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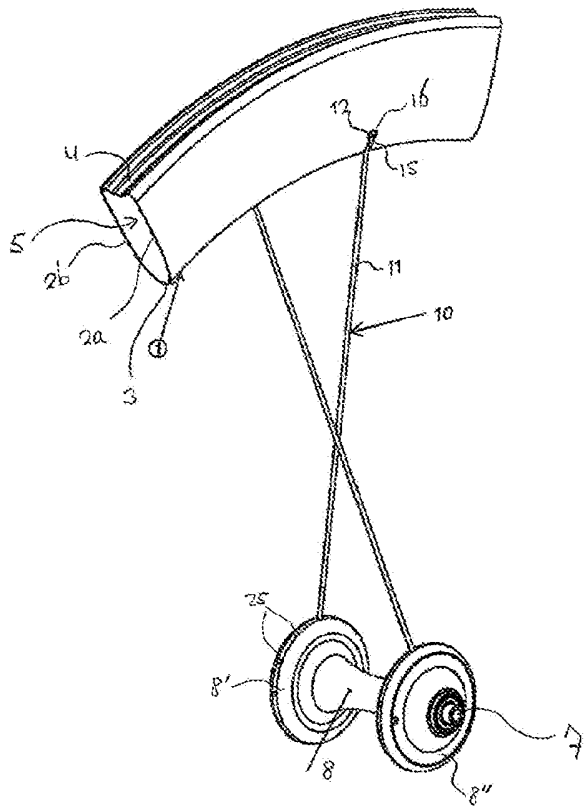
(54) **A bicycle wheel rim having sidewardly opening two-part slit shaped spoke mounting apertures.**

(57) A bicycle wheel rim 1 comprises a wall with two opposite radially outwardly extending annular sidewall parts 2a, b in which a plurality of slit shaped spoke mounting apertures are provided. Spokes 10 are provided which comprise a shaft 11 with a thickened head 12. Each slit extends both in a sideward and radial outward direction and comprises a first slit part 15 and a second slit part 16, wherein the first slit part has cross sectional dimensions lying between the cross sectional dimensions of the shaft and the head, and the second slit part has cross sectional dimensions larger than the cross sectional dimensions of the head. The second slit part lies further radially outward than the first slit part, and the slit parts are both open in the direction of the central axis of the rim and in the direction of at least one of the sidewall parts of the rim.



NL C 2004125

P30132NL00/RR

Title: A bicycle wheel rim having sidewardly opening two-part slit shaped spoke mounting apertures.

The invention relates to a bicycle wheel rim construction, and in particular to the shape of spoke mounting apertures provided therein.

Conventional bicycle wheels comprise an annular wheel rim, a central hub and a number of spokes connecting them with each other. The spokes are usually thin metal rounded wire spokes with a thread on one end and a J-shaped hook with a head on the other end. In the most common configurations, the spokes have first been inserted in openings in flanges of the hub until their hook with thickened head abuts against the hub flange. Threaded nipples are installed in corresponding holes in the rim. The nipples are connected with the threaded spoke ends and the spokes are subsequently tensioned by rotation of the nipples.

A disadvantage with this conventional wheel, in particular if it has a deep carbon rim profile, is that, being the lower side of the nipple larger than the spoke, the hole in the rim has to be larger than the diameter of the spoke. This weakens the structural strength of the rim. Also the nipple holes in the rim lead to high concentrated stresses applied to the surrounding rim walls and the weight of the nipples at the rim increase the angular inertia of the wheel and its resistance to acceleration. Further, the spokes frequently tend to break at the location of their J-shaped hook.

It has been tried to solve these problems by reversing the spokes and at the same time making them fully straight. For example US-5,810,453 shows an embodiment in which the spokes have been inserted through central openings in the annular bottom rim wall, against which they are abutting with a thickened head while their spoke shafts hang freely downwardly. Nipples here are seated in flange openings of the hub. The openings in the rim can now be manufactured smaller and the straight spokes break less easily.

Nevertheless, some problems connected to manufacturing and/or load transfer still remain with this reversed spoke construction. For example, it is necessary to remove the wheel tire when one of the spokes needs to be replaced. Also, the rim construction needs internal strengthening walls diverging towards the central openings in the bottom wall of the rim. This increases the weight of the rim.

US 2003/0209936 shows a wheel rim construction in which the rim is provided with rectangular transverse apertures through which thickened complementary rectangular spoke heads can be inserted. Subsequently each spoke can be rotated 90 degrees so as to fix the rectangular head part between upstanding groove walls which are provided inside an

annular hollow chamber of the wheel rim. With this construction the tyre no longer needs to be removed when one of the spokes needs to be replaced.

A disadvantage with this is that the rim construction is difficult to manufacture, in particular because of the provision of its annular hollow chamber and annular groove walls upstanding therein. Furthermore, the rectangular transverse apertures are weakening the rim, and the rim still has a relative high angular inertia.

The present invention aims to overcome one or more of the above-mentioned disadvantages, or to at least provide a usable alternative. In particular, the inventions aims to provide a user-friendly bicycle wheel rim with optimal performance behaviour because it combines a lightweight construction with a high strength.

This aim is achieved by a bicycle wheel rim according to claim 1. The rim comprises a wall with two opposite radially outwardly extending annular sidewall parts. In the rim wall a plurality of spoke mounting apertures are provided. A plurality of spokes is provided which comprise a slender shaft with a widened head. The head is provided at one of the outer ends of the shaft and has a larger cross section than the shaft. The spoke mounting apertures are delimited by wall parts of the rim, which wall parts form seats for the heads of the spokes to abut against when mounted in the spoke mounting apertures with their spoke shafts extending radially inwardly. At least one of the spoke mounting apertures is formed by a slit that extends both in a transverse sideward and radial outward direction. The slit comprises a slender first slit part and a widened second slit part. The first slit part has cross sectional dimensions lying between the cross sectional dimensions of the spoke shaft and the spoke head, in particular slightly larger than the shaft, such that the shaft can freely be placed into and removed from this first slit part whereas the head is blocked by it. The second slit part has cross sectional dimensions larger than the cross sectional dimensions of the spoke head, in particular slightly larger than the head, such that the head can be placed into and removed from this second slit part. The second slit part lies further radially outward than the first slit part. The slit parts are both open in the direction of the central axis of the rim and in the direction of at least one of the sidewall parts of the rim. This makes it possible to insert the spoke into the slit coming from the side of the respective sidewall part, and to then simply slide the spoke with its head towards its abutting mounting position. The rim construction with its sidewardly approachable two-part slits according to the invention makes the assembly of a bicycle wheel using such a rim much more user-friendly. The manufacturing complexity of the rim has become easier, particularly if it is made of carbon, and it is possible to use less material for the rim while maintaining enough strength.

It is possible for the heads of the spokes to be formed by nipples screwed onto the shafts. Preferably however the heads of the spokes have been made integral with the shafts. This has the advantage that the integral heads may have a lighter weight then the nipples

nipples which helps in reducing the angular inertia of the wheel. In an embodiment the heads have been made rotation symmetric such that it makes no difference in whatever rotational position they are to be slid into their respective slits.

Also it is possible for the spokes to still have a hooked end part, either at the location of their connections with the hub either at the location of their heads. Preferably however straight spokes are used. Neither the connection with the rim neither the connection with the hub needs a hooked end part. This makes the spokes stronger and/or makes it possible to construct them more lightweight.

The side wall parts of the rim may be directly connected to each other from where they diverge radially outwards in order to delimit a V-shaped annular space. It is also possible that a bottom wall is provided which connects the side wall parts which each other in order to together delimit a U-shaped annular space.

In a preferred embodiment the rim wall at the location of the slit parts is provided with strengthening wall parts, which extend into the internal annular space of the rim. With this there will be an increasing stiffness, the loads will be better shared on the rim walls, and the rim will be no more be subjected to high concentrated stresses.

In a further embodiment the wall parts, which delimit the slit parts towards the internal annular space, form a closed pocket in the rim wall. No holes have to be drilled into the rim wall for being able to provide the two-part slits. They can be formed as indents in the rim wall. The wall parts, which delimit the slit parts towards the internal annular space can advantageously be manufactured integral with the rest of the rim wall. Particularly if the rim is made out of a moulded composite material, in particular a carbon fibre reinforced material, this strongly reduces the manufacturing complexity and the strength of the rim. All in all the two-part slit pockets and the sliding positioning of the spoke heads coming from the sideward direction in these pockets helps in keeping the angular inertia of the wheel rather low and thus to give it a low resistance to acceleration. The abutting seats of the spokes in the rim pockets aid in ensuring a better load transfer between the spoke head and the rim.

Further advantageous embodiments are stated in the subclaims.

The invention also relates to a bicycle wheel according to claim 10 and a bicycle according to claim 11 making use of the advantageous wheel rim.

The invention shall be dealt with in further detail below with reference to the accompanying drawings, wherein:

Fig. 1 is a perspective partial view of a bicycle wheel embodiment according to the invention;

Fig. 2 shows a side view of fig. 1;

Fig. 3 shows detail B of fig. 2 in an enlarged view;

Fig. 4 shows the rim of fig. 1 without spokes connected thereto;

Fig. 5 shows a partial side view of fig. 4; and

Fig. 6 shows the cross section V-V of fig. 5.

In fig. 1-6 the annular wheel rim has been indicated with the reference numeral 1. Only a small circle segment of the rim 1 has been shown. The rim 1 here comprises two opposite radially outwardly extending annular sidewall parts 2a, 2b, a radial inward bottom wall part 3 and a radial outward tyre support wall part 4. The wall parts 2, 3, 4, seen in cross section, form a circumferentially closed wall inside which an internal hollow space 5 is present. Like the rim 1 and the wall parts 2, 3, 4 itself, the internal hollow space 5 runs like an annulus around a central axis of rotation 7.

The rim 1 is connected to a central hub 8 by means of a plurality of spokes 10 of which only two are shown. Each spoke 10 comprises a longitudinal shaft 11 with an integral head 12 at its radial outward end (see fig. 3). The head 12 has a larger cross section than the shaft 11. In particular the head 12 has a width/thickness (cross sectional dimension) which is at least one and a half times larger than the width/thickness (cross sectional dimension) of the shaft 11.

In the rim wall, and in particular in the side wall parts 2a, 2b thereof, a plurality of slit shaped spoke mounting apertures are provided. The apertures are equally divided around the circumference of the rim 1. Adjacent spoke mounting apertures are provided alternating in the two side wall parts 2a, 2b and thus open towards opposite sideward directions. As can be seen in fig 5 and 6, each slit extends both in a transverse sideward direction X and in a radial outward direction Y. Furthermore each slit comprises a first slit part 15 and a second slit part 16. The first slit part 15 starts near the centre of the bottom wall part 3 and from there runs sideward and outward in the directions X and Y. The second slit part 16 extends above the entire radial outward side of the first slit part 15. The first slit part 15 is open in the directions -Y towards the central axis of rotation 7 and +X towards the sidewall part 2a in which it is provided. The second slit part 16 is open in the direction -Y towards the first slit part 15 below it and +X towards the sidewall part 2a in which it is provided. The first slit part 15 has cross sectional dimensions slightly larger than the shaft 11 and substantially smaller than the head 12. The second slit part 16 has cross sectional dimensions slightly larger than the head 12. In side view, the two slit parts 15, 16 delimit a T-shape which is substantially complementary to the upper part of the spoke 10.

The slit parts 15, 16 of each slit are delimited by so-called standing wall parts 20', 20'' extending in the radial direction Y and so-called lying wall parts 21', 21'' extending in the sideward direction X. Together these standing and lying wall parts 20, 21 form a closed pocket around the slit which pocket extends inwardly into the internal annular space 5 of the

rim 1. The pocket wall parts 20, 21 are manufactured integral with the rest of the rim wall. The lying wall parts 21' extending between the transition of the first and second slit part 15, 16 form a seat 23 for the head 12 of the spoke 10 to abut against while the spoke shaft 11 extends through the first slit part 15 in the direction of the central axis 7. The closed pockets have the large advantage that the rim wall can maintain continuous even at the location of the spoke mounting apertures. The drilling of holes in the rim wall is not necessary for making the slits.

During assembly each spoke 10 may simply be pushed with its head 12 and upper shaft part 11 into one of the two-part slits, until they reach their seated end position in there. The spokes 10 are then connected with their free ends with the hub 8 and brought to a desired tension. For this the free spoke ends are provided with screw threaded end parts. The hub 8 may be provided with nipple openings 25 in opposite flanges 8', 8'' of the hub 8, into which openings 25 threaded nipples are placed. In the alternative it is also possible to first connect the spokes 10 with the hub 8, to then push the spoke heads 12 sidewards into the slits 15, 16, and to then tension the spokes 10. Advantageously in both of the two assembly methods, the spokes 10 do not have to be bend or otherwise deformed to be able to connect them with the rim 1 and hub 8. Also the spokes 10 can advantageously be made fully straight with one common longitudinal axis.

Besides the embodiment shown numerous variants are possible. For example the rim and the slit shaped apertures therein may be given other shapes and dimensions. It is also possible to provide the hub directly with threaded holes into which spoke ends can be screwed or to connect the spokes with hooked and/or thickened end parts with the hub. The head of the spoke may even be formed by a nipple. This makes it possible to use the rim according to the invention in combination with all kinds of hubs and with or without 'reversed' spokes. The rim can be made out of various kinds of materials, for example metal. Preferably, however the rim is made out of a moulded composite material, in particular a carbon fibre reinforced material. The construction with the closed pockets makes the rim very suitable to be made out of such a moulded composite material. It is also possible to make the slit shaped apertures directly in the rim wall and not have them delimited by internal strengthening wall parts like the above described pockets. The seat shall then be formed by the outer rim wall itself, in particular a bottom wall part thereof. The slit parts shown extend in a sideward direction substantially perpendicular to the sidewall parts. In the alternative it is also possible to have them extend under an oblique angle to these sidewall parts.

Thus a bicycle wheel rim is provided which aids in making a bicycle lightweight, strong and fast during accelerations. In particular during racing where the demands are high, this may make a critical positive difference.

C O N C L U S I E S

1. Een fietswielvelg met een centrale rotatie-as, omvattende:
- een wand met twee tegenover elkaar liggende zich in radiale richting naar buiten toe uitstrekkende ringvormige zijwanddelen;
- meerdere spaak montage uitsparingen in de wand;
- meerdere spaken bestemd voor het verbinden van de velg met een centrale naaf;
waarbij de spaken een schacht omvatten met een kop aan zijn radiale buiteneinde welke kop een grotere dwarsdoorsnede dan de schacht heeft,
waarbij wanddelen van de velg die de spaak montage uitsparingen begrenzen zittingen vormen voor de koppen van de spaken om tegenaan te liggen terwijl de spaakschachten zich uitstrekken door de uitsparingen in de richting van de centrale as,
waarbij ten minste één van de spaak montage uitsparingen gevormd is door een sleuf,
met het kenmerk,
de sleuf zich zowel uitstrekt in een zijwaartse als ook in een radiaal naar buiten gerichte richting en omvattende een eerste sleufdeel en een tweede sleufdeel, waarbij het eerste sleufdeel dwarsdoorsnede afmetingen heeft die liggen tussen de dwarsdoorsnede afmetingen van de schacht en de kop, en het tweede sleufdeel dwarsdoorsnede afmetingen heeft die groter zijn dan de dwarsdoorsnede afmetingen van de kop,
waarbij het tweede sleufdeel in radiale richting meer naar buiten toe ligt dan het eerste sleufdeel, en waarbij de sleufdelen zowel open zijn in de richting van de centrale as van de velg als ook in de richting van ten minste één van de zijwanddelen van de velg.

2. Fietswielvelg volgens conclusie 1, waarbij de velgwand voorzien is van wanddelen die de sleufdelen begrenzen aan de zijde van een ringvormige binnenruimte van de velg.

3. Fietswielvelg volgens conclusie 2, waarbij de wanddelen die de sleufdelen richting de ringvormige binnenruimte begrenzen een gesloten pocket in de velgwand vormen.

4. Fietswielvelg volgens conclusie 2 of 3, waarbij de wanddelen die de sleufdelen begrenzen in de richting van de ringvormige binnenruimte integraal vervaardigd zijn met de velgwand.

5. Fietswielvelg volgens één van de voorgaande conclusies 2-4 waarbij de wanddelen die de sleufdelen begrenzen opstaande wanddelen omvatten die zich in de radiale richting uitstrekken en liggende wanddelen omvatten die zich in de zijwaartse richting uitstrekken.

6. Fietswielvelg volgens één van de voorgaande conclusies, waarbij het tweede sleufdeel zich volledig in de zijwaartse richting uitstrekt en wanddelen heeft die zijn radiale binnenzijde begrenzen die de zitting voor de kop van de spaak vormen om tegenaan te komen te liggen terwijl de spaakschacht zich door het eerste sleufdeel uitstrekt in de richting van de centrale as.

7. Fietswielvelg volgens één van de voorgaande conclusies, waarbij de sleuf die open is in de richting van ten minste één van de zijwanddelen van de velg, open is in een zijwaartse richting loodrecht op de zijwanddelen.

8. Fietswielvelg volgens één van de voorgaande conclusies, waarbij aangrenzende spaak montage uitsparingen hun sleuven open hebben in de richting van tegengestelde zijwaartse richtingen.

9. Fietswielvelg volgens één van de voorgaande conclusies, waarbij de velg vervaardigd is uit een gevormd composiet materiaal, in het bijzonder een carbonvezel versterkt materiaal.

10. Fietswiel omvattende:
- een centrale naaf met flenzen met meerder spaak montage openingen daarin;
- een fietswielvelg volgens één van de voorgaande conclusies waarvan de spaken de naaf en de velg met elkaar verbinden; en
- meerdere nippels voor het instellen van de spanning in de spaken.

11. Fiets omvattende ten minste één fietswielvelg volgens één van de voorgaande conclusies.

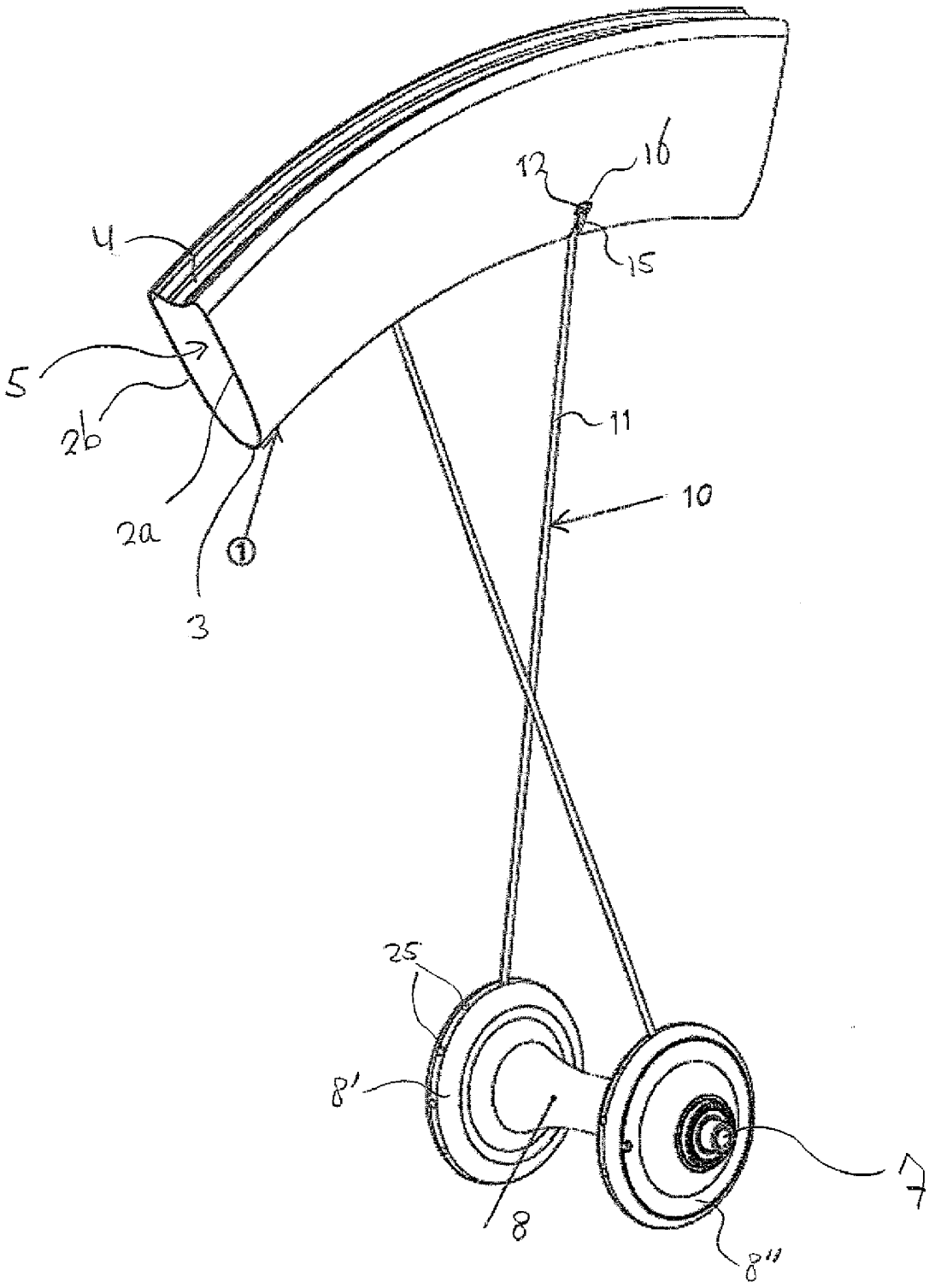


Fig. 1

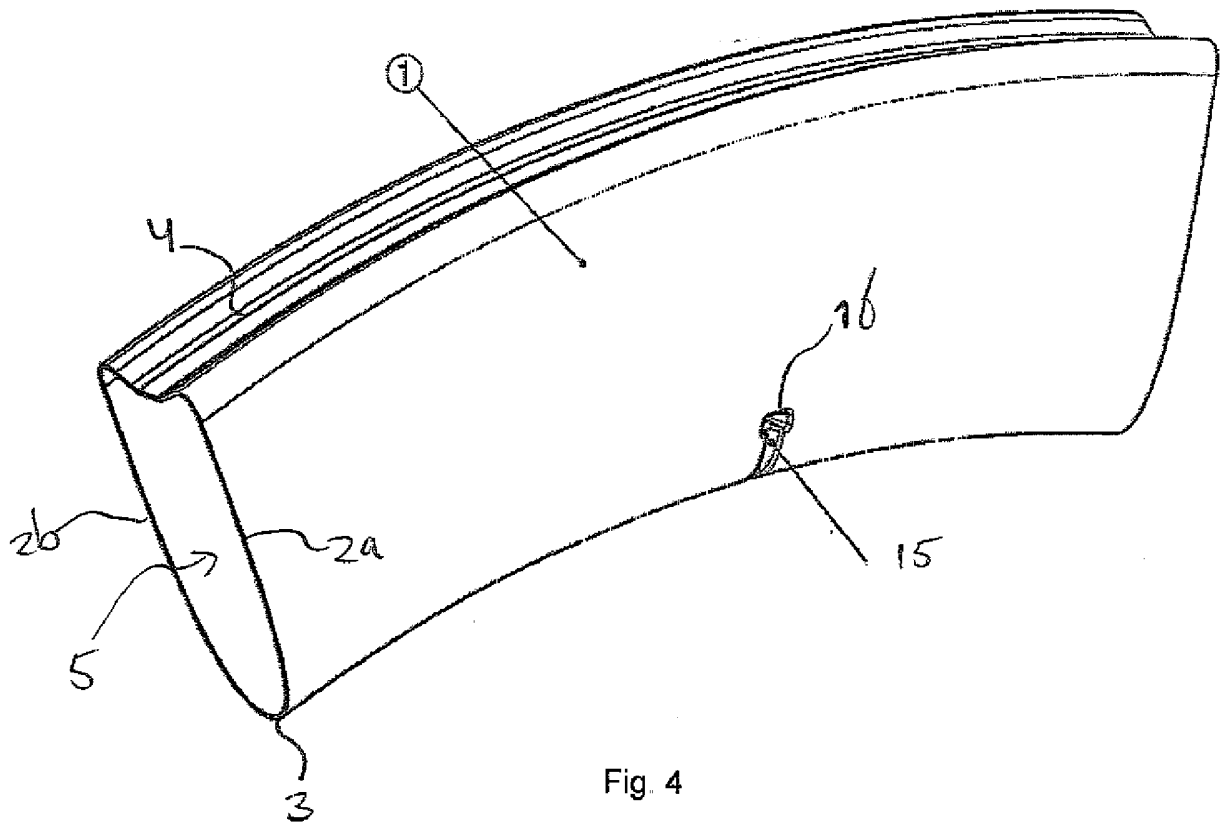


Fig. 4

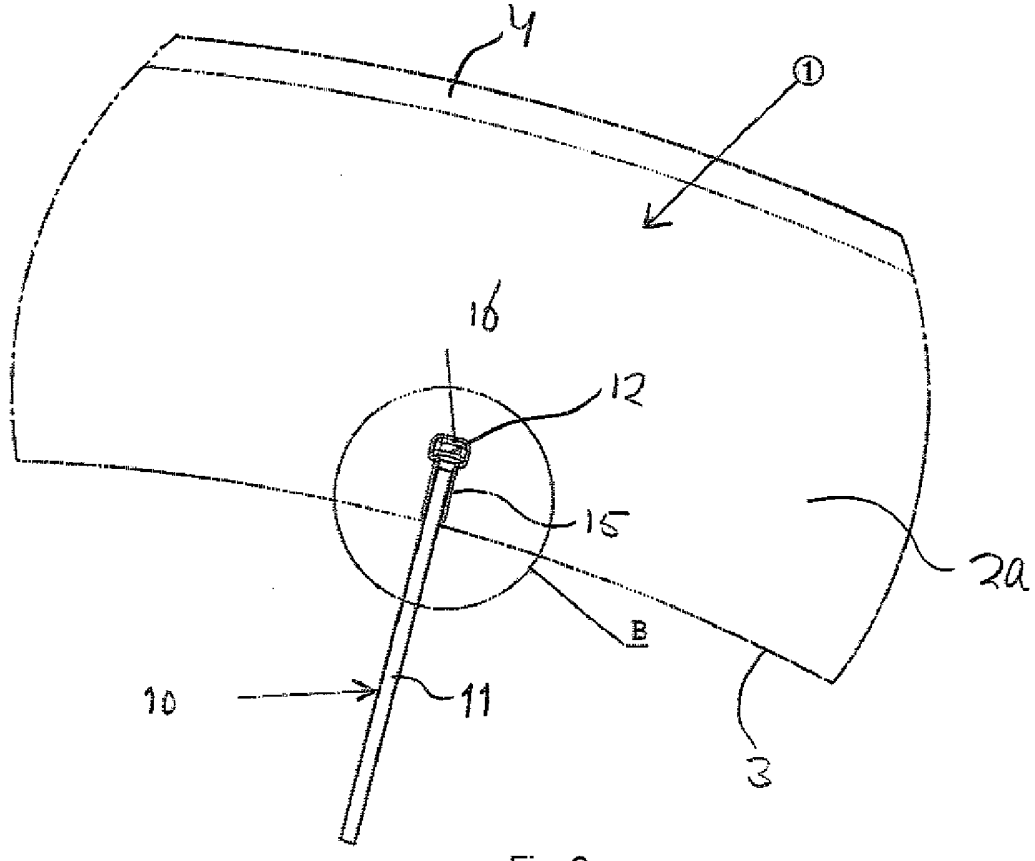
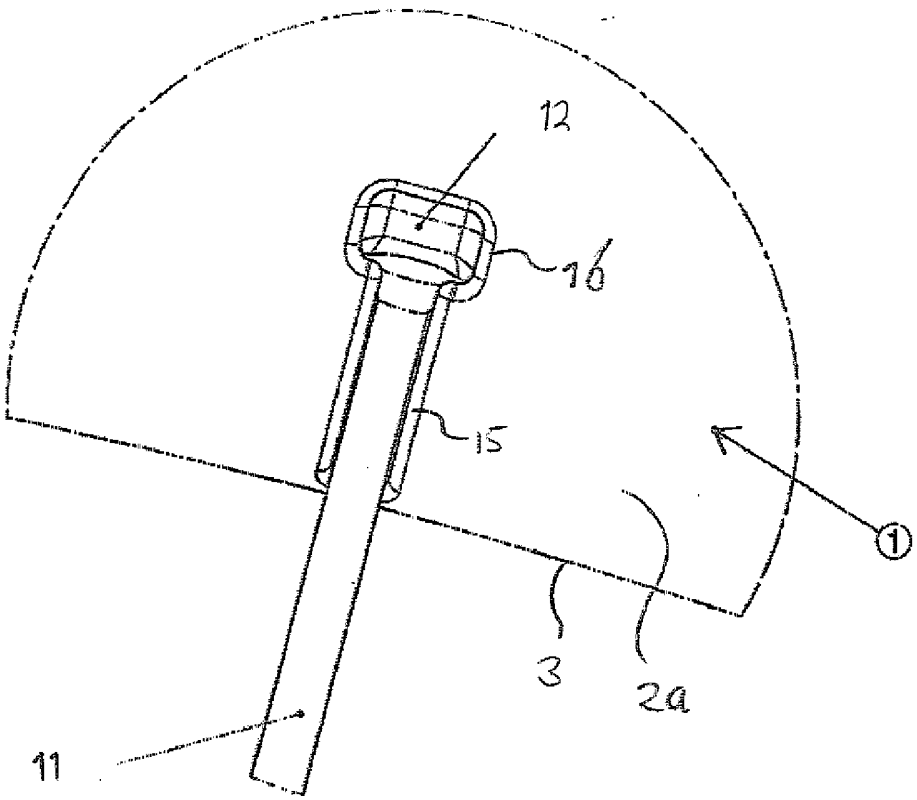


Fig. 2



Detail B

Fig. 3

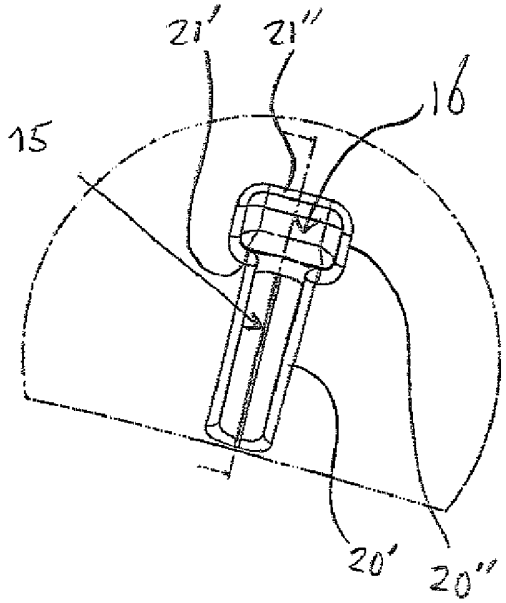


Fig. 5

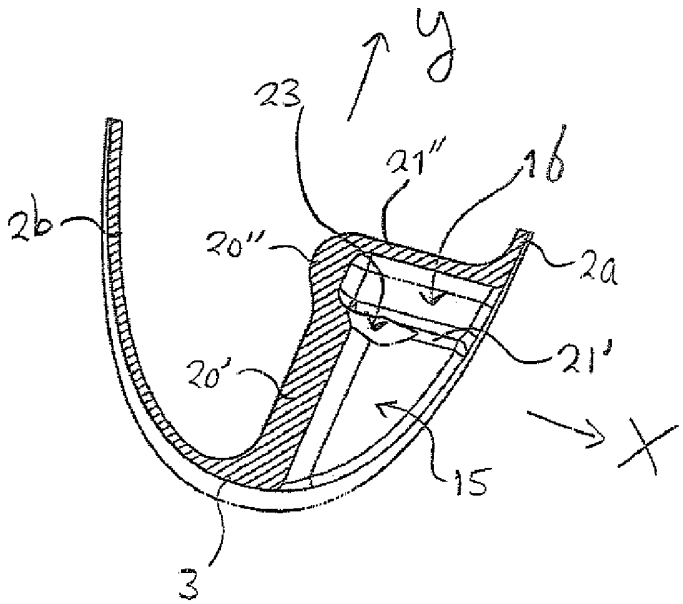


Fig. 6

SAMENWERKINGSVERDRAG (PCT)

RAPPORT BETREFFENDE NIEUWHEIDSONDERZOEK VAN INTERNATIONAAL TYPE

IDENTIFICATIE VAN DE NATIONALE AANVRAGE	KENMERK VAN DE AANVRAGER OF VAN DE GEMACHTIGDE
	P30132NL00/RRI
Nederlands aanvraag nr. **2004125**	Indieningsdatum **21-01-2010**
	Ingeroepen voorrangsdatum
Aanvrager (Naam) **3T design Limited**	
Datum van het verzoek voor een onderzoek van internationaal type **22-05-2010**	Door de Instantie voor Internationaal Onderzoek aan het verzoek voor een onderzoek van internationaal type toegekend nr. **SN 54158**

I. CLASSIFICATIE VAN HET ONDERWERP (bij toepassing van verschillende classificaties, alle classificatiesymbolen opgeven)

Volgens de internationale classificatie (IPC)

B60B21/06 **B60B5/02**

II. ONDERZOCHTE GEBIEDEN VAN DE TECHNIEK

Onderzochte minimumdocumentatie

Classificatiesysteem	Classificatiesymbolen
IPC	**B60B**

Onderzochte andere documentatie dan de minimum documentatie, voor zover dergelijke documenten in de onderzochte gebieden zijn opgenomen

III.	☐	**GEEN ONDERZOEK MOGELIJK VOOR BEPAALDE CONCLUSIES**	(opmerkingen op aanvullingsblad)
IV.	☐	**GEBREK AAN EENHEID VAN UITVINDING**	(opmerkingen op aanvullingsblad)

ONDERZOEKSRAPPORT BETREFFENDE HET RESULTAAT VAN HET ONDERZOEK NAAR DE STAND VAN DE TECHNIEK VAN HET INTERNATIONALE TYPE

Nummer van het verzoek om een onderzoek naar de stand van de techniek
NL 2004125

A. CLASSIFICATIE VAN HET ONDERWERP
INV. B60B21/06 B60B5/02
ADD.

Volgens de Internationale Classificatie van octrooien (IPC) of zowel volgens de nationale classificatie als volgens de IPC.

B. ONDERZOCHTE GEBIEDEN VAN DE TECHNIEK

Onderzochte miminum documentatie (classificatie gevolgd door classificatiesymbolen)
B60B

Onderzochte andere documentatie dan de mimimum documentatie, voor dergelijke documenten, voor zover dergelijke documenten in de onderzochte gebieden zijn opgenomen

Tijdens het onderzoek geraadpleegde elektronische gegevensbestanden (naam van de gegevensbestanden en, waar uitvoerbaar, gebruikte trefwoorden)
EPO-Internal, WPI Data

C. VAN BELANG GEACHTE DOCUMENTEN

Categorie °	Geciteerde documenten, eventueel met aanduiding van speciaal van belang zijnde passages	Van belang voor conclusie nr.
A	EP 1 300 260 A2 (SHIMANO KK [JP]) 9 april 2003 (2003-04-09) * alinea [0014] - alinea [0015]; figuren 4,5 *	1,10,11
A,D	US 5 810 453 A (O'BRIEN COLIN [US]) 22 september 1998 (1998-09-22) in de aanvraag genoemd * conclusie 1; figuren *	1
A,D	US 2003/209936 A1 (CHEN LAI-CHIEN [TW]) 13 november 2003 (2003-11-13) in de aanvraag genoemd * alinea [0013] - alinea [0018]; figuren *	1
A	US 2007/188011 A1 (CHEN HSUEH-CHEN [TW]) 16 augustus 2007 (2007-08-16) * alinea [0013] - alinea [0017]; figuren *	1

-/--

[X] Verdere documenten worden vermeld in het vervolg van vak C.

[X] Leden van dezelfde octrooifamilie zijn vermeld in een bijlage

° Speciale categorieën van aangehaalde documenten

"A" niet tot de categorie X of Y behorende literatuur die de stand van de techniek beschrijft

"D" in de octrooiaanvrage vermeld

"E" eerdere octrooi(aanvrage), gepubliceerd op of na de indieningsdatum, waarin dezelfde uitvinding wordt beschreven

"L" om andere redenen vermelde literatuur

"O" niet-schriftelijke stand van de techniek

"P" tussen de voorrangsdatum en de indieningsdatum gepubliceerde literatuur

"T" na de indieningsdatum of de voorrangsdatum gepubliceerde literatuur die niet bezwarend is voor de octrooiaanvrage, maar wordt vermeld ter verheldering van de theorie of het principe dat ten grondslag ligt aan de uitvinding

"X" de conclusie wordt als niet nieuw of niet inventief beschouwd ten opzichte van deze literatuur

"Y" de conclusie wordt als niet inventief beschouwd ten opzichte van de combinatie van deze literatuur met andere geciteerde literatuur van dezelfde categorie, waarbij de combinatie voor de vakman voor de hand liggend wordt geacht

"&" lid van dezelfde octrooifamilie of overeenkomstige octrooipublicatie

Datum waarop het onderzoek naar de stand van de techniek van internationaal type werd voltooid	Verzenddatum van het rapport van het onderzoek naar de stand van de techniek van internationaal type
12 augustus 2010	

Naam en adres van de instantie	De bevoegde ambtenaar
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Vanneste, Marc

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ONDERZOEKSRAPPORT BETREFFENDE HET RESULTAAT VAN HET ONDERZOEK NAAR DE STAND VAN DE TECHNIEK VAN HET INTERNATIONALE TYPE

Nummer van het verzoek om een onderzoek naar de stand van de techniek
NL 2004125

C.(Vervolg). VAN BELANG GEACHTE DOCUMENTEN

Categorie °	Geciteerde documenten, eventueel met aanduiding van speciaal van belang zijnde passages	Van belang voor conclusie nr.
A	DE 10 2008 007722 A1 (SALOMON SA [FR]) 14 augustus 2008 (2008-08-14) * conclusie 1; figuren *	1

ONDERZOEKSRAPPORT BETREFFENDE HET RESULTAAT VAN HET ONDERZOEK NAAR DE STAND VAN DE TECHNIEK VAN HET INTERNATIONALE TYPE

Informatie over leden van dezelfde octrooifamilie

Nummer van het verzoek om een onderzoek naar de stand van de techniek
NL 2004125

In het rapport genoemd octrooigeschrift	Datum van publicatie	Overeenkomend(e) geschrift(en)	Datum van publicatie
EP 1300260	A2 09-04-2003	EP 1300262 A2	09-04-2003
US 5810453	A 22-09-1998	GEEN	
US 2003209936	A1 13-11-2003	DE 20307262 U1	10-07-2003
		FR 2839469 A3	14-11-2003
		TW 516518 Y	01-01-2003
US 2007188011	A1 16-08-2007	GEEN	
DE 102008007722	A1 14-08-2008	FR 2912345 A1	15-08-2008
		US 2008191543 A1	14-08-2008

OCTROOICENTRUM NEDERLAND

WRITTEN OPINION

File No.	Filing date *(day/month/year)*	Priority date *(day/month/year)*	Application No.
SN54158	21.01.2010		NL2004125

International Patent Classification (IPC)
INV. B60B21/06 B60B5/02

Applicant
3T design Limited

This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the application
- ☐ Box No. VIII Certain observations on the application

Examiner
Vanneste, Marc

Application number

WRITTEN OPINION

NL2004125

Box No. I Basis of this opinion

1. This opinion has been established on the basis of the latest set of claims filed before the start of the search.

2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the application and necessary to the claimed invention, this opinion has been established on the basis of:

   a. type of material:

   ☐ a sequence listing

   ☐ table(s) related to the sequence listing

   b. format of material:

   ☐ on paper

   ☐ in electronic form

   c. time of filing/furnishing:

   ☐ contained in the application as filed.

   ☐ filed together with the application in electronic form.

   ☐ furnished subsequently for the purposes of search.

3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating there has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments:

Box No. V Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty	Yes:	Claims	1-11
	No:	Claims	
Inventive step	Yes:	Claims	1-11
	No:	Claims	
Industrial applicability	Yes:	Claims	1-11
	No:	Claims	

2. Citations and explanations

see separate sheet

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Reference is made to the following document(s):

D1 EP 1 300 260 A2 (SHIMANO KK [JP]) 9 april 2003 (2003-04-09)

1. D1 is regarded as being the prior art closest to the subject-matter of claim 1, and discloses :

A bicycle wheel rim having a central axis of rotation, comprising (see figures 4 and 5):

- a wall with two opposite radially outwardly extending annular sidewall parts (24a, 24b);

- a plurality of spoke mounting apertures in the wall;

- a plurality of spokes (22a) destined for connecting the rim with a central hub (20a, 20b);

in which the spokes comprise a shaft with a head (51) at its radially outward end, which head has a larger cross section than the shaft, in which wall parts of the rim that are delimiting the spoke mounting apertures form seats for the heads of the spokes to abut against while the spoke shafts (42) extend through the apertures in the direction of said central axis,

at least one of the spoke mounting apertures is formed by a slit (74).

The subject-matter of claim 1 therefore differs from this known D1 in that said slit extends both in a sideward and radial outward direction and comprises a first slit part

and a second slit part, wherein the first slit part has cross sectional dimensions lying between the cross sectional dimensions of the shaft and the head, and the second slit part has cross sectional dimensions larger than the cross sectional dimensions of the head, wherein the second slit part lies further radially outward than the first slit part, and wherein the slit parts are both open in the direction of the central axis of the rim and in the direction of at least one of the sidewall parts of the rim

and is therefore new.

2. The problem to be solved by the present invention may therefore be regarded as to provide a bicycle wheel rim with an improved connection spokes-rim while the nipples are on the side of the hub (reversed spoke construction).

The solution proposed in claim 1 of the present application is considered as involving an inventive step because there is no indication in the state of the art to solve the problem in this or similar way.

3. Claims 2-11 are dependent on claim 1 and as such meet the requirements of novelty and inventive step.

Vanneste, M.