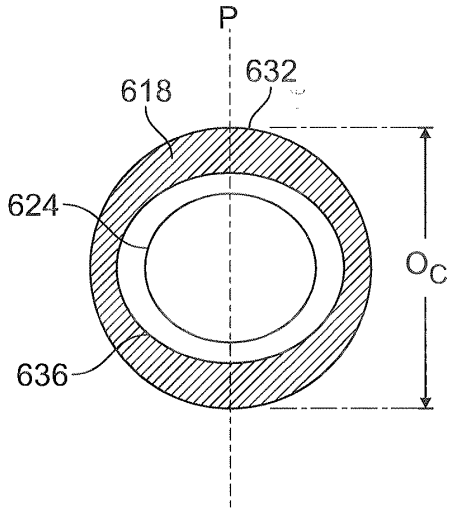


FIG. 34

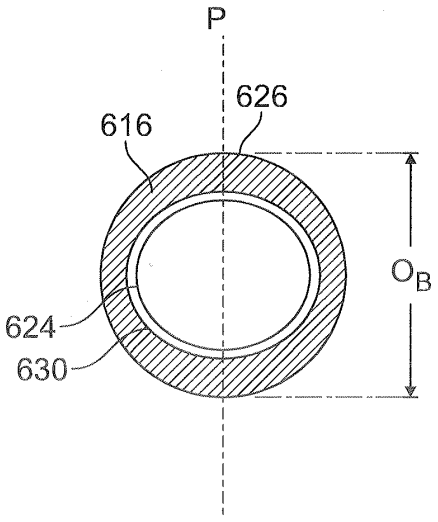


FIG. 35

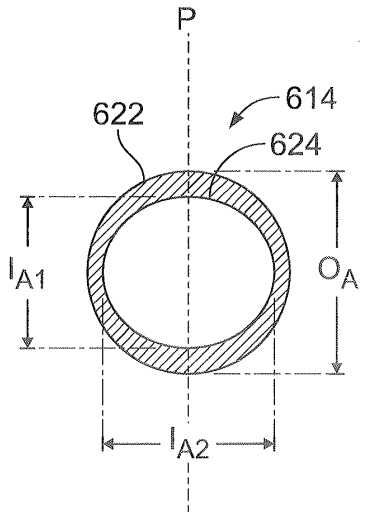


FIG. 36

Electronic Acknowledgement Receipt	
EFS ID:	21677068
Application Number:	14585629
International Application Number:	
Confirmation Number:	8583
Title of Invention:	Bicycle Steerer Tube with Variant Stiffness
First Named Inventor/Applicant Name:	Jonathan Blair Watt
Customer Number:	23470
Filer:	Lisa J Wunderlich
Filer Authorized By:	
Attorney Docket Number:	RS180US
Receipt Date:	04-MAR-2015
Filing Date:	30-DEC-2014
Time Stamp:	16:48:52
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Applicant Response to Pre-Exam Formalities Notice	RS180US_missing_parts.pdf	32730 abf6174ccd029c6561f492c1a782ff9ca6af8220	no	1

Warnings:
Information:

2	Drawings-only black and white line drawings	RS180US_replacement_drawings.pdf	547694 4925a85137045ed90fd687829419ecbde883b0b5	no	16
Warnings:					
Information:					
			Total Files Size (in bytes):	580424	

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

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

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

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

UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
14/585,629	12/30/2014	Jonathan Blair Watt	RS180US

CONFIRMATION NO. 8583

23470
SRAM, LLC
1333 N. KINGSBURY, 4TH FLOOR
CHICAGO, IL 60642

FORMALITIES LETTER

OC00000072950708

Date Mailed: 01/22/2015

NOTICE TO FILE CORRECTED APPLICATION PAPERS

Filing Date Granted

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

The required item(s) identified below must be timely submitted to avoid abandonment:

- Replacement drawings in compliance with 37 CFR 1.84 and 37 CFR 1.121(d) are required. The drawings submitted are not acceptable because:
  - The drawings must be reasonably free from erasures and must be free from alterations, overwriting, interlineations, folds, and copy marks. See Figure(s) 2-4, 5a, 5b, 6-9, 12, 14-17, 19-36.

Applicant is cautioned that correction of the above items may cause the specification and drawings page count to exceed 100 pages. If the specification and drawings exceed 100 pages, applicant will need to submit the required application size fee.

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

Replies should be mailed to:

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

Registered users of EFS-Web may alternatively submit their reply to this notice via EFS-Web, including a copy of this Notice and selecting the document description "Applicant response to Pre-Exam Formalities Notice". https://sportal.uspto.gov/authenticate/AuthenticateUserLocalEPF.html

For more information about EFS-Web please call the USPTO Electronic Business Center at **1-866-217-9197** or visit our website at http://www.uspto.gov/ebc.

If you are not using EFS-Web to submit your reply, you must include a copy of this notice.

/ldvan/

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

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 14/585,629

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	280
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	600
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	720
TOTAL CLAIMS (37 CFR 1.16(i))	67 minus 20 =	* 47			OR	x 80 =	3760
INDEPENDENT CLAIMS (37 CFR 1.16(h))	1 minus 3 =	*				x 420 =	0.00
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						0.00
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0.00
			TOTAL			TOTAL	5360

* If the difference in column 1 is less than zero, enter "0" in column 2.

APPLICATION AS AMENDED - PART II

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT A	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT B	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.

UNITED STATES PATENT AND TRADEMARK OFFICE

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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
14/585,629	12/30/2014	3611	5360	RS180US	67	1

CONFIRMATION NO. 8583

23470
SRAM, LLC
1333 N. KINGSBURY, 4TH FLOOR
CHICAGO, IL 60642

FILING RECEIPT

OC000000072950707

Date Mailed: 01/22/2015

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

Inventor(s)

Jonathan Blair Watt, Colorado Springs, CO;
Robert Powell, Colorado Springs, CO;

Applicant(s)

SRAM, LLC, Chicago, IL

Assignment For Published Patent Application

SRAM, LLC, Chicago, IL

Power of Attorney: None

Domestic Applications for which benefit is claimed - None.
A proper domestic benefit claim must be provided in an Application Data Sheet in order to constitute a claim for domestic benefit. See 37 CFR 1.76 and 1.78.

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.) - None.
Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access - A proper **Authorization to Permit Access to Application by Participating Offices** (PTO/SB/39 or its equivalent) has been received by the USPTO.

If Required, Foreign Filing License Granted: 01/21/2015
The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 14/585,629**
Projected Publication Date: To Be Determined - pending completion of Corrected Papers

Non-Publication Request: No

Early Publication Request: No

Title

Bicycle Steerer Tube with Variant Stiffness

Preliminary Class

280

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

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

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

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

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

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

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

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

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

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

NOT GRANTED

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

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The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop technology, manufacture products, deliver services, and grow your business, visit http://www.SelectUSA.gov or call +1-202-482-6800.

PTO/AIA/14 (12-13)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	RS180US
	Application Number	
Title of Invention	Bicycle Steerer Tube with Variant Stiffness	

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

Secrecy Order 37 CFR 5.2

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

Inventor Information:

Inventor 1 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
Mr.	Jonathan	Blair	Watt	

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

City	Colorado Springs	State/Province	CO	Country of Residence i	US

Mailing Address of Inventor:

Address 1	5203 Meadowgreen Drive		
Address 2			
City	Colorado Springs	State/Province	CO
Postal Code	80919	Country i	US

Inventor 2 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
Mr.	Robert		Powell	

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

City	Colorado Springs	State/Province	CO	Country of Residence i	US

Mailing Address of Inventor:

Address 1	6215 Rendezvous Trail		
Address 2			
City	Colorado Springs	State/Province	CO
Postal Code	80919	Country i	US

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

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

PTO/AIA/14 (12-13)
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	RS180US
	Application Number	
Title of Invention	Bicycle Steerer Tube with Variant Stiffness	

☐ **An Address is being provided for the correspondence Information of this application.**			
Customer Number	23470		
Email Address	lserdynski@sram.com	Add Email	Remove Email

Application Information:

Title of the Invention	Bicycle Steerer Tube with Variant Stiffness		
Attorney Docket Number	RS180US	**Small Entity Status Claimed**	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)		**Suggested Figure for Publication (if any)**	

Filing By Reference :

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

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

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

Publication Information:

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

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

Representative Information:

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

Please Select One:	◉ Customer Number	○ US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number	23470		

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	RS180US
	Application Number	
Title of Invention	Bicycle Steerer Tube with Variant Stiffness	

Domestic Benefit/National Stage Information:

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

Prior Application Status			Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button. Add

Foreign Priority Information:

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

Remove

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

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button. Add

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

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.
NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

PTO/AIA/14 (12-13)
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	RS180US
	Application Number	
Title of Invention	Bicycle Steerer Tube with Variant Stiffness	

Authorization to Permit Access:

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

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

In accordance with 37 CFR 1.14(h)(3), access will be provided to a copy of the instant patent application with respect to: 1) the instant patent application-as-filed; 2) any foreign application to which the instant patent application claims priority under 35 U.S.C. 119(a)-(d) if a copy of the foreign application that satisfies the certified copy requirement of 37 CFR 1.55 has been filed in the instant patent application; and 3) any U.S. application-as-filed from which benefit is sought in the instant patent application.

In accordance with 37 CFR 1.14(c), access may be provided to information concerning the date o f filing this Authorization.

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Applicant 1 Remove

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

Clear

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

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

Name of the Deceased or Legally Incapacitated Inventor :

If the Applicant is an Organization check here. ☒

Organization Name	SRAM, LLC

PTO/AIA/14 (12-13)
Approved for use through 04/30/2017. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	RS180US
	Application Number	
Title of Invention	Bicycle Steerer Tube with Variant Stiffness	

Mailing Address Information For Applicant:			
Address 1	1333 N. Kingsbury Street, 4th Floor		
Address 2			
City	Chicago	**State/Province**	IL
Country i	US	Postal Code	60642
Phone Number	3126648800	Fax Number	
Email Address			

Additional Applicant Data may be generated within this form by selecting the Add button. Add

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not subsitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Assignee 1

Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication . An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

Remove

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

Organization Name	SRAM, LLC

Mailing Address Information For Assignee including Non-Applicant Assignee:			
Address 1	1333 N. Kingsbury Street, 4th Floor		
Address 2			
City	Chicago	**State/Province**	IL
Country i	US	Postal Code	60642
Phone Number	3126648800	Fax Number	
Email Address			

Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button. Add

Signature:

Remove

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

Signature	/Lisa Serdynski/	Date (YYYY-MM-DD)	2014-12-30

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	RS180US
	Application Number	
Title of Invention	Bicycle Steerer Tube with Variant Stiffness	

First Name	Lisa	Last Name	Serdynski	Registration Number	40307
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Docket No.: RS180US

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As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name; that the below-identified application was made or authorized to be made by me; that I believe I am the original inventor or an original joint inventor of the subject matter which is claimed and for which a patent is sought on the invention or design Bicycle Steerer Tube with Variant Stiffness, the specification of which:

X is attached hereto; or
was filed in the United States on _____; Serial Number _____; or
was filed as International Application Serial Number _____on
_____, which application designated the United States of America; or
was the subject of an amendment filed in the U.S. Patent and Trademark
Office on _____

that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above; and that I knowledge the duty to disclose to the U.S. Patent and Trademark Office all information known to me to be material to patentability as defined in 37 C.F.R. §1.56(a).

I hereby claim foreign priority benefits under 35 U.S.C. §119 or §365(b) of any foreign application(s) for patent or inventor's certificate designated below, or under §365(a) of any application filed under the Patent Cooperation Treaty which designated at least one country other than the United States of America, and have also identified below any foreign application(s) for patent or inventor's certificate having a filing date before that of the application to which priority is claimed:

Application Number	Country	Date Filed	Priority Claimed	Certified Copy Attached

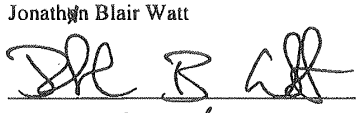
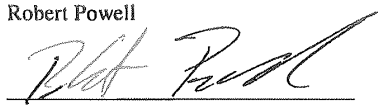
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Application Serial Number	Date Filed	Status

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Chicago, Illinois 60642
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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such false statements may jeopardize the validity of the application or any patent issuing thereon.

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BICYCLE STEERER TUBE WITH VARIANT STIFFNESS

BACKGROUND OF THE INVENTION

[0001] This invention relates in general to bicycles, and more particularly to bicycle steerer tubes.

[0002] A conventional bicycle (a mountain bike is shown at 100 in FIG. 1) is steered by varying the plane of its front wheel 102 out of a plane of travel P, which is aligned with the running direction of the bicycle. This is done by linking the front wheel 102 to a rider-operated handlebar 104. The front wheel 102 is rotatably suspended between left and right tubes 106, 108 of a fork indicated generally at 110. The left and right fork tubes 106, 108 are joined, either in solid fashion or by shock absorbing apparatus, to a fork crown 112 positioned upward from the front wheel.

[0003] Referring to FIGS. 1 and 2, a steerer tube 200 has its lower end 202 affixed to the fork crown 112 and is disposed along an upwardly and usually rearwardly extending steering axis X. Axis X is within the plane of travel P. The steerer tube 200 is inserted into a coaxial head tube 204 that is part of a bicycle frame 206. Bearings are mounted between the steerer tube 200 and the head tube 204 to permit the free rotation of the steerer tube 200 relative to the head tube 204. The handlebar 104 is affixed in some fashion (as by a star nut, not shown) to an upper end 212 of the steerer tube, and permits the rider to impart torque to the steerer tube 200, the fork 110 and the front wheel 102, which in response rotate around the steering axis X as a unit. Thus, the rider may steer the bicycle 100 right or left as desired.

[0004] Many conventional steerer tubes are circularly cylindrical. A perfectly cylindrically circular steerer tube, having a uniform wall thickness, will exhibit a uniform stiffness longitudinally, or fore-and-aft and in alignment with plane of travel P, and laterally, or side-to-side and perpendicular to plane of travel P and axis X. But uniformly thick and stiff steerer tubes do not take into account the differences in loads on the steerer tube and stability, comfort and steering requirements.

SUMMARY OF THE INVENTION

[0005] According to one aspect of the invention, a bicycle steerer tube has an elongate hollow body that is arranged around a steering axis of the bicycle. The steering axis is located in a vertical plane of travel of the bicycle. A segment of an upper section of the body is adapted to be joined to a bicycle handlebar. A segment of a lower section of the steerer tube body is adapted to be joined to a crown of a front wheel fork. The lower and upper sections of the steerer tube body are joined together. The body of the steerer tube is formed by a wall. The thickness of the wall at any point in the lower section of the body varies as a function of the cross-sectional angle of the point relative to the plane of travel, the wall thickness being at a maximum in the plane of travel of the bicycle.

[0006] In some embodiments of the invention, the outer surfaces of the upper and lower sections of the steerer tube body are circular in cross section. In some embodiments of the invention, the wall thickness is at a minimum in a plane containing the steering axis and orthogonal to the plane of travel of the bicycle. In some embodiments of the invention, at least a portion of the inner surface of the wall is formed as an ellipse in cross section, with a major diameter of the ellipse being formed to be perpendicular to the plane of travel, and a minor diameter of the ellipse being formed to be in the plane of travel.

[0007] Steerer tubes according to the invention have a large stiffness and strength in the fore and aft plane of travel of the bicycle. But since side bending stiffness isn't as critical due to lighter side loads, the wall thickness outside of the plane of travel may be reduced. This permits a lighter weight steerer tube that nonetheless meets all loading requirements.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] Further aspects of the invention and their advantages can be discerned in the following detailed description, in which like characters denote like parts and in which:

[0009] FIG. 1 is a perspective view of a representative bicycle;

[0010] FIG. 2 is a front view of a bicycle fork as incorporating a steerer tube according to one embodiment of the invention;

[0011] FIG. 3 is a bottom end view taken substantially along line 3-3 of FIG. 2;

[0012] FIG. 4 is a top end view taken substantially along line 4-4 of FIG. 2;

[0013] FIG. 5a is a side view of the steerer tube shown in FIG. 2;

[0014] FIG. 5b is a perspective view of the steerer tube shown in FIG. 2;

[0015] FIG. 6 is an axial sectional view taken substantially along line 6-6 of FIG. 3;

[0016] FIG. 7 is an axial sectional view taken substantially along line 7-7 of FIG. 3;

[0017] FIG. 8 is a bottom end view of the steerer tube of FIG. 6;

[0018] FIG. 9 is a sectional view taken substantially along line 9-9 of FIG. 6;

[0019] FIG. 10 is a sectional view taken substantially along line 10-10 of FIG. 6;

[0020] FIG. 11 is a sectional view taken substantially along line 11-11 of FIG. 6;

[0021] FIG. 12 is a front view of a bicycle fork as incorporating a steerer tube according to another embodiment of the invention;

[0022] FIG. 13 is an axial sectional view of a steerer tube according to another embodiment of the present invention;

[0023] FIG. 14 is an axial sectional view taken substantially along line 14-14 of FIG. 13;

[0024] FIG. 15 is a bottom end view of the steerer tube of FIG. 13;

[0025] FIG. 16 is a sectional view taken substantially along line 16-16 of FIG. 13;

[0026] FIG. 17 is a sectional view taken substantially along line 17-17 of FIG. 13;

[0027] FIG. 18 is a sectional view taken substantially along line 18-18 of FIG. 13;

[0028] FIG. 19 is an axial sectional view of a steerer tube according to another embodiment of the invention;

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[0029] FIG. 20 is an axial sectional view taken substantially along line 20-20 of FIG. 19;

[0030] FIG. 21 is a bottom end view of the steerer tube of FIG. 19;

[0031] FIG. 22 is a sectional view taken substantially along line 22-22 of FIG. 19;

[0032] FIG. 23 is a sectional view taken substantially along line 23-23 of FIG. 19;

[0033] FIG. 24 is a sectional view taken substantially along line 24-24 of FIG. 19;

[0034] FIG. 25 is an axial sectional view of a steerer tube according to another embodiment of the invention;

[0035] FIG. 26 is an axial sectional view taken substantially along line 26-26 of FIG. 25

[0036] FIG. 27 is a bottom end view of the steerer tube of FIG. 25;

[0037] FIG. 28 is a sectional view taken substantially along line 28-28 of FIG. 25;

[0038] FIG. 29 is a sectional view taken substantially along line 29-29 of FIG. 25;

[0039] FIG. 30 is a sectional view taken substantially along line 30-30 of FIG. 25;

[0040] FIG. 31 is an axial sectional view of a steerer tube according to another embodiment of the invention;

[0041] FIG. 32 is an axial sectional view taken substantially along line 32-32 of FIG. 31;

[0042] FIG. 33 is a bottom end view of the steerer tube of FIG. 31;

[0043] FIG. 34 is a sectional view taken substantially along line 34-34 of FIG. 31;

[0044] FIG. 35 is a sectional view taken substantially along line 35-35 of FIG. 31; and

[0045] FIG. 36 is a sectional view taken substantially along line 36-36 of FIG. 31.

DETAILED DESCRIPTION

[0046] FIG. 2 illustrates a steerer tube 200 as used as a component of a mountain bike fork, although the present invention may be used with any bicycle type, including road bicycles and triathlon bicycles. The steerer tube 200 is particularly advantageous as used with a mountain bike, as the steerer tube stiffness within the plane of travel P ideally is enhanced relative to its stiffness orthogonal to plane P.

[0047] The embodiment of the steerer tube 200 shown in FIGS. 2 – 11 has an upper section 214 and a lower section 213 that in turn has a first or upper portion 216 and a second or lower portion 218. The upper section 214 extends from the upper end 212 of the steerer tube 200 to a lower end 220 of the upper section. A segment 215 of the upper section, adjacent to end 212, is adapted to be joined to handlebar 104. The upper section 214 has an outer surface 222 which is circularly cylindrical throughout the length of the upper section 214, and an inner surface 224 which is also circularly cylindrical throughout the length of the upper section 214. Upper section 214 has an invariant outer diameter O_A, which in one embodiment may be in the range of 25 mm to 40 mm and more preferably can be about 28.5 mm, and an invariant inner diameter I_A, which in one embodiment may be in the range of 20 mm to 36 mm and more preferably can be about 24.6 mm. While the segment 215 of the upper section 214 is circularly cylindrical so as to be more easily compatible with a star nut (not shown), in an alternative embodiment, the segment 215 of the upper section 214 could be tapered or elliptical in cross section and still be compatible with a star nut.

[0048] In this embodiment, the upper portion 216 of lower section 213 has an outer surface 226 which is frustoconical. The lower end 220 of the upper section 214 acts as the upper end of the upper portion 216 of lower section 213. The upper portion 216 extends from its upper end 220 to a lower end 228; the lower end 228 is defined by the termination of the sloped outer surface 226. In this embodiment, the outer surface 226 is circular in cross section and has an outer diameter O_B which increases linearly from outer diameter O_A, at its upper end 220, to an outer diameter O_C at its lower end 228. Said another way, the outer surface 226 of upper portion 216 gradually tapers in diameter from O_C to O_A as one proceeds upwardly along axis X. More generally, outer diameter O_C can be greater

than outer diameter O_A. In one embodiment, the outer diameter O_C can be in the range of 25 mm to 50 mm and more preferably can be about 39.9 mm. Upper portion 216 can be about 76 mm long.

[0049] In this embodiment, the inner surface 230 of upper portion 216 has a shape which changes as a function of the distance from upper end 220. At upper end 220, the inner surface 230 is circular in cross section. As one proceeds towards upper portion lower end 228, the cross section becomes more and more elliptical. FIG. 6 is an axial sectional view aligned with the minor axis of the ellipse formed by the inner surface 230 of upper portion 216. The minor diameter I_{B1} of surface 230 linearly increases as a function of distance from upper end 220, but the rate of increase is relatively small. As shown in FIG. 7, the major diameter I_{B2} of surface 230 is the same as I_A at upper end 220 but then increases linearly as a function of the distance away from upper end 220.

[0050] The wall thickness of the tube 200 at the crown 112 is generally greater than the wall thickness of the upper section 214, as the stress on tube 200 is highest at its junction with crown 112. The lower portion 218 of the lower section 213 of steerer tube 200 is characterized in that its outer surface 232 is circularly cylindrical. Lower portion 218 extends downwardly from upper portion end 228, which is the same as the lower end of upper portion 216, to lower end 202 of the steerer tube. A segment 234 of lower portion 218, adjacent to the lower end 202, is formed in this embodiment to include a ring of increased diameter (such as about 42 mm) and is adapted for affixation to fork crown 112. In another embodiment shown in FIG. 12, a steerer tube 260 and a fork crown 262 may be integrally formed rather than assembled and in those embodiments a raised ring may be missing. An outer diameter O_C of the outer surface 232 may be in the range of 25 mm to 50 mm and more preferably can be chosen to be 39.9 mm. Lower portion 218 can be at least 25 mm long.

[0051] In this embodiment, lower portion 218 has an inner surface 236 which continues to change cross-sectional shape as one proceeds to tube end 202. In this illustrated embodiment, while the outer surface 232 makes a shoulder with outer surface 222 of the upper portion 216 at end 228, the shape of inner surface 236 changes continuously and linearly from upper portion inner surface 230, with no discernable break or bend at portion

end 228. In this illustrated embodiment, the lower portion inner surface minor diameter I_{C1} will continue to slowly increase as steerer tube end 202 is approached. The lower portion inner surface major diameter I_{C2} will continue to linearly increase at a faster rate.

[0052] In this and other embodiments, a ratio of I_{C2} to I_{C1}, taken at tube end 202, can be in the range of 1.05 to 1.3, and more preferably is in the range of 1.10 to 1.25. The combined lengths of upper portion 216 and lower portion 218 can be chosen to be between 40 mm and 200 mm and in one embodiment can be about 101 mm. In this and other embodiments, a ratio of the upper section inner diameter I_A to the upper section outer diameter O_A can be chosen to be in the range of 0.75 to 0.95.

[0053] Steerer tube 200 (and the other embodiments 300, 400, 500 and 600 herein described) may be fabricated of aluminum, steel, magnesium, titanium or carbon fiber reinforced composite. Steerer tube 200 may be made of a material that is the same or different from the rest of fork 110.

[0054] In the embodiment illustrated in FIGS. 13-18, a steerer tube indicated generally at 300 continues to have an upper section 302 and a lower section 303, the lower section in turn having an upper portion 304 and a lower portion 306, similar to the embodiment shown in FIGS. 2-11. An upper segment 308 adjacent to an upper tube end 310 is adapted to be affixed to a bicycle handlebar 104. A lower segment 312 adjacent to a lower tube end 314, herein shown as including a raised annulus or ring, is adapted to be affixed to a fork crown 112.

[0055] Upper section 302 extends from upper tube end 310 to a lower end 316 of upper section 302. An outer surface 318 and an inner surface 320 of upper section 302 are circularly cylindrical throughout the length of upper section 302, as before. Upper section 302 may have an outer diameter O_A and an inner diameter I_A with measurements and/or ratios to each other similar to those described for the embodiment illustrated in FIGS. 2-11.

[0056] First or upper portion 304 of lower section 303 extends from its upper end 316 (which is the same as the lower end of the upper section 302) to a lower end 322. An outer surface 324 of the upper portion 304 is frustoconical in shape; its outer diameter O_B increases linearly from upper end 316 to lower end 322. The lower end 322 is defined by

the termination of the sloped outer surface 324. An inner surface 326 of the upper portion 304 changes cross-sectional shape from circular to elliptical, and the eccentricity of the ellipse increases as the lower end 322 is approached. A major diameter I_{B2} of upper portion inner surface 326 increases linearly as the lower end 322 is approached. A minor diameter I_{B1} of upper portion inner surface 326 stays the same as upper section inner diameter I_A.

[0057] Second or lower portion 306 of lower section 303 extends from its upper end 322, which is the same as the lower end of upper portion 304, to lower tube end 314. The lower portion 306 has an outer surface 330 that is circularly cylindrical. The lower portion 306 has an inner surface 328 which continues to change cross-sectional shape as one proceeds to lower tube end 314. In this illustrated embodiment, while the outer surface 330 makes a shoulder with outer surface 324 of the upper portion 304 at end 322, the shape of the inner surface 328 changes continuously and linearly from the upper portion inner surface 326, with no discernable break or bend at end 322. The lower portion inner surface major diameter I_{C2} increases linearly as steerer tube end 314 is approached. The lower portion inner surface minor diameter I_{C1} stays the same as upper section inner diameter I_A.

[0058] In the embodiment illustrated in FIGS. 19-24, a steerer tube indicated generally at 400 continues to have an upper section 402 and a lower section 403, the lower section in turn having an upper portion 404 and a lower portion 406, similar to the embodiment shown in FIGS. 2-11. An upper segment 408 adjacent to an upper tube end 410 is adapted to be affixed to bicycle handlebar 104. A lower segment 412 adjacent to a lower tube end 414, herein shown as including a raised annulus or ring, is adapted to be affixed to fork crown 112.

[0059] Upper section 402 extends from tube end 410 to a lower end 416 of upper section 402. An outer surface 418 and an inner surface 420 of upper section 402 are circularly cylindrical throughout the length of upper section 402, as before. Upper section 402 may have an outer diameter O_A and an inner diameter I_A with measurements and/or ratios to each other similar to those described for the embodiment illustrated in FIGS. 2-11.

[0060] First or upper portion 404 of lower section 403 extends from its upper end 416 (which is the same as the lower end of the upper section 402) to a lower end 422. An outer surface 424 of the upper portion 404 is frustoconical in shape; its outer diameter O_B increases linearly from end 416 to end 422. An inner surface 426 of the upper portion 404 changes cross-sectional shape from circular to elliptical, and the eccentricity of the ellipse increases as the lower end 422 of upper portion 404 is approached. A major diameter I_{B2} of upper portion inner surface 426 increases linearly as lower end 422 is approached. A minor diameter I_{B1} of upper portion inner surface 426 also increases linearly as lower end 422 is approached, but at a slower rate than the rate of increase of I_{B2}.

[0061] The second or lower portion 406 of lower section 403 extends from its upper end 422 (which is the same as the lower end of upper portion 404) to the lower tube end 414. An outer surface 428 of the lower portion 406 is circularly cylindrical and has an outer diameter O_C, of dimensions similar to those chosen for the embodiment shown in FIGS. 2-11. An inner surface 430 of the lower portion 406 is elliptically cylindrical; the cross-sectional ellipse taken at end 422 is the same as the cross-sectional ellipse taken at end 414. Major inner diameter I_{C2} and minor inner diameter I_{C1} are the same at end 422 as they are at end 414.

[0062] FIGS. 25-30 illustrate another embodiment of a steerer tube 500 of the invention. The steerer tube 500 has an upper end 502 and a lower end 504. The steerer tube 500 is divided into an upper section 506 and a lower section 508; section 508 has no distinct upper and lower portions. An upper segment 510 adjacent tube upper end 502 is adapted to be affixed to handlebar 104. A lower segment 512, here including a raised ring, is disposed adjacent lower tube end 504 and is adapted to be affixed to fork crown 112.

[0063] Upper section 506 extends from upper tube end 502 to a lower end 514. Both an outer surface 516 of section 506 and an inner surface 518 of section 506 are circularly cylindrical throughout the length of upper section 506. Inner surface 518 has a constant diameter I_A and outer surface 516 has a constant outer diameter O_A.

[0064] Lower section 508 extends from its upper end 514, which is the same as the lower end of the upper section 506, to the tube end 504. An outer surface 520 of the lower

section 508 is circularly cylindrical and may have an outer diameter O_C. Outer diameter O_C may be chosen to be the same as outer diameter O_A and in this instance outer surface 520 will be linearly continuous with outer surface 516 of upper section 506. The dimension of outer diameter O_C can be chosen to be similar to that described in the first embodiment (FIGS. 2-11).

[0065] An inner surface 522 of the lower section 508 changes shape as one proceeds from its upper end 514 to the tube end 504. At end 514, the inner surface 522 has a circular cross section such that its minor diameter I_{C1} is the same as its major diameter I_{C2}, and at end 514 these are the same as upper section inner diameter I_A. As one approaches tube end 504, major diameter I_{C2} will increase linearly. Minor diameter I_{C1} will also increase linearly, but at a slower rate. Therefore, the eccentricity of the cross-sectional ellipse of inner surface 522 will increase and will be greatest at end 504. At end 504, the ratio of I_{C2} to I_{C1} can be chosen from the range of 1.05 and 1.3, and more preferably from within the range of 1.10 to 1.25, similar to the ratios expressed for the embodiment shown in FIGS. 2-11.

[0066] While the above embodiments show an inner surface of the steerer tube transitioning between a circular cross section and an elliptical cross section, in another embodiment the inner surface of a steerer tube may have an elliptical cross section throughout the length of the steerer tube as shown in FIGS. 31-36. The steerer tube 600 has the upper section 614 and a lower section 613. The lower section 613 has an upper portion 616 and a lower portion 618. The upper section 614 extends from an upper end 612 of the steerer tube 600 to a lower end 620 of the upper section 614. A segment 615 of the upper section, adjacent to end 612, is adapted to be joined to handlebar 104. The upper section 614 has an outer surface 622 which is circularly cylindrical throughout the length of the upper section 614 and an inner surface 624 which is elliptical in cross section throughout the length of the upper section 614. Upper section 614 has an invariant outer diameter O_A and an invariant inner minor diameter I_{A1} and an invariant inner major diameter I_{A2}.

[0067] The upper section 616 of lower section 613 has an outer surface 626 which is frustoconical. The lower end 620 of the upper section 614 acts as the upper end of the

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upper portion 616 of lower section 613. The upper portion 616 extends from its upper end 620 to a lower end 628; the lower end 628 is defined by the termination of the sloped outer surface 626. In this embodiment, the outer surface 626 is circular in cross section and has an outer diameter O_B which increases linearly from outer diameter O_A at is upper end 620, to an outer diameter O_C at its lower end 628.

[0068] The inner surface 630 of upper section 616 has a shape which changes as a function of the distance from upper end 620. At upper end 620, the inner surface 630 is elliptical in cross section. As one proceeds towards upper portion lower end 628, the cross section becomes more and more elliptical. FIG. 31 is an axial sectional view aligned with the minor diameter of the ellipse formed by the inner surface of upper portion 616. The minor diameter I_{B1} of surface 630 linearly increases as a function of distance from upper end 620, but the rate of increase is relatively small. As shown in FIG. 32, the major diameter I_{B2} of surface 630 is the same as I_{A2} at upper end 620 but then increases linearly as a function of the distance away from upper end 620.

[0069] The lower section 618 of the lower section 613 of steerer tube 600 is characterized in that its outer surface 632 is circularly cylindrical. Lower portion 618 extends downwardly from upper portion end 628, which is the same as the lower end of upper portion 616, to lower end 602 of the steerer tube. A segment 634 of lower portion 618, adjacent to the lower end 602, is adapted for affixation to the fork crown 112.

[0070] In this embodiment, lower portion 618 has an inner surface 636 which continues to change cross-sectional shape as one proceeds to tube end 602. While the outer surface 632 makes a shoulder with outer surface 622 of the upper section 616 at end 628, the shape of the inner surface 636 changes continuously and linearly from upper portion inner surface 630, with no discernable break or bend at portion end 628. The lower portion inner surface minor diameter I_{C2} will continue to slowly increase as steerer tube end 602 is approached. The lower portion inner surface major diameter I_{C2} will continue to linearly increase at a faster rate. At end 602, the ratio of I_{C2} and I_{C1} can be chosen from the range of 1.05 and 1.3, and more preferably from within the range of 1.10 to 1.25, similar to the ratios expressed for the embodiment shown in FIGS. 2-11.

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[0071] In summary, steerer tube embodiments have been illustrated and described which have lower sections, or portions of same, with a wall thickness in the plane of travel that is greater than the wall thickness outside of the plane of travel, and which therefore exhibit a greater stiffness fore and aft than they do side-to-side. The outer surface of the lower portion of the lower tube section nonetheless may be specified as circularly cylindrical as an aid to its assembly to other fork elements.

[0072] While illustrated embodiments of the present invention have been described and illustrated in the appended drawings, the present invention is not limited thereto but only by the scope and spirit of the appended claims.

WE CLAIM:

1. A steerer tube for a bicycle, the steerer tube comprising:

an elongate hollow body arranged around a steering axis located in a vertical plane of travel of the bicycle,

the body having upper and lower sections, a segment of the upper section adapted to be joined to a bicycle handlebar, a segment of the lower section adapted to be joined to a crown of a front wheel fork of the bicycle, the lower section joined to the upper section, and

the body formed by a wall, a thickness of the wall at any point in the lower section of the body varying as a function of the cross-sectional angle of the point relative to the plane of travel, the wall thickness being at a maximum in the plane of travel of the bicycle.

2. The steerer tube of Claim 1, wherein outer surfaces of the upper and lower sections of the body are circular in cross section.

3. The steerer tube of Claim 2, wherein an outer diameter of the lower section of the body is greater than an outer diameter of the upper section of the body.

4. The steerer tube of Claim 3, wherein the lower section of the body has first and second portions, the first portion adjoining the upper section of the body, an outer diameter of the first portion of the lower section being greater than an outer diameter of the upper section and less than an outer diameter of the second portion of the lower section.

5. The steerer tube of Claim 4, wherein the outer diameter of the first portion of the lower section gradually tapers from the second portion of the lower section to the upper section of the body.

6. The steerer tube of Claim 5, wherein an inner surface of the upper section forms an ellipse in cross section, a major diameter of the ellipse formed to be perpendicular to the plane of travel, a minor diameter of the ellipse formed to be in the plane of travel of the bicycle.

7. The steerer tube of Claim 5, wherein an inner surface of the upper section is circular in cross section.

8. The steerer tube of Claim 7, wherein the inner and outer surfaces of the upper section are substantially circularly cylindrical and the outer surface of the second portion of the lower section is substantially circularly cylindrical.

9. The steerer tube of Claim 7, wherein a ratio of an inner diameter of the upper section of the body to an outer diameter of the upper section of the body is within the range of 0.75 to 0.95, inclusive.

10. The steerer tube of Claim 2, wherein an outer diameter of the lower section of the body is substantially the same as an outer diameter of the upper section of the body.

11. The steerer tube of Claim 2, wherein an inner surface of the upper section is circular in cross section.

12. The steerer tube of Claim 11, wherein the inner and outer surfaces of the upper section are substantially circularly cylindrical and the outer surface of the lower section is substantially circularly cylindrical.

13. The steerer tube of claim 11, wherein a ratio of an inner diameter of the upper section of the body to an outer diameter of the upper section of the body is within the range of 0.75 to 0.95, inclusive.

14. The steerer tube of Claim 1, wherein an outer diameter of the lower section of the body is greater than an outer diameter of the upper section of the body.

15. The steerer tube of Claim 14, wherein the lower section of the body has first and second portions, the first portion adjoining the upper section of the body, an outer diameter of the first portion of the lower section being greater than an outer diameter of the upper section and less than an outer diameter of the second portion of the lower section.

16. The steerer tube of Claim 15, wherein the outer diameter of the first portion of the lower section gradually tapers from the second portion of the lower section to the upper section of the body.

17. The steerer tube of Claim 1, wherein the segment of the lower section of the body is formed as one piece with the crown of the front wheel fork.

18. The steerer tube of Claim 1, wherein the segment of the lower section of the body is joined to the crown of the front wheel fork, the body formed of a material different from the crown of the front wheel fork.

19. The steerer tube of Claim 18, wherein the segment of the lower section of the body is formed as one piece with the crown of the front wheel fork.

20. The steerer tube of Claim 1, wherein the body is formed from a material selected from the group consisting of steel, carbon fiber reinforced composite, aluminum, titanium and magnesium.

21. The steerer tube of Claim 1, wherein the wall thickness is at a minimum in a plane containing the steering axis and orthogonal to the plane of travel of the bicycle.

22. The steerer tube of Claim 21, wherein outer surfaces of the upper and lower sections of the body are circular in cross section.

23. The steerer tube of Claim 22, wherein an outer diameter of the lower section of the body is greater than an outer diameter of the upper section of the body.

24. The steerer tube of Claim 23, wherein the lower section of the body has first and second portions, the first portion adjoining the upper section of the body, an outer diameter of the first portion of the lower section being greater than an outer diameter of the upper section and less than an outer diameter of the second portion of the lower section.

25. The steerer tube of Claim 24, wherein the outer diameter of the first portion of the lower section gradually tapers from the second portion of the lower section of the body to the upper section of the body.

26. The steerer tube of Claim 25, wherein an inner surface of the upper section forms an ellipse in cross section, a major diameter of the ellipse formed to be perpendicular to the plane of travel, a minor diameter of the ellipse formed to be in the plane of travel of the bicycle.

27. The steerer tube of Claim 25, wherein an inner surface of the upper section is circular in cross section.

28. The steerer tube of Claim 27, wherein the inner and outer surfaces of the upper section are substantially circularly cylindrical and the outer surface of the second portion of the lower section is substantially circularly cylindrical.

29. The steerer tube of Claim 27, wherein a ratio of an inner diameter of the upper section of the body to an outer diameter of the upper section of the body is within the range of 0.75 to 0.95, inclusive.

30. The steerer tube of Claim 21, wherein an outer diameter of the lower section of the body is substantially the same as an outer diameter of the upper section of the body.

31. The steerer tube of Claim 21, wherein an inner surface of the upper section is circular in cross section.

32. The steerer tube of Claim 31, wherein the inner and outer surfaces of the upper section are substantially circularly cylindrical and the outer surface of the second portion of the lower section is substantially circularly cylindrical.

33. The steerer tube of claim 31, wherein a ratio of an inner diameter of the upper section of the body to an outer diameter of the upper section of the body is within the range of 0.75 to 0.95, inclusive.

34. The steerer tube of Claim 21, wherein an outer diameter of the lower section of the body is greater than an outer diameter of the upper section of the body.

35. The steerer tube of Claim 34, wherein the lower section of the body has first and second portions, the first portion adjoining the upper section of the body, an outer diameter of the first portion of the lower section being greater than an outer diameter of the upper section and less than an outer diameter of the second portion of the lower section.

36. The steerer tube of Claim 35, wherein the outer diameter of the first portion of the lower section gradually tapers from the second portion of the lower section of the body to the upper section of the body.

37. The steerer tube of Claim 21, wherein the segment of the lower section of the body is formed as one piece with the crown of the front wheel fork.

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38. The steerer tube of Claim 21, wherein the segment of the lower section of the body is joined to the crown of the front wheel fork, the body formed of a material different from the crown of the front wheel fork.

39. The steerer tube of Claim 38, wherein the segment of the lower section of the body is formed as one piece with the crown of the front wheel fork.

40. The steerer tube of Claim 21, wherein the body is formed from a material selected from the group consisting of steel, carbon fiber reinforced composite, aluminum, titanium and magnesium.

41. The steerer tube of Claim 21, wherein an inner surface of the wall within the lower section of the body is formed as an ellipse in cross section, a major diameter of the ellipse formed to be perpendicular to the plane of travel, a minor diameter of the ellipse formed to be in the plane of travel of the bicycle.

42. The steerer tube of Claim 41, wherein outer surfaces of the upper and lower sections of the body are circular in cross section.

43. The steerer tube of Claim 42, wherein an outer diameter of the lower section of the body is greater than an outer diameter of the upper section of the body.

44. The steerer tube of Claim 43, wherein the lower section of the body has first and second portions, the first portion adjoining the upper section of the body, an outer diameter of the first portion of the lower section being greater than an outer diameter of the upper section and less than an outer diameter of the second portion of the lower section.

45. The steerer tube of Claim 44, wherein the outer diameter of the first portion of the lower section gradually tapers from the second portion of the lower section of the body to the upper section of the body.

46. The steerer tube of Claim 45, wherein an inner surface of the upper section forms an ellipse in cross section, a major diameter of the ellipse formed to be perpendicular to the plane of travel, a minor diameter of the ellipse formed to be in the plane of travel of the bicycle.

47. The steerer tube of Claim 45, wherein an inner surface of the upper section is circular in cross section.

48. The steerer tube of Claim 47, wherein the inner and outer surfaces of the upper section are substantially circularly cylindrical and the outer surface of the second portion of the lower section is substantially circularly cylindrical.

49. The steerer tube of Claim 47, wherein a ratio of an inner diameter of the upper section of the body to an outer diameter of the upper section of the body is within the range of 0.75 to 0.95, inclusive.

50. The steerer tube of Claim 41, wherein an outer diameter of the lower section of the body is substantially the same as an outer diameter of the upper section of the body.

51. The steerer tube of Claim 41, wherein an inner surface of the upper section is circular in cross section.

52. The steerer tube of Claim 51, wherein the inner and outer surfaces of the upper section are substantially circularly cylindrical and the outer surface of the second portion of the lower section is substantially circularly cylindrical.

53. The steerer tube of claim 51, wherein a ratio of an inner diameter of the upper section of the body to an outer diameter of the upper section of the body is within the range of 0.75 to 0.95, inclusive.

54. The steerer tube of Claim 41, wherein an outer diameter of the lower section of the body is greater than an outer diameter of the upper section of the body.

55. The steerer tube of Claim 54, wherein the lower section of the body has first and second portions, the first portion adjoining the upper section of the body, an outer diameter of the first portion of the lower section being greater than an outer diameter of the upper section and less than an outer diameter of the second portion of the lower section.

56. The steerer tube of Claim 55, wherein the outer diameter of the first portion of the lower section gradually tapers from the second portion of the lower section of the body to the upper section of the body.

57. The steerer tube of Claim 41, wherein the segment of the lower section of the body is formed as one piece with the crown of the front wheel fork.

58. The steerer tube of Claim 41, wherein the segment of the lower section of the body is joined to the crown of the front wheel fork, the body formed of a material different from the crown of the front wheel fork.

59. The steerer tube of Claim 58, wherein the segment of the lower section of the body is formed as one piece with the crown of the front wheel fork.

60. The steerer tube of Claim 41, wherein the body is formed from a material selected from the group consisting of steel, carbon fiber reinforced composite, aluminum, titanium and magnesium.

61. The steerer tube of Claim 41, wherein an inner surface of the upper section is circular in cross section, an inner diameter of the upper section being substantially the same as the minor diameter of the lower section.

62. The steerer tube of Claim 41, wherein the lower section has an axial length, the minor diameter remaining substantially the same along the axial length of the lower section.

63. The steerer tube of Claim 41, wherein the minor diameter decreases as a function of proximity to the upper section of the body.

64. The steerer tube of Claim 41, wherein a ratio of the major diameter to the minor diameter taken at a lower end of the lower section is within the range of 1.05 to 1.3, inclusive.

65. The steerer tube of Claim 64, wherein the ratio is within the range of 1.10 to 1.25, inclusive.

66. The steerer tube of Claim 41, wherein the major diameter of the lower section tapers from the second portion of the lower section to the first portion of the lower section.

67. The steerer tube of Claim 41, wherein a ratio of the major diameter to the minor diameter decreases as a function of proximity to the upper section of the body.

ABSTRACT

A bicycle steerer tube is adapted to reside in a plane of travel of the bicycle. A thickness at a point on the wall of the steerer tube body in a lower section thereof varies as a function of the cross-sectional angle of the point to the plane of travel, with the wall thickness being at a maximum in the plane of travel. An inner wall of the lower section may be elliptical, with a minor axis aligned with the plane of travel and a major axis orthogonal to the plane of travel.

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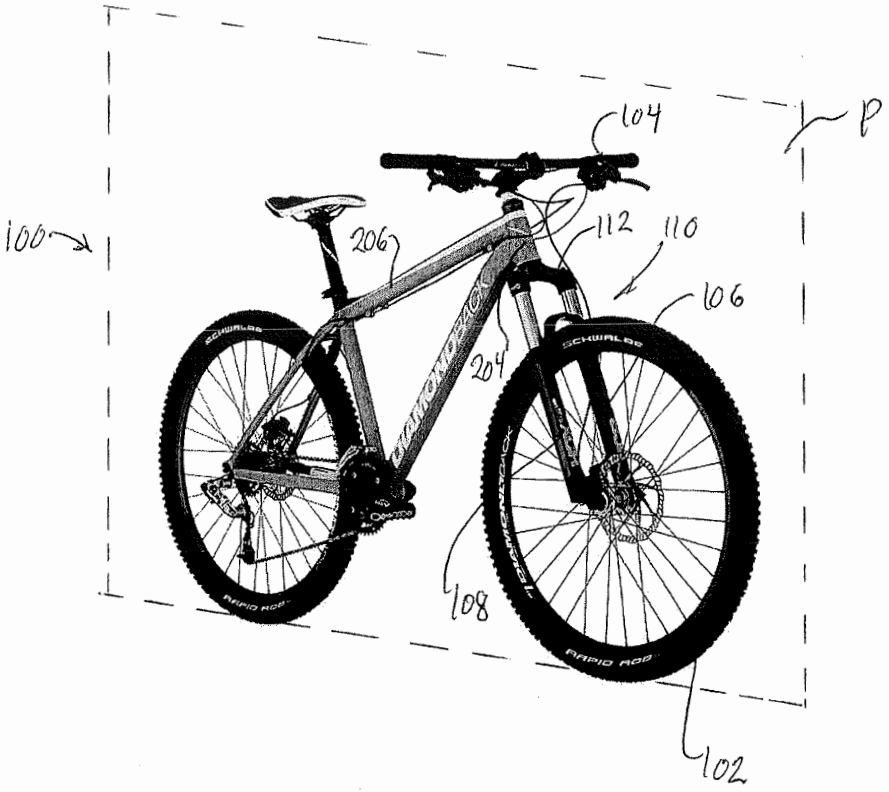


FIG. 1

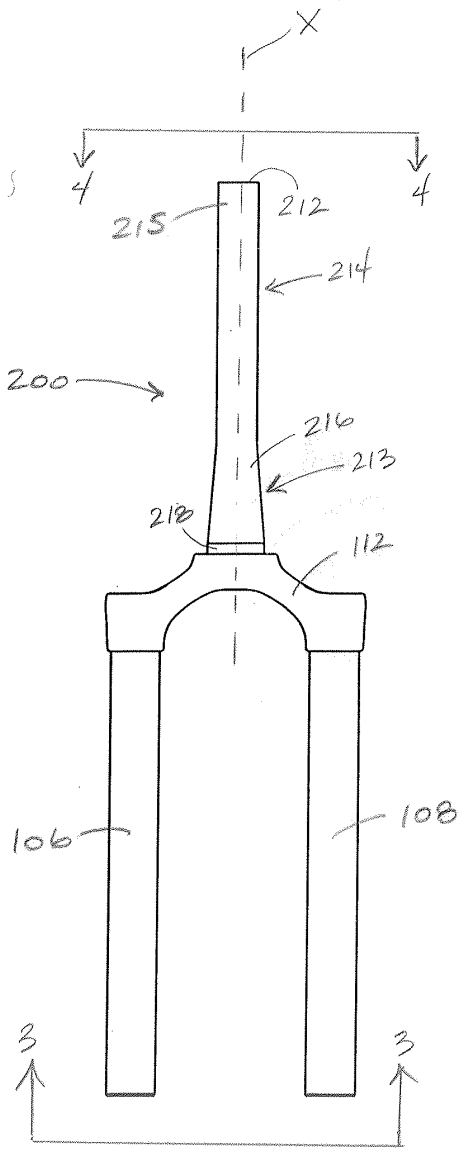


FIG. 2

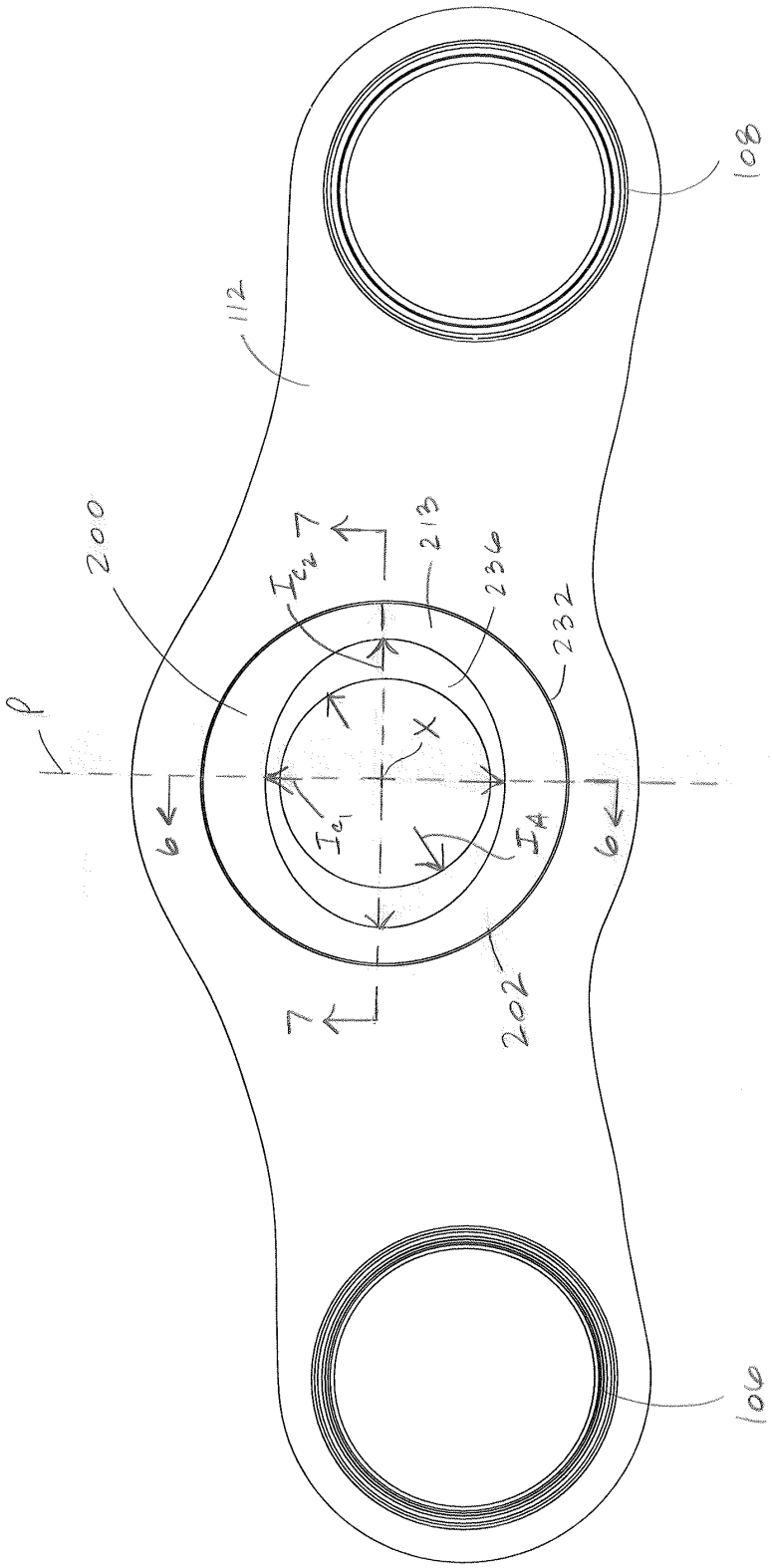


FIG. 3

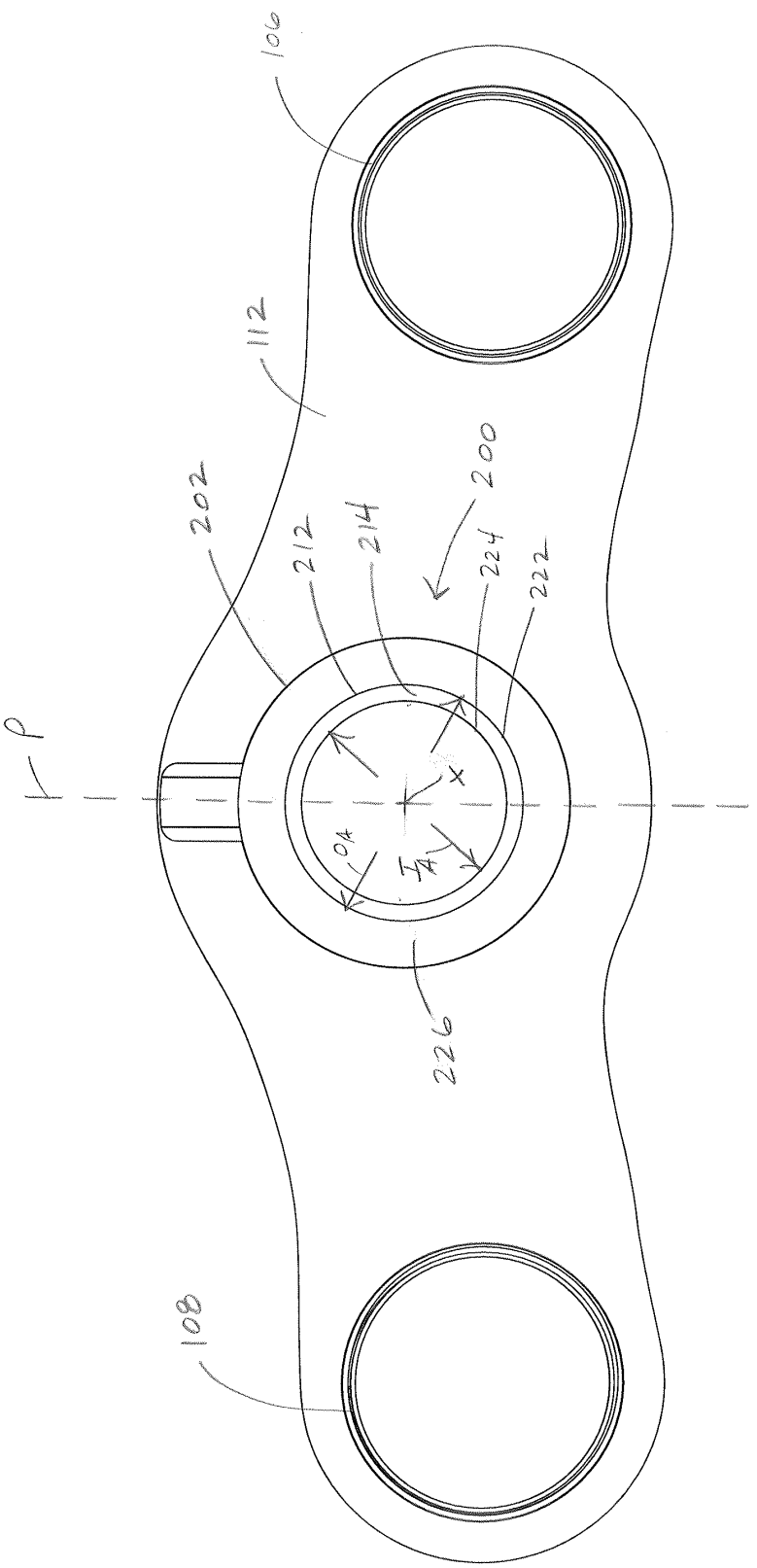


FIG. 4

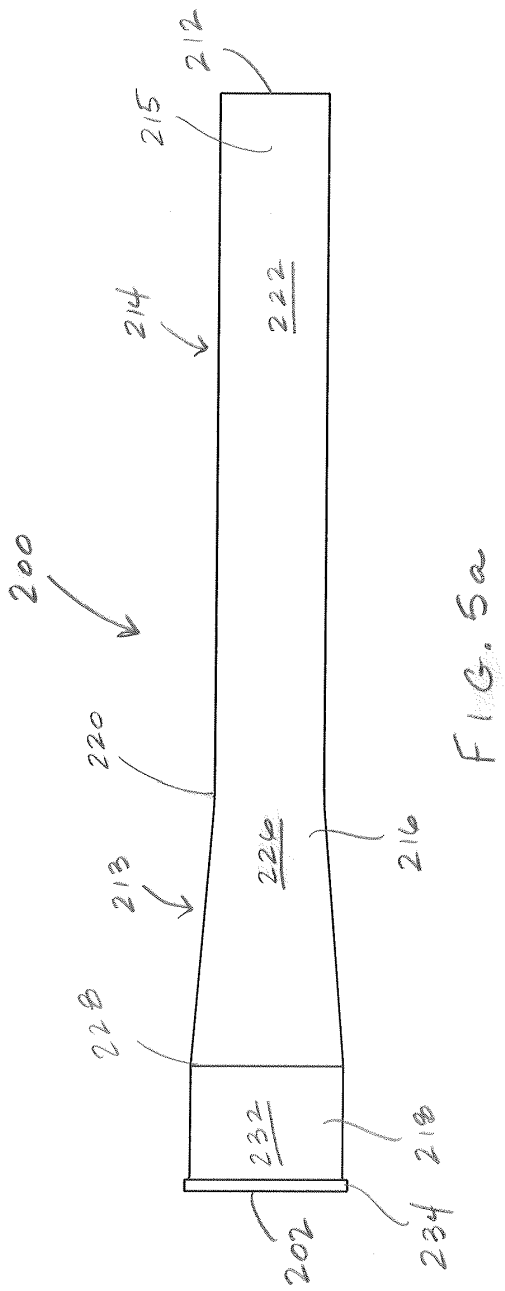


FIG. 5a

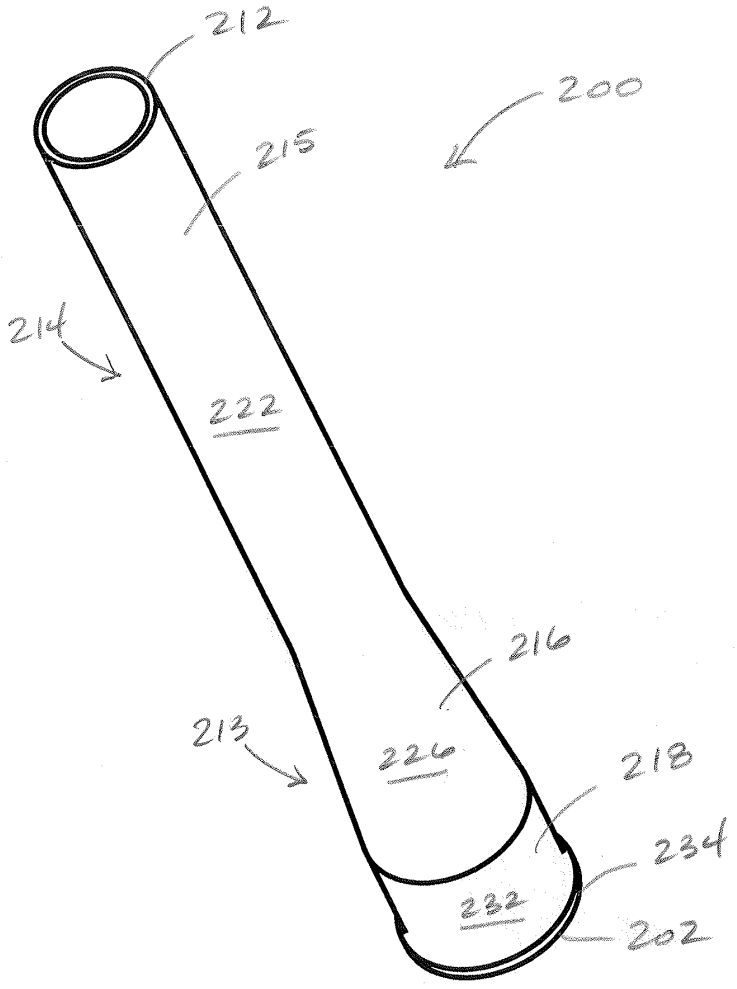


FIG. 5b

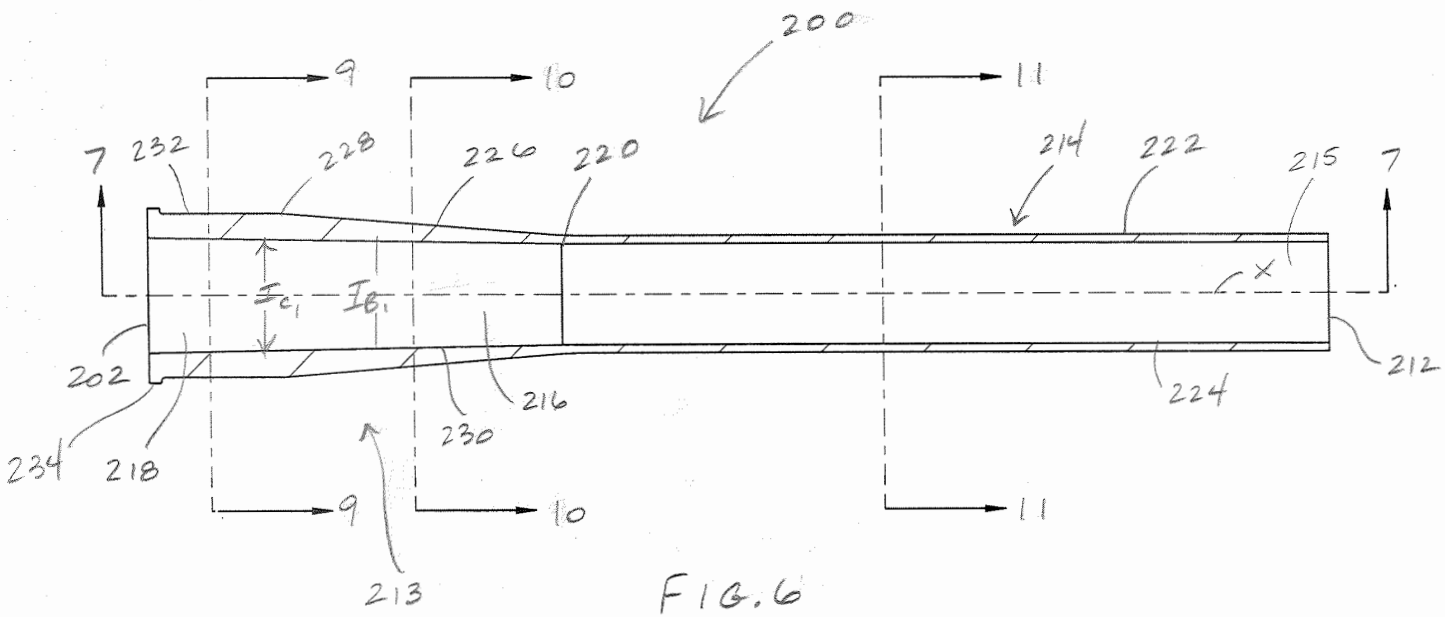


FIG. 6

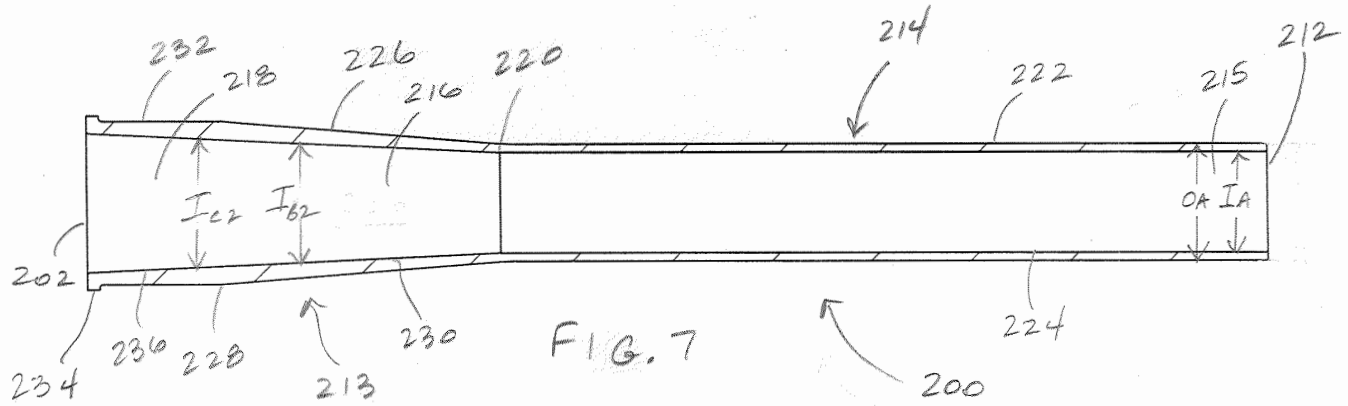


FIG. 7

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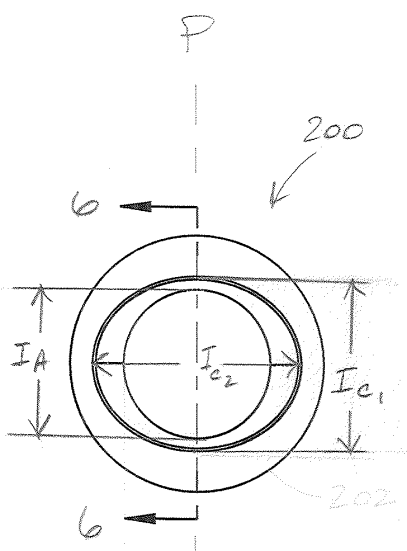


FIG. 8

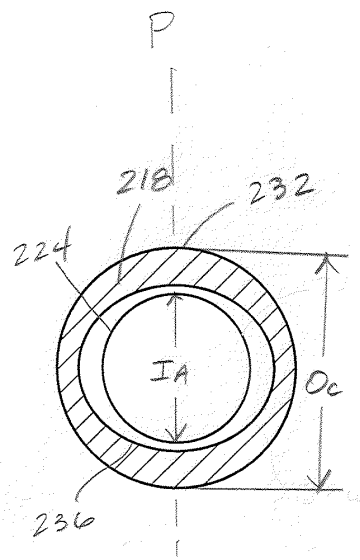


FIG. 9

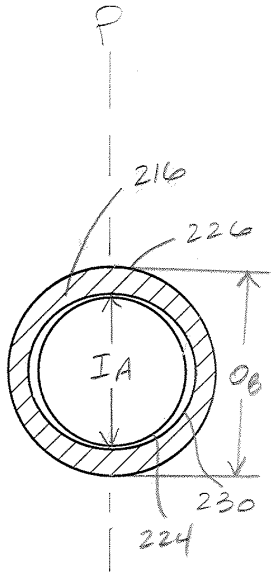


FIG. 10

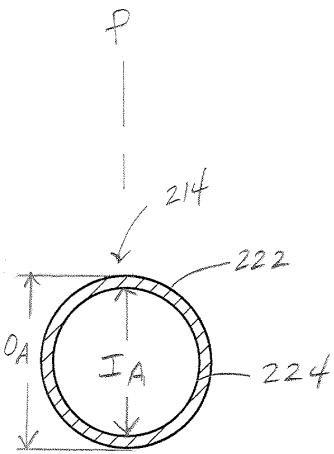


FIG. 11

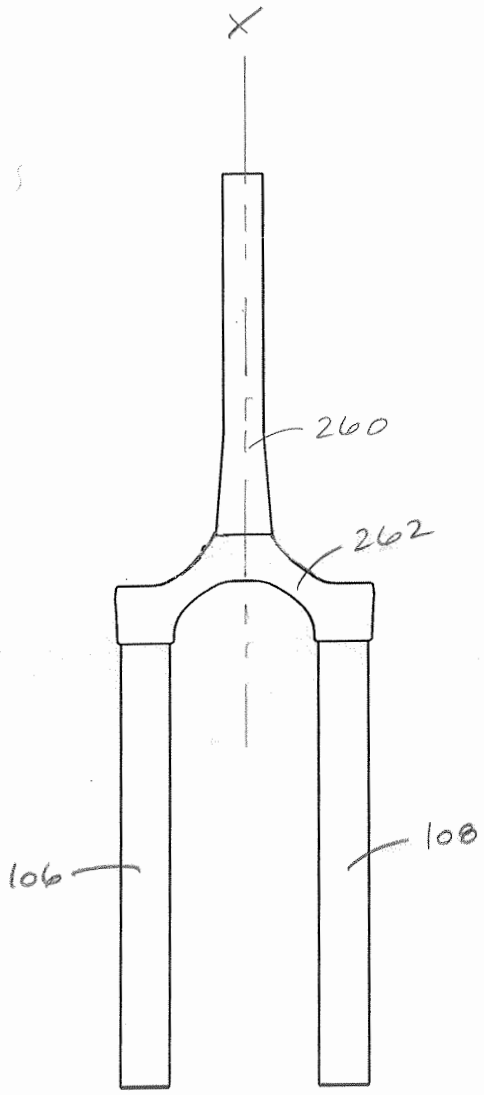


FIG. 12

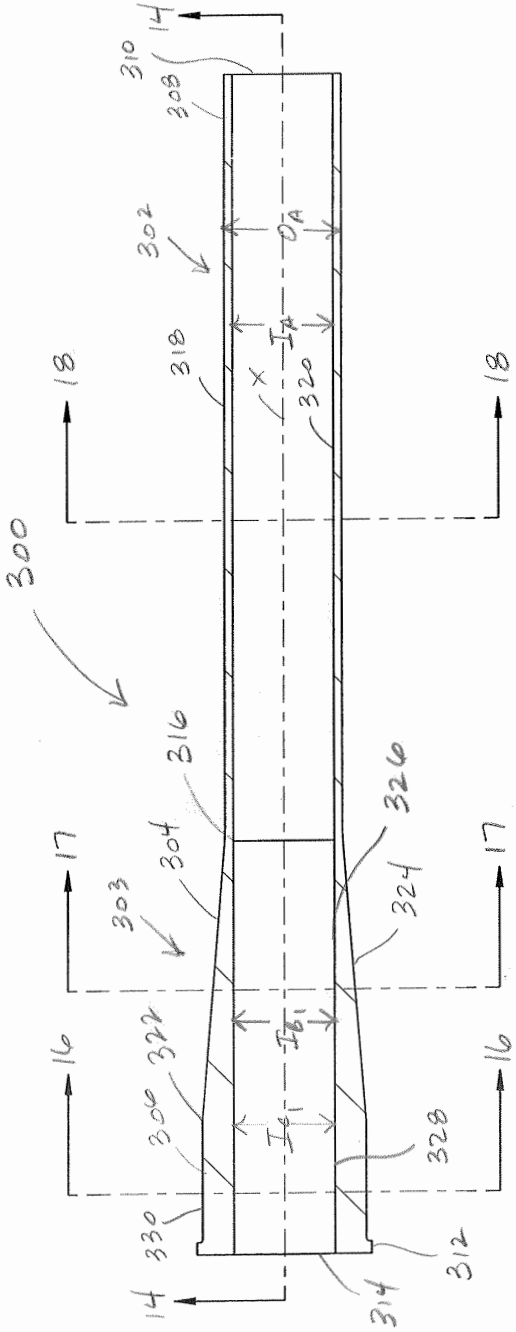

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FIG. 13

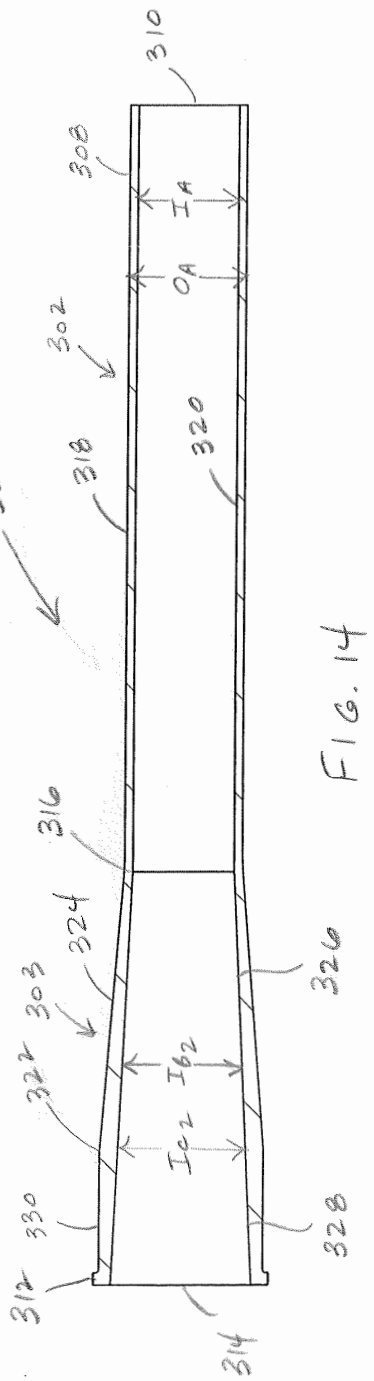

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FIG. 14

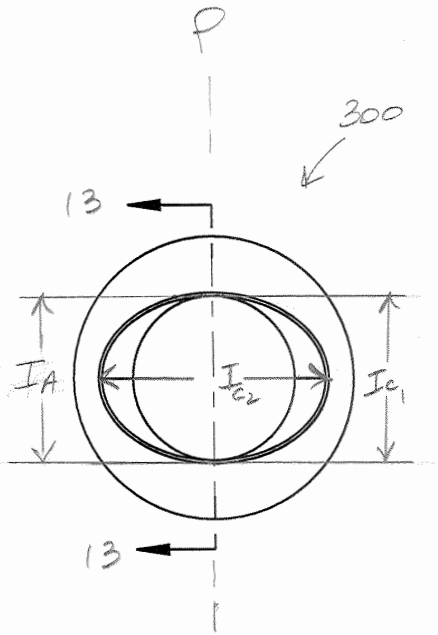


FIG. 15

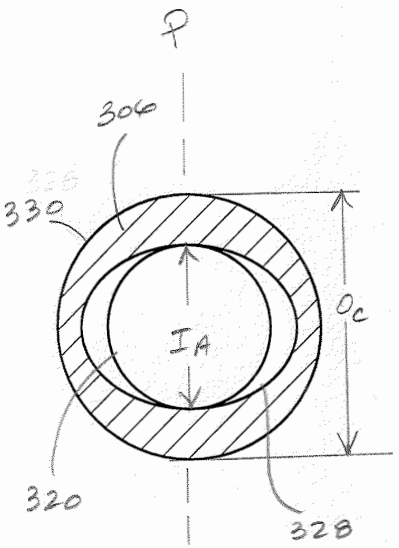


FIG. 16

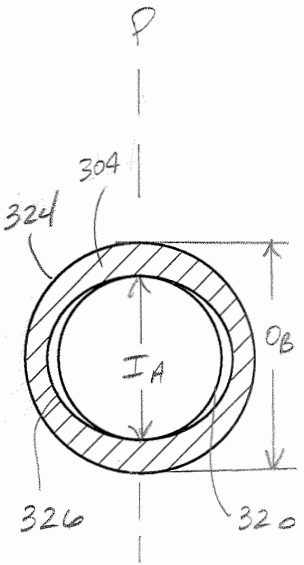


FIG. 17

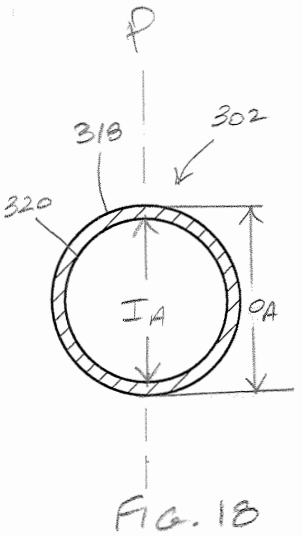


FIG. 18

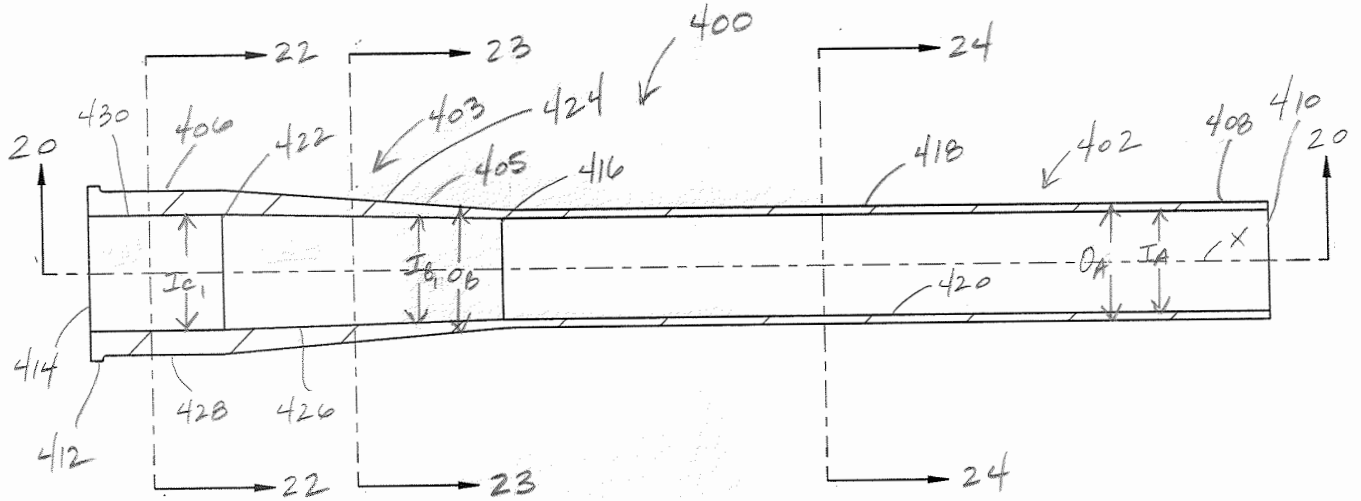


FIG. 19

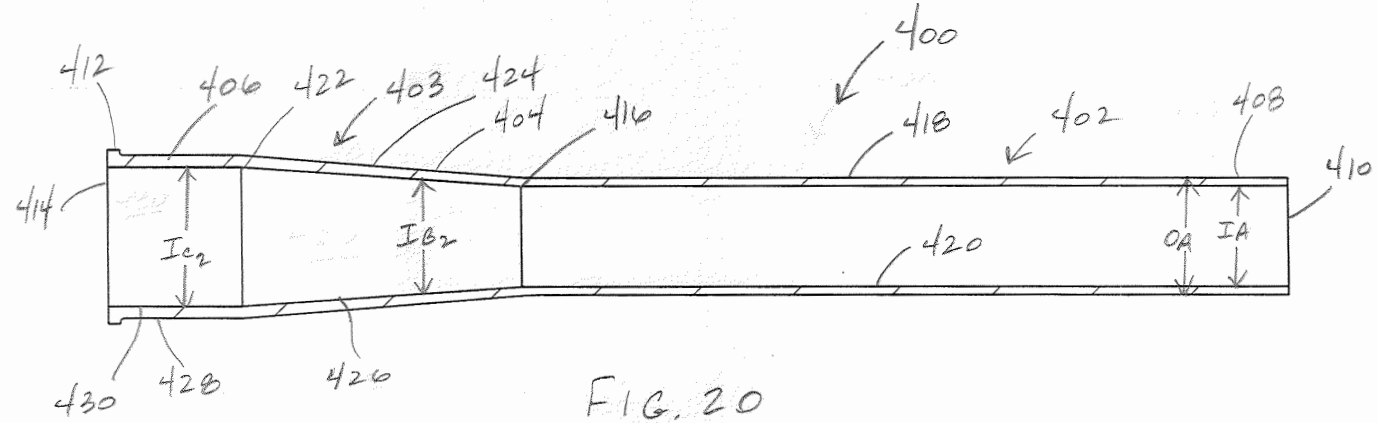


FIG. 20

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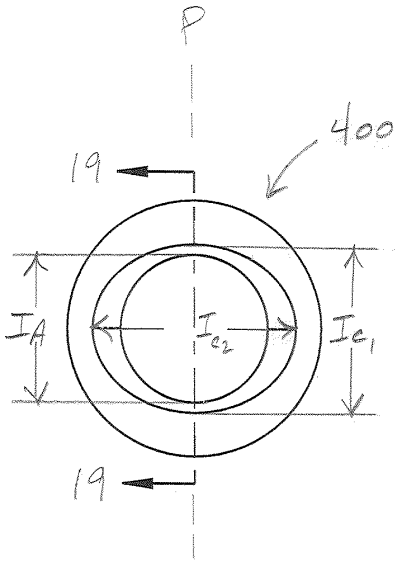


FIG. 21

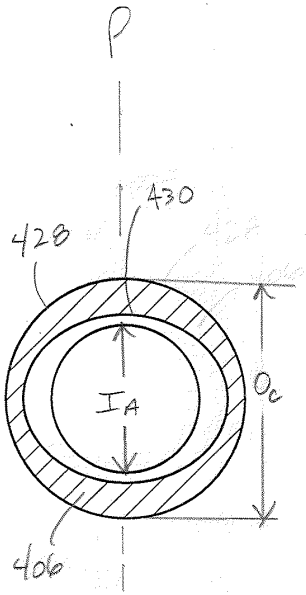


FIG. 22

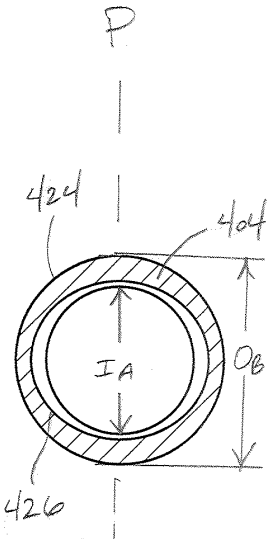


FIG. 23

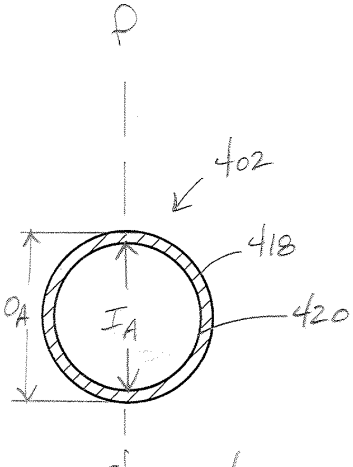


FIG. 24

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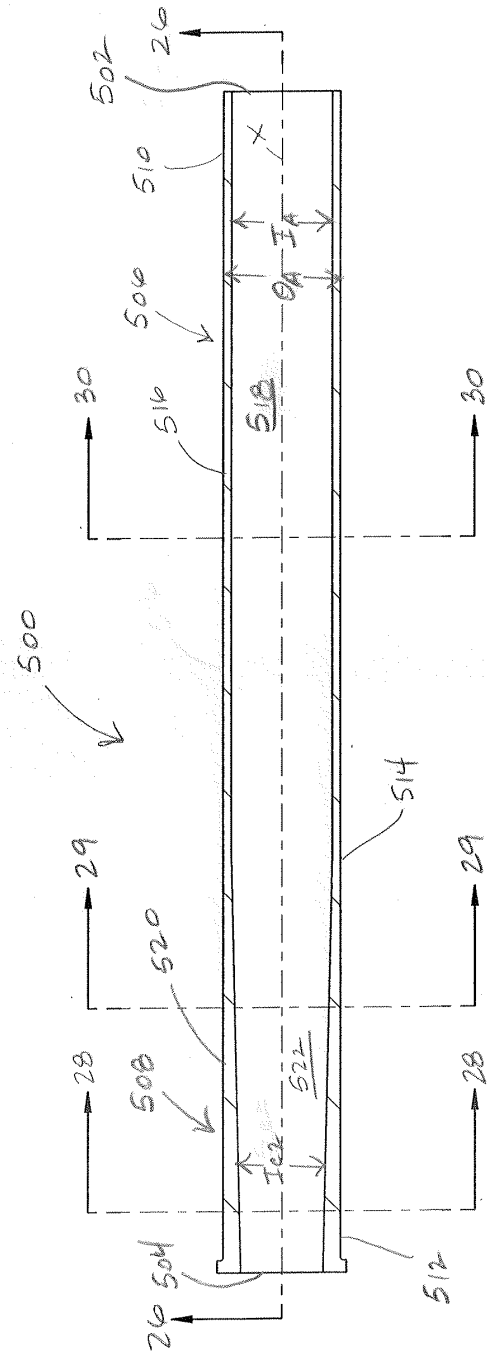

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FIG. 25

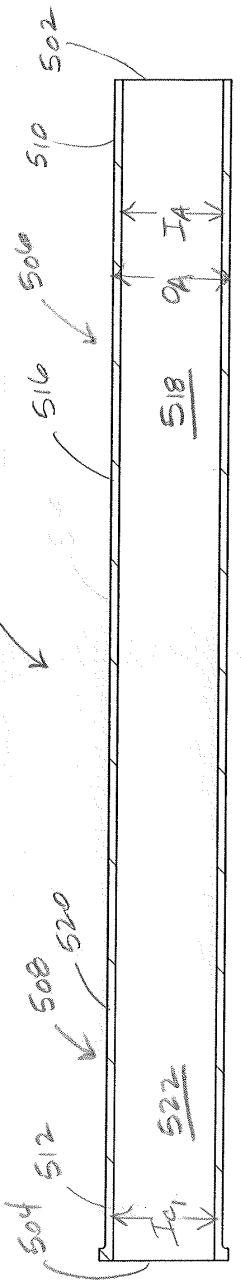

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FIG. 26

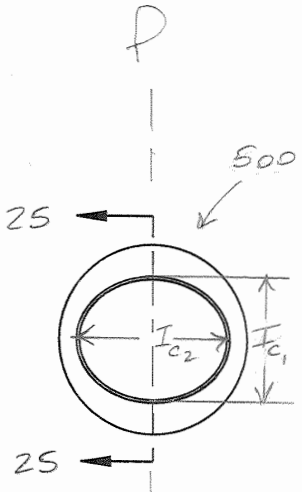


FIG. 27

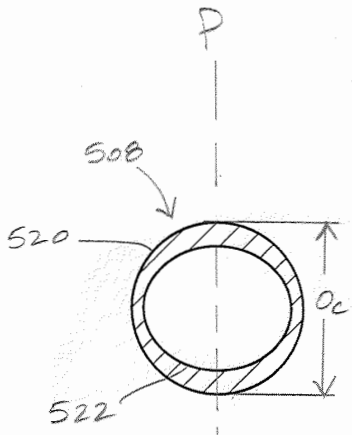


FIG. 28

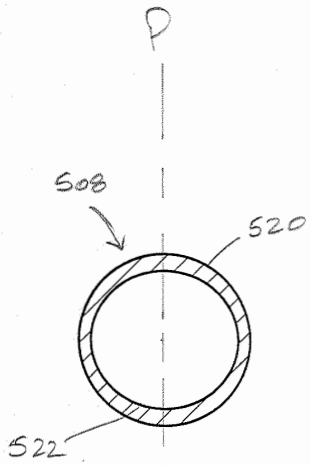


FIG. 29

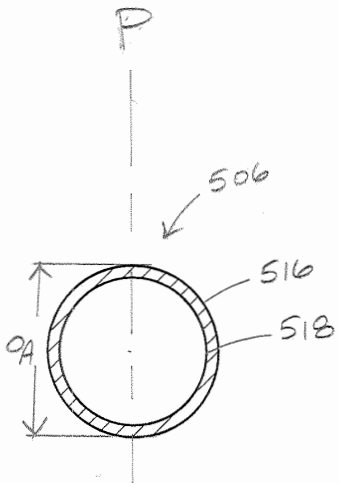


FIG. 30

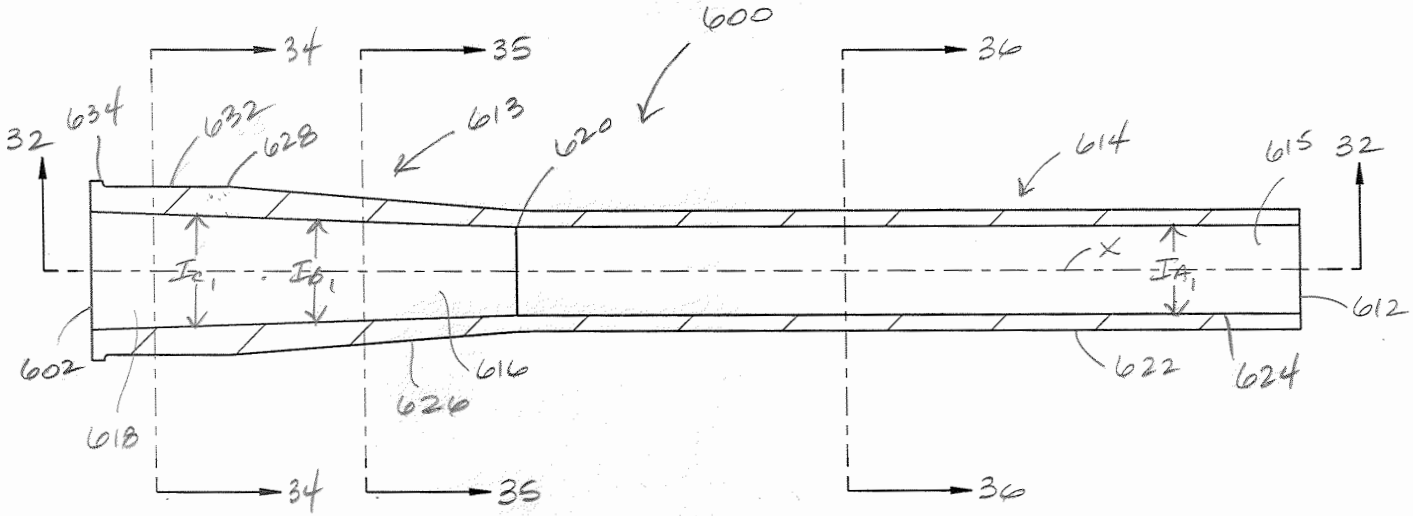


FIG. 31

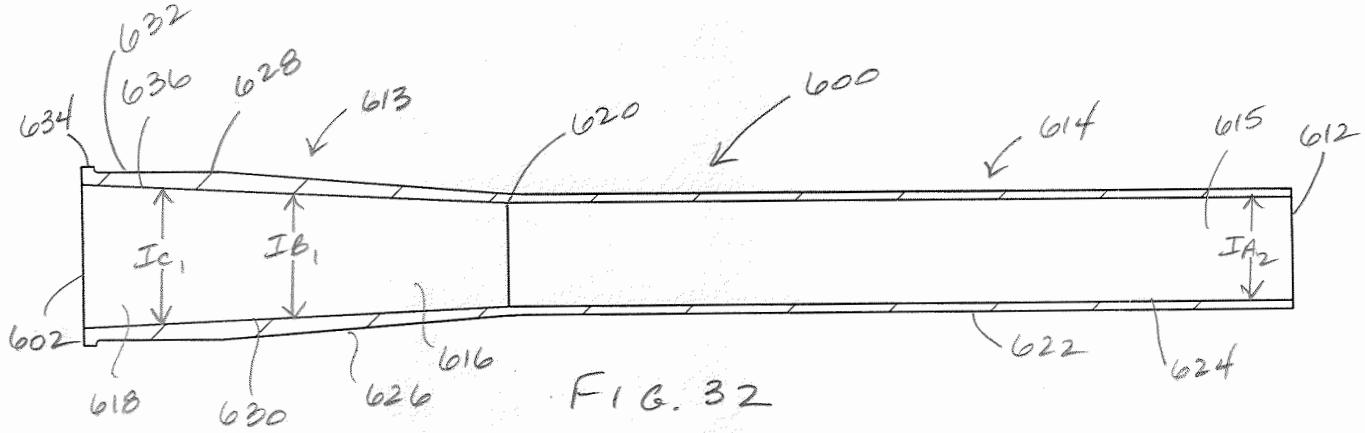


FIG. 32

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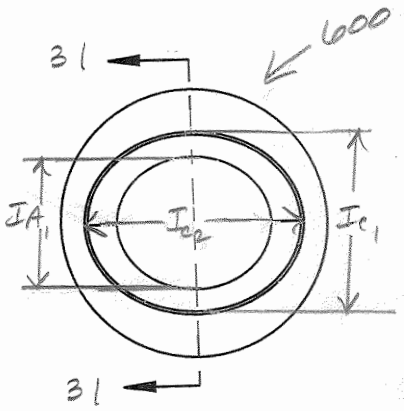


FIG. 33

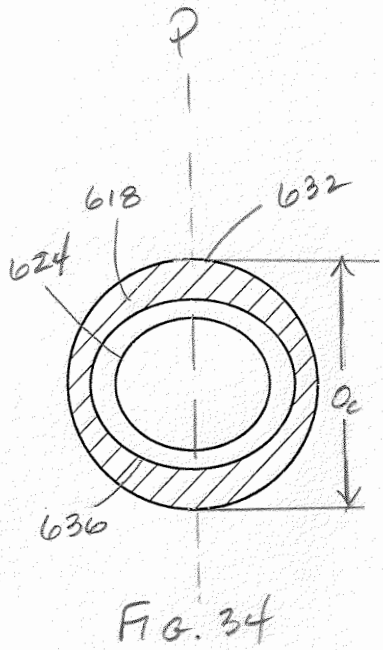


FIG. 34

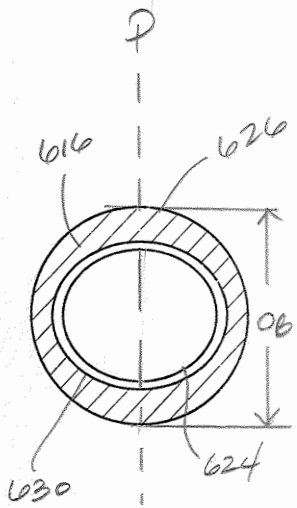


FIG. 35

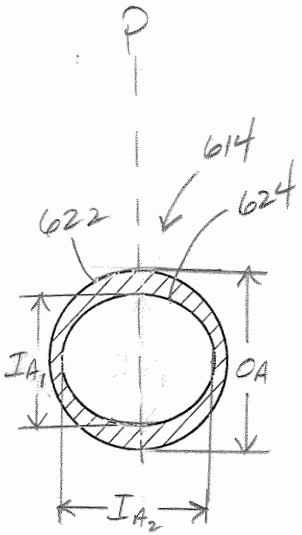


FIG. 36

Electronic Patent Application Fee Transmittal	
Application Number:	
Filing Date:	
Title of Invention:	Bicycle Steerer Tube with Variant Stiffness
First Named Inventor/Applicant Name:	Jonathan Blair Watt
Filer:	Lisa J Wunderlich
Attorney Docket Number:	RS180US
Filed as Large Entity	
Filing Fees for Utility under 35 USC 111(a)	

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Utility application filing	1011	1	280	280
Utility Search Fee	1111	1	600	600
Utility Examination Fee	1311	1	720	720
Pages:				
Claims:				
Claims in Excess of 20	1202	47	80	3760
Miscellaneous-Filing:				
Petition:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		5360

Electronic Acknowledgement Receipt	
EFS ID:	21087431
Application Number:	14585629
International Application Number:	
Confirmation Number:	8583
Title of Invention:	Bicycle Steerer Tube with Variant Stiffness
First Named Inventor/Applicant Name:	Jonathan Blair Watt
Customer Number:	23470
Filer:	Lisa J Wunderlich
Filer Authorized By:	
Attorney Docket Number:	RS180US
Receipt Date:	30-DEC-2014
Filing Date:	
Time Stamp:	13:46:07
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	$5360
RAM confirmation Number	14019
Deposit Account	
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The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Application Data Sheet	aia0014.pdf	1894793 0f3dd91d26fd82e44adef59e741961989a158596	no	7
Warnings:					
Information:					
2	Oath or Declaration filed	RS180US_declaration.pdf	100870 f43efc1107cb97744326 46b18ca49ef5ba25fa04	no	2
Warnings:					
Information:					
3		RS180US_specification.pdf	1794178 2656399717 31a60193fada5c68b20a59d48bec7a	yes	22

Multipart Description/PDF files in .zip description

Document Description	Start	End
Specification	1	12
Claims	13	21
Abstract	22	22

Warnings:					
Information:					
4	Drawings-only black and white line drawings	RS180US_drawings.pdf	519291 b723a52e0829f40db48c4ba280b8d63bc6fc9bb3	no	17
Warnings:					
Information:					
5	Fee Worksheet (SB06)	fee-info.pdf	36356 60caeed613b086d813e71c0a5f336c4006c76578	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	4345488		

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