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BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

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(54) Title: ALUMINUM ALLOY WIRE AND WIRE ASSEMBLY PARTS

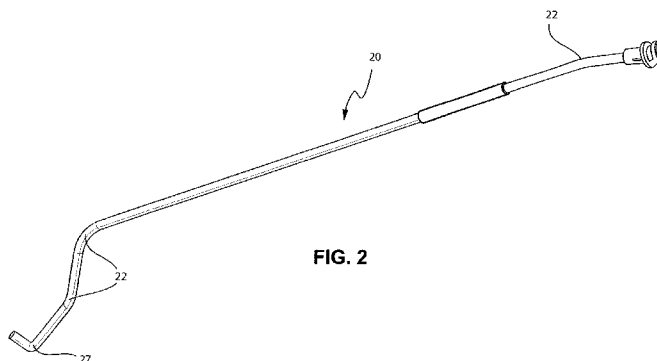


FIG. 2

(57) Abstract: Vehicle parts, and more particularly wire and wire assembly parts, manufactured from a non-heat-treatable, wrought aluminum alloy are disclosed. The wire and wire assembly parts are shaped into different forms that meet certain strength and bendability requirements and are capable of being manufactured using forming, threading and swaging. The aluminum alloy used to manufacture the parts is a non-heat-treatable, wrought alloy formed predominantly from aluminum (Al) metal, which is alloyed primarily with magnesium (Mg), and which also includes silicon (Si), iron (Fe), copper (Cu), manganese (Mn), chromium (Cr), zinc (Zn), titanium (Ti), beryllium (Be) and other elements.



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INTERNATIONAL SEARCH REPORT **PCT/US2014/047806-19.05.2015**

International application No.

PCT/US 14/47806

A. CLASSIFICATION OF SUBJECT MATTER
 IPC(8) - C22C 21/06, C22C 21/08, C22F 1/05, B62D 29/00 (2015.01)
 CPC - C22C 21/06, C22C 21/08, C22F 1/05, B62D 29/00, B62D 29/008
 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(8)- C22C 21/06, C22C 21/08, C22F 1/05, B62D29/00 (2015.01);
 CPC- C22C 21/06, C22C 21/08, C22F 1/05, B62D 29/00, B62D 29/008

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
 USPC- C22C 21/06, C22C 21/08, C22F 1/05, B62D 29/00, B62D 29/008;
 Patents and NPL (classification, keyword; search terms below) :

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
 Pub West (US EP JP WO), Pat Base (AU BE BR CA CH CN DE DK EP ES FI FR GB IN JP KR SE TH TW US WO), Google Patent, Google Scholar, Free Patents Online; search terms: wrought, alloy, aluminum, aluminium, Al, magnesium, Mg, silicon, Si, iron, Fe, copper, Cu, manganese, Mn, chromium, Cr, zinc, Zn, titanium, Ti, beryllium, Be, hood, door...

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5,571,347 A (BERGSMA) 05 November 1996 (05.11.1996), Tables 1, 2; col 3, ln 7-14; col 4, ln 35-39	1
Y		2-26
Y	WO 96/15281 A1 (KOCH) 23 May 1996 (23.05.1996), English Abstract	2-26
Y	US 2012/0217060 A1 (KUSAKARI et al.) 30 August 2012 (30.08.2012), Fig. 9 para [0001]-[0004], [0033], [0036], [0081], [0100], [0105]	10-26
Y	US 2012/0121456 A1 (KULAS et al.) 17 May 2012 (17.05.2012), para [0010]-[0090]	1-26
Y	US 2007/0187009 A1 (VAN DER HOEVEN et al.) 16 August 2007 (16.08.2007), para [0016]-[0074]	1-26
Y	US 5,678,773 A (WEBSTER) 14 October 1997 (14.10.1997), col 3, ln 16 to col 15, ln 55	1-26

Further documents are listed in the continuation of Box C.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance	"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
"E" earlier application or patent but published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search 14 April 2015 (14.04.2015)	Date of mailing of the international search report 19 MAY 2015
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Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-8300	Authorized officer: Lee W. Young PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774
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Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

– Please See Extra Sheet –

1. As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.
3. As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid; specifically claims Nos.:
4. No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:
1-26

Remark on Protest

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.

Continued from Box No. III, Observations where unity of invention is lacking.

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I: Claims 1-26, drawn to a vehicle part.

Group II: Claims 27-33, drawn to a wire or wire assembly part.

The inventions listed as Groups I and II do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons:

Special Technical Features

Group II does not require a vehicle part comprising other predetermined elements, the aluminum being a percentage by weight that is a majority of the alloy and the magnesium (Mg) being a percentage by weight that is less than the aluminum, but more than the remaining elements forming the aluminum alloy, as required by Group I.

Group I does not require a wire or wire assembly part comprising elements as a percentage by weight of the alloy, 0.09% silicon (Si), 0.19% iron (Fe), 0.01% copper (Cu), 0.05% - 0.15% manganese (Mn), 0.1% - 0.15% chromium (Cr), 0.01% zinc (Zn), 0.06% - 0.11% titanium (Ti), 4.8% - 5.05% magnesium (Mg), 0.0003% beryllium (Be), 0.1% other predetermined elements, and the remainder of the alloy being aluminum (Al) as the majority metal, as required by Group II.

Shared Common Features

The only feature shared by Groups I and II that would otherwise unify the groups is a non-heat-treatable, wrought aluminum alloy, the aluminum alloy comprising the elements of aluminum (Al), magnesium (Mg), silicon (Si), iron (Fe), copper (Cu), manganese (Mn), chromium (Cr), zinc (Zn), titanium (Ti), magnesium (Mg), beryllium (Be). However, this shared technical feature does not represent a contribution over prior art, because the shared technical feature is anticipated by US 5,571,347 A (Bergsma).

Bergsma discloses a non-heat-treatable, wrought aluminum alloy (col 3, ln 29-31, roll cast or slab cast), the aluminum alloy (col 3, ln 12-14), comprising the elements of aluminum (Al) (col 3, ln 12-14), magnesium (Mg) (col 3, ln 8), silicon (Si) (col 3, ln 8), iron (Fe) (col 3, ln 9), copper (Cu) (col 3, ln 9), manganese (Mn) (col 3, ln 11), chromium (Cr) (col 3, ln 9), zinc (Zn) (col 3, ln 12), titanium (Ti) (col 3, ln 12), magnesium (Mg) (col 3, ln 8), beryllium (Be) (col 3, ln 11).

As the technical feature was known in the art at the time of the invention, this cannot be considered a special technical feature that would otherwise unify the groups.

Groups I and II therefore lack unity under PCT Rule 13 because they do not share a same or corresponding special technical feature.