Title: MANUFACTURE OF WHEELS

Abstract: A method of making at least a component for a rim base (76) of a multi-piece wheel for a vehicle, comprising providing a workpiece of tubular configuration and hot upset forging the workpiece in press tooling to form a part thereof to a required configuration, wherein the part of the workpiece is heated (76) to a forging temperature in situ in the press tooling, preferably by induction heating.
A. CLASSIFICATION OF SUBJECT MATTER

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)
B21J B21K

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 practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
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<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
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<tr>
<td>X</td>
<td>CN 101 982 291 A (JIAXING STONE WHEEL CO LTD) 2 March 2011 (2011-03-02)</td>
<td>1, 2, 9-14, 16-18, 22-25, 28-31-35</td>
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<td>Y</td>
<td>the whole document</td>
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<td>FR 2 393 630 AI (DEHOVE ROGER [FR]) 5 January 1979 (1979-01-05) page 8, paragraph 3; figure 4</td>
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</table>

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"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)
"O" document referring to an oral disclosure, use, exhibition or other means
"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
"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
"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
"A/" document member of the same patent family

Date of the actual completion of the international search: 21 October 2013
Date of mailing of the international search report: 10/04/2014

Authorized officer: Auge, Marc
**INTERNATIONAL SEARCH REPORT**

**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:

> see additional 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 an 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.:

   1-4, 8-14, 16-18, 22-28, 31-35

**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.
This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-4, 8-14, 16-18, 22-28, 31-35
   Method of making a component by upsetting with the heating element moving with a second part of the press tooling.

2. claims: 5-7
   Method of making a component by upsetting with a succession of upsetting stages.

3. claim: 15
   Method of making a component by upsetting with welded element also upset

4. claim: 19
   Method of making a component by upsetting with cold forming the upset part.

5. claims: 20, 21
   Method of making a component by upsetting with upsetting of the opposite edge portion.

6. claim: 29
   Tooling of making a component by upsetting with shielding element.

7. claim: 30
   Method of making a component by upsetting with forging cavity for different stage forging.
## INTERNATIONAL SEARCH REPORT

**Information on patent family members**

**International application No**

PCT/GB2013/05175O

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<td>CN 101982291 A</td>
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<td>FR 2393630 AI</td>
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