

664772

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Australia

Patents Act 1990

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DATED this Twelfth day of September 19 94.

.....*John Gordon Hinde*.....
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INTERNATIONALE ANMELDUNG VERÖFFENTLICHT NACH DEM VERTRAG ÜBER DIE
INTERNATIONALE ZUSAMMENARBEIT AUF DEM GEBIET DES PATENTWESENS (PCT)

<p>(51) Internationale Patentklassifikation 5 : B60B 3/14</p>	<p>A1</p>	<p>(11) Internationale Veröffentlichungsnummer: WO 94/04379 (43) Internationales Veröffentlichungsdatum: 3. März 1994 (03.03.94)</p>
<p>(21) Internationales Aktenzeichen: PCT/DE93/00752 (22) Internationales Anmeldedatum: 18. August 1993 (18.08.93) (30) Prioritätsdaten: P 42 27 259.9 18. August 1992 (18.08.92) DE (71) Anmelder (für alle Bestimmungsstaaten ausser US): STAHL-SCHMIDT & MAIWORM GMBH [DE/DE]; Bruchstr. 34, D-67098 Bad Dürkheim (DE). (72) Erfinder; und (73) Erfinder/Anmelder (nur für US) : MAIWORM, Friedhelm [DE/DE]; Schulstr. 34, D-58791 Werdohl (DE). PFORR, Hans-Joachim [DE/DE]; Jahnstr. 18, D-58809 Neuenrade (DE). (74) Anwalt: SEIBERT + MICHELIS; Tattenbachstr. 9, D-80538 München (DE).</p>		<p>(81) Bestimmungsstaaten: AU, BR, CA, JP, US, europäisches Patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).</p> <p>Veröffentlicht <i>Mit internationalem Recherchenbericht.</i></p> <p>664772</p>
<p>(54) Title: ARRANGEMENT FOR PREVENTING CONTACT CORROSION IN MAGNESIUM WHEELS</p>		
<p>(54) Bezeichnung: ANORDNUNG ZUR VERMEIDUNG VON KONTAKTKORROSIONEN BEI MAGNESIUMRÄDERN</p>		
<p>(57) Abstract</p>		
<p>In order to avoid contact corrosion when fastening a magnesium wheel onto the wheel support of a motor vehicle, an arrangement is provided with a ring-shaped aluminium spacing disk (10) inserted between the inner supporting surface of the magnesium wheel (1) and the wheel support (6), in the area of the attachment bores (17). A plastic ring-shaped adapter (11) is clamped in the hub bore (8) of the magnesium wheel, covering and centering the radial inner circumferential surface (20) of the spacing disk (10).</p>	<p>The diagram is a cross-sectional view of a wheel hub assembly. It shows a magnesium wheel (1) with a hub bore (8) and attachment bores (17). A ring-shaped aluminium spacing disk (10) is inserted between the inner supporting surface of the wheel and the wheel support (6). A plastic ring-shaped adapter (11) is clamped in the hub bore (8), covering and centering the radial inner circumferential surface (20) of the spacing disk (10). Other components shown include a wheel support (6), a hub (7), and various fasteners and components labeled 1, 2, 3, 4, 5, 13, and 17.</p>	
<p>(57) Zusammenfassung</p>		
<p>Zur Vermeidung von Kontaktkorrosionen bei der Befestigung eines Magnesiumrades an der Radanlage eines Kraftfahrzeuges ist eine Anordnung vorgesehen, bei der erfindungsgemäß zwischen der innenseitigen Anlagefläche des Magnesiumrades (1) und der Radanlage (6) im Bereich der Befestigungsbohrungen (17) eine ringförmige Distanzscheibe (10) aus Aluminium eingefügt ist und als Mittenzentrierung in die Nabenbohrung (8) des Magnesiumrades (1) ein ringförmiger Adapter (11) aus Kunststoff eingeklemmt ist, der die radial innenliegende Umfangsfläche (20) der Distanzscheibe (10) abdeckt und diese zentriert.</p>		

Arrangement for Preventing Contact Corrosion in the Case of Magnesium Wheels

The invention relates to an arrangement for preventing contact corrosion in the fixing of a magnesium wheel to the wheel mount of a motor vehicle.

5 In expensive passenger motor vehicles, the wheels carrying the tyres are increasingly being made of light metal in order to reduce the weight of the unsprung mass and thus to improve travel comfort. For wheels of this type, aluminium has been the material mainly used hitherto. An even lighter weight and thus a further reduction in the unsprung mass is achieved if magnesium is used for these wheels.

10 Wheels of this type are conventionally screwed firmly to the wheel mounts of the vehicle axles, the wheel supports consisting of steel or cast steel.

However, the direct contact of magnesium and steel can lead to what is known as contact corrosion, which can permanently damage the metal crystalline structure of the magnesium wheel, thus reducing the service life of such a magnesium wheel.

15 The object of the present invention is therefore to create an arrangement whereby direct contact between magnesium and steel is avoided, without in any way limiting the strength of the connection between the magnesium wheel and the wheel mount on the vehicle.

There is disclosed herein an apparatus for preventing contact corrosion between 20 magnesium and steel in the fixing of a magnesium wheel comprising fixing bores to the wheel mount of a motor vehicle, comprising:

an annular, aluminium washer comprising a radially inner circumferential face and adapted to be inserted between an inner contact face of the magnesium wheel and the wheel mount, in the region of said fixing bores of the magnesium wheel, and

25 an annular, plastics adapter adapted to function as a centring means and holding device for the washer and being squeezed into a central hub bore of the magnesium wheel so as to cover the radially inner circumferential face of the washer and centre same.



~~the radially inner circumferential face of the washer and centring same.~~

With this interposition of an aluminium washer between the magnesium wheel and the steel wheel mount in the region of substantial pressure, direct contact between magnesium and steel is avoided, as contact corrosion between magnesium and aluminium and aluminium and steel is virtually non-existent. The remaining, non-stressed contact areas between the magnesium wheel and the wheel mount are separated by plastics parts having sufficient pressure resistance.

It is advantageous in this case if the washer has axially parallel bores corresponding to the fixing bores of the magnesium wheel and an inner circumferential face which tapers conically towards the magnesium wheel and on which the correspondingly conically widening outer circumferential face of the plastics adapter bears.

It is also advantageous if at least one of the bores in the washer has on its contact side with the magnesium wheel a countersinking depression, and that a centring bush with a centrally, radially projecting collar is so inserted into said bore that the collar completely fills the depression and is flush with the plane face of the washer.

The plastics adapter itself may have a cylindrical section with a plurality of axially punched locking lugs and an adjoining section conically widening on the inner and outer circumference with inner diameters corresponding to the outer diameter of the centring attachment of the wheel mount.

To fix the adapter to the magnesium wheel, it is advantageous if the hub bore of the wheel has a radial widening into which the locking lugs of the adapter can engage.



Advantageously the plastics adapter consists of glass-reinforced nylon, the same material from which the centring bush is made.

The centring bush advantageously has a slightly larger inner diameter than the outer diameter of the fixing screws, and an outer diameter corresponding to the bore diameters in the washer and the magnesium wheel for the fixing screws in order to permit exact alignment of the washer with the magnesium wheel.

The aluminium washer itself should have a thickness of approximately 3 to 5 mm.

The structure and mode of operation of an embodiment according to the invention are explained in more detail by means of a diagrammatic drawing, in which:

- Fig. 1 shows a longitudinal section through a fully mounted magnesium wheel,
- Fig. 2, an exploded view in perspective of the adapter, washer and centring bush, and
- Fig. 3, an enlarged partial section through the magnesium wheel in the region of a fixing screw.

Fig. 1 first of all shows a cross-section through a magnesium disc wheel 1 with a hub 2, spokes 3 and rim well 4 for receiving the tyre, which is not shown. This magnesium wheel is connected in the region of the hub 2 via corresponding screws 5 to the wheel mount 6, shown in broken lines, on the outside relative to the brake disc 7, also shown in broken lines. Between the magnesium wheel 1 and the wheel mount 6, in the region of the screws 5, an annular aluminium washer 10 is disposed, which is radially centred



on the inside relative to a plastics adapter 11 clamped into the hub bore 8.

In Fig. 2, the individual parts for preventing contact corrosion are shown again, in an exploded, perspective view, their cross-sections being shown individually in the enlarged partial cross-section according to Fig. 3. As can be seen from Fig. 2, the aluminium washer 10 has five coaxial bores 12, which are flush with the corresponding bores in the hub for the fixing screws. For insertion into one of these bores 12, the centring bush 13 is provided, whose function will be described below.

The plastics adapter 11 has in the rear cylindrical region 15 four punched locking lugs 16 to lock into the wheel hub.

As can be also seen from the enlarged cross section in Fig. 3, the aluminium washer 10 inserted between the hub 2 of the magnesium wheel 1 and the wheel mount 6 has bores 12 whose diameter corresponds exactly to the bores 17 in the wheel hub 2.

Into one of the bores 12 in the washer 10, a cylindrical centring bush 13 is inserted, which has in its centre a radially projecting collar 14, which engages in a depression 18 on the wheel-side end face of the washer 10. This centring bush 13 is thus held in the washer 10 and extends into the bore 17 of the wheel hub 2 in order to align the washer 10 precisely.

The inner circumference of the washer 10 has a circumferential face 20 which tapers conically towards the magnesium wheel 1 and on which the correspondingly conically widening outer circumferential face 21 of the plastics adapter 11 bears. This plastics adapter 11 projects with its cylindrical region 15 into the hub bore 8 and has - as



can be seen in particular from the perspective view according to Fig. 2 - slightly elongate locking lugs 16 which are punched out of the cylindrical region 15 and which engage in a radial widening 22 in the hub bore 8.

The plastics adapter 11 rests with its inner diameter 23 exactly over the outer circumference of the centring projection 24 (shown in broken lines) of the wheel mount 6.

The assembly of the individual parts, washer 10 and adapter 11 on the magnesium wheel 1 is advantageously carried out as follows: First the centring bush 13 is inserted into the bore 12 of the washer 10 having the depression 18 in such a manner that the collar 14 does not project above the plane face 25 of the washer 10.

Then the magnesium wheel 1 is laid on the ground with its visible side at the bottom, and the centring bush 13 together with the washer 10 are inserted into one of the bores 17 in the wheel hub 2. Then the washer 10 is rotated until all the bores 12 in the washer 10 are aligned with the bores 17 in the hub 2.

Then the plastics adapter 11 is pushed through the central aperture 20 in the washer 10 until the locking lugs 16 audibly engage in the hub bore 8. This then ensures precise centring and mounting of the washer 10 relative to the magnesium wheel 1. Then titanium conical collar screws 5 are inserted from the outside of the magnesium wheel 1 via widened blind bores 26 and the wheel 1 is screwed therewith to the wheel mount 6.

The washer 10 advantageously has a thickness of approximately 3 to 5 mm and is made of pressure-resistant aluminium, which has no contact corrosion with the magnesium of the wheel or the steel of the wheel mount.



The adapter 11 is advantageously made of glass-reinforced nylon and is therefore also very strong. The centring bush 13 may also be manufactured from the same material.

With the described arrangement and the correspondingly formed parts, it is possible to prevent, simply and reliably, contact corrosion with the steel wheel mount when a magnesium disc wheel is used, as all possible contact faces are separated by aluminium in the pressure region and plastics material in the purely positively locking region.



The claims defining the invention are as follows:

1. Apparatus for preventing contact corrosion between magnesium and steel in the fixing of a magnesium wheel comprising fixing bores to the wheel mount of a motor vehicle, comprising:

5 an annular, aluminium washer comprising a radially inner circumferential face and adapted to be inserted between an inner contact face of the magnesium wheel and the wheel mount, in the region of said fixing bores of the magnesium wheel, and

an annular, plastics adapter adapted to function as a centring means and holding device for the washer and being squeezed into a central hub bore of the magnesium wheel
10 so as to cover the radially inner circumferential face of the washer and centre same.

2. The apparatus of claim 1, wherein the washer has axially parallel bores corresponding to the fixing bores of the magnesium wheel and said inner circumferential face tapers conically towards the magnesium wheel such that a correspondingly conically widening outer circumferential face of the plastics adapter bears thereon.

15 3. The apparatus of claim 2, wherein at least one of the bores in the washer has a countersunk depression, and a centring bush with a centrally, radially projecting collar is inserted into said bore such that the collar completely fills the depression and is flush with a plane face of the washer.

4. The apparatus of claim 1 or claim 2, wherein the plastics adapter has a
20 cylindrical section with a plurality of axially punched locking lugs and an adjoining section conically widening on the inner and outer circumference with inner diameters corresponding to the outer diameter of the centring attachment of the wheel mount.

5. The apparatus of claim 4, wherein the hub bore of the magnesium wheel is provided with a radial widening in which the locking lugs of the adapter engage.

25 6. The apparatus of claim 4, wherein the plastics adapter comprises of glass fibre-reinforced nylon.

7. The apparatus of claim 1, wherein the aluminium washer has a thickness of 3 to 5 mm.

8. The apparatus of claim 3, wherein the centring bush has a slightly larger inner
30 diameter than the outer diameter of fixing screws for the wheel, and an outer diameter corresponding to bore diameters in the washer and the magnesium wheel for the fixing screws.

9. An apparatus substantially as hereinbefore described with reference to the accompanying drawings.

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Dated 29 September, 1995

Stahlschmidt & Maiworm GmbH

Patent Attorneys for the Applicant/Nominated Person

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Abstract

To prevent contact corrosion when a magnesium wheel is fixed to the wheel mount of a motor vehicle, an arrangement is provided in which, according to the invention, an annular aluminium washer (10) is inserted between the inner contact face of the magnesium wheel (1) and the wheel mount (6) in the region of the fixing bores (17), and as a central centring means an annular plastics adapter (11) is squeezed into the hub bore (8) of the magnesium wheel (1) in order to cover the radially inner circumferential face (20) of the washer (10) and to centre same (Fig. 1).



Translator's Note

In this mechanical context, "polyamid" has been translated as "nylon" rather than as "polyamide".

Fig. 1

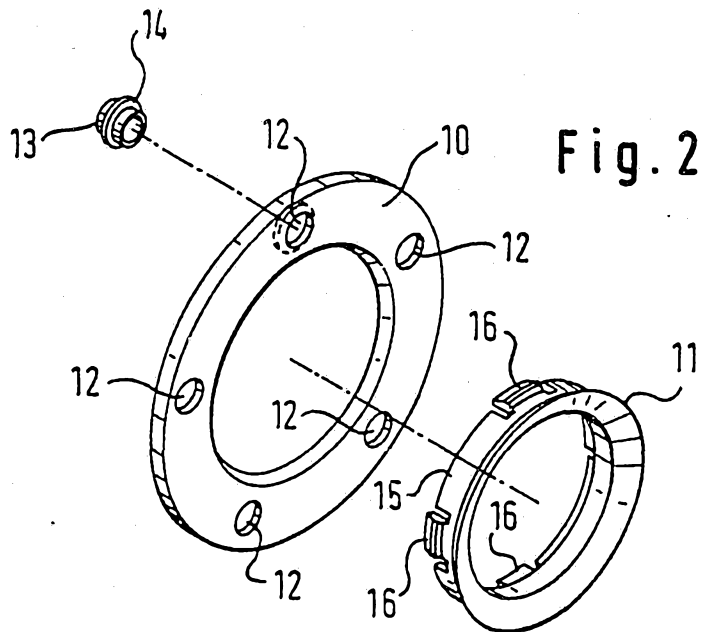
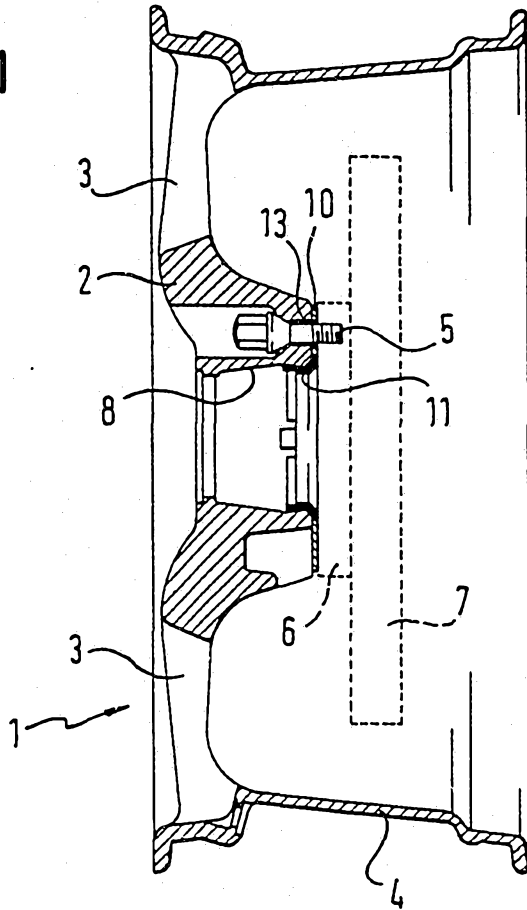
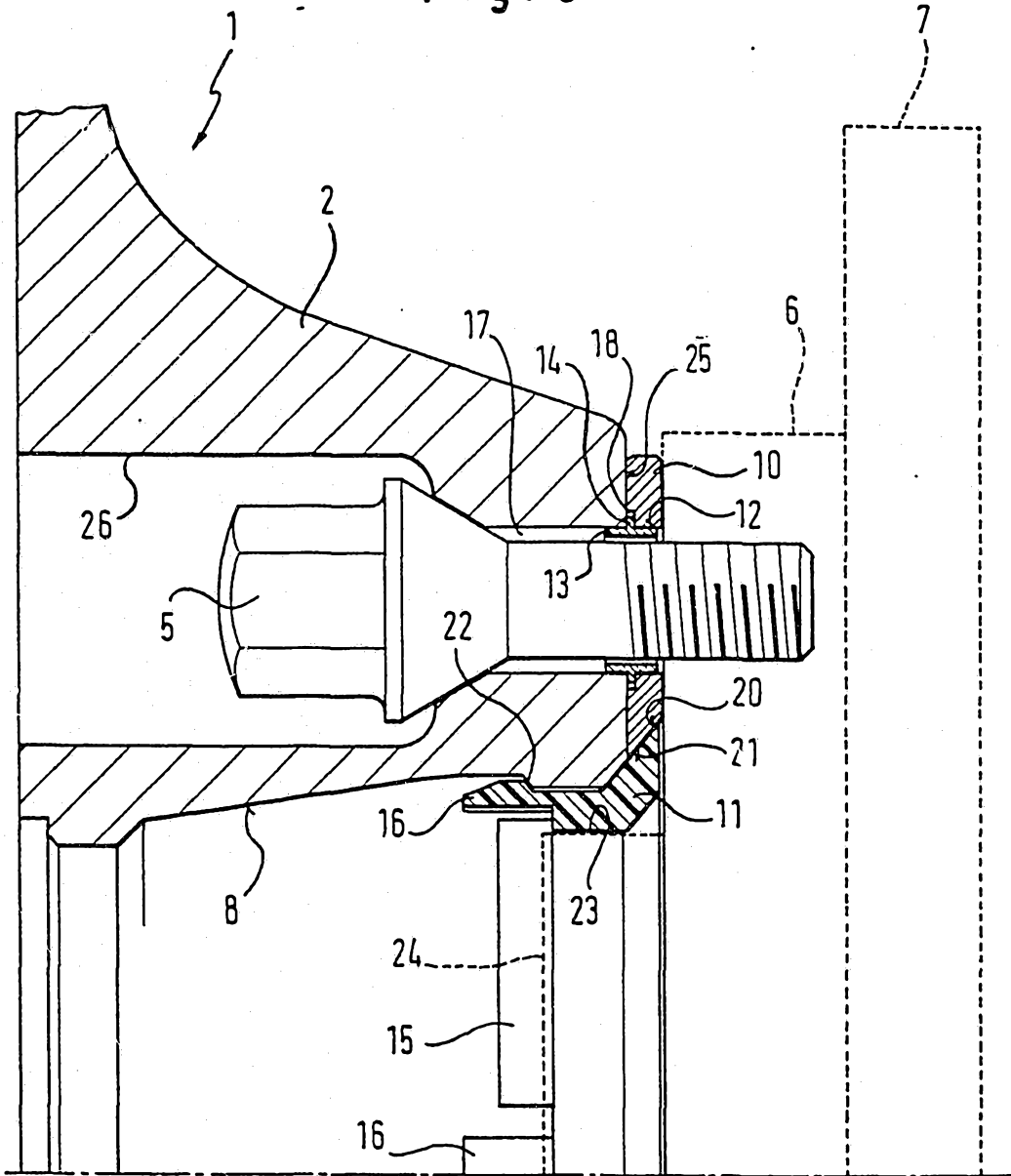


Fig. 3



INTERNATIONAL SEARCH REPORT

International Application No
PCT/DE 93/00752

A. CLASSIFICATION OF SUBJECT MATTER
IPC 5 B60B3/14

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 5 B60B

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)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P, X	PATENT ABSTRACTS OF JAPAN vol. 017, no. 248 (M-1411) 18 May 1993 & JP, A, 04 368 202 (HONDA) 21 December 1992 see abstract	1
A	PATENT ABSTRACTS OF JAPAN vol. 007, no. 116 (M-216) 20 May 1983 & JP, A, 58 036 701 (TOYOTA) 3 March 1983 see abstract	1
A	DE, A, 22 07 771 (BAYRISCHES DRUCKGISS-WERK THURNER) 23 August 1973	1

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

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Date of the actual completion of the international search
9 November 1993

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE-A-2207771	23-08-73	NONE	

A. KLASSIFIZIERUNG DES ANMELDUNGSGEGENSTANDES IPK 5 B60B3/14		
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Kategorie*	Bezeichnung der Veröffentlichung, soweit erforderlich unter Angabe der in Betracht kommenden Teile	Betr. Anspruch Nr.
P, X	PATENT ABSTRACTS OF JAPAN vol. 017, no. 248 (M-1411) 18. Mai 1993 & JP, A, 04 368 202 (HONDA) 21. Dezember 1992 siehe Zusammenfassung ----	1
A	PATENT ABSTRACTS OF JAPAN vol. 007, no. 116 (M-216) 20. Mai 1983 & JP, A, 58 036 701 (TOYOTA) 3. März 1983 siehe Zusammenfassung ----	1
A	DE, A, 22 07 771 (BAYRISCHES DRUCKGISS-WERK THURNER) 23. August 1973 -----	1
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INTERNATIONALER RECHERCHENBERICHT

Angaben zu Veröffentlichungen, die zur selben Patentfamilie gehören

Internationales Aktenzeichen

PCT/DE 93/00752

Im Recherchenbericht angeführtes Patentdokument	Datum der Veröffentlichung	Mitglied(er) der Patentfamilie	Datum der Veröffentlichung
DE-A-2207771	23-08-73	KEINE	