Title: SUSPENDED DRIVE AXLE AND AGRICULTURAL TRACTOR WITH SAME

Abstract: A suspended drive axle (26) and agricultural tractor (10) having same including a central housing having inboard final drives (52) and left and right axle housing (62) suspended therefrom by upper and lower control arms (64, 66) with axle shafts (44, 46) extending outwardly therefrom to which wheel and tire assemblies (14, 16) are mounted. A constant velocity universal joint (150) is provided between the inboard final drives (52) and the axle shafts (44, 46). The universal joint (150) having a pair of journal members (210, 212) and a coupling yoke (222) that radially surround the drive and driven yokes (174, 190) of the joint (150) whereby the axial length of the universal joint (150) is minimized to enable the wheels (14, 16) to be located on the axle shafts (44, 46) at 60 inch tread spacing. This allows the drive axle (26) to be used on a row crop tractor without altering the structure of the vehicle from a conventional row crop tractor whereby the characteristics of a row crop tractor are maintained.
SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZM, ZW.

(84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, T1, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— with international search report
— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

(88) Date of publication of the international search report: 5 December 2002

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.
**INTERNATIONAL SEARCH REPORT**

**A. CLASSIFICATION OF SUBJECT MATTER**

<table>
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<th>IPC</th>
<th>B66K17/04</th>
<th>F16H37/08</th>
<th>B60G3/18</th>
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</table>

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)

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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**

<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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<tbody>
<tr>
<td>A</td>
<td>GB 2 087 327 A (COUNTY COMMERCIAL CARS LTD) 26 May 1982 (1982-05-26) the whole document</td>
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<tr>
<td>A</td>
<td>US 5 277 270 A (HASEGAWA TOSHIYUKI) 11 January 1994 (1994-01-11) the whole document</td>
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</table>

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
  * "E" earlier document but published on or after the international filing date
  * "L" document which may throw doubts on priority claim(s) of which the document is cited to establish the publication date of another citation or other special reason (as specified)
  * "O" document referring to or containing an oral disclosure, use, exhibition or other means
  * "P" document published prior to the international filing date but later than the priority date claimed

"**" 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

"*" 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.

"*S" document member of the same patent family

**Date of the actual completion of the international search**

20 August 2002

**Date of mailing of the International search report**

04.10.2002

Name and mailing address of the ISA

European Patent Office, P.B. 8818 Patentfirm 2
NL-2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 051 epi nl
Fax: (+31-70) 340-3015

Authorized officer

CLASEN M.P.
INTERNATIONAL SEARCH REPORT

Box I  Observations where certain claims were found unsearchable (Continuation of Item 1 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 II  Observations where unity of invention is lacking (Continuation of Item 2 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 fee, this Authority did not invite payment of any additional fee.

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.:

   1-30, 35-41

Remark on Protest

□ The additional search fees were accompanied by the applicant's protest.

□ No protest accompanied the payment of additional search fees.

Form PCT/ISA/210 (continuation of first sheet (1)) (July 1996)
This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-30, 35-41

   agricultural tractor having a drive axle including a central housing and left and right axle housings movably coupled to the central housing for vertical movement.

2. Claims: 31-34

   a universal joint for transmitting rotary power
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<th>Publication date</th>
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<tr>
<td>US 5277270</td>
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