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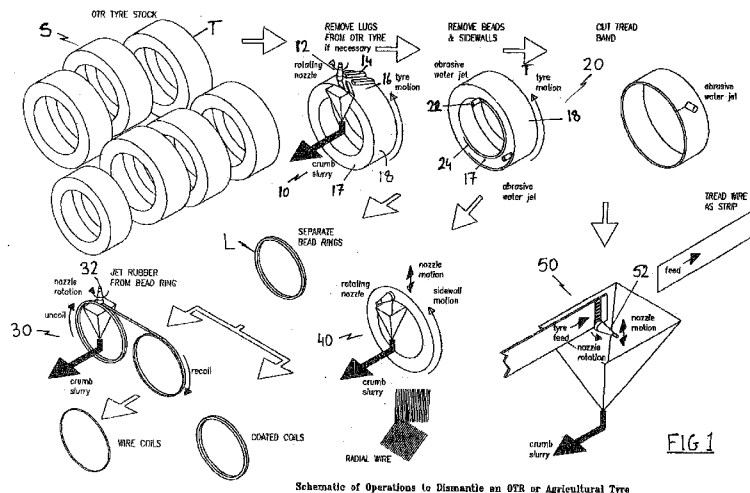
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- (81) **Designated States (unless otherwise indicated, for every kind of national protection available):** AE, AG, AL, AM,

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- Published:**
- with international search report (Art. 21(3))
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))
- (88) **Date of publication of the international search report:**
8 October 2009

(54) **Title:** METHOD OF AND APPARATUS FOR REDUCING A VEHICLE TYRE INTO COMPONENTS FOR RE-USE AND RECYCLING



(57) **Abstract:** The method of the invention involves the stepwise reduction of a vehicle tyre (T), having a tread portion (18) supporting tread lugs (14) and sidewall portions (17) connecting the tread portion or band (18) to rim-engaging beads (24), into useable constituent parts. The methods of the invention are achieved using high-pressure water jets (12, 22, 32, 52) to remove tread lugs and pattern from the tread portion of a tyre, to cut rim-engaging beads from each side wall of the tyre and to remove the sidewall portion to leave a strip of tread material. Each removed portion is further reduced at processing stations (30, 40, 50) to separate rubber material from reinforcing material. Apparatus for effecting the methods of the invention are also disclosed.

WO 2009/068874 A3

INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2008/003950

A. CLASSIFICATION OF SUBJECT MATTER
INV. B29B17/02 B29B17/00

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)
B29B

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.
X	FR 2 798 089 A (PRIOUL LOIC [FR]) 9 March 2001 (2001-03-09) page 5, line 30; figures 8,9,13-15 -----	1-4
A	DE 198 18 566 A1 (IVVG INDUSTRIEBODEN VERWERTUNG [DE]) 28 October 1999 (1999-10-28) column 1, line 63; figure 4 -----	1-4
A	WO 92/15438 A (KEERS RICHARD ANTHONY [SG]; COWLEY BARRY ANTHONY [AU]) 17 September 1992 (1992-09-17) claim 4; figure 4 -----	1-4

Further documents are listed in the continuation of Box C.

See patent family annex.

* 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) 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.
- * & * document member of the same patent family

Date of the actual completion of the international search

8 April 2009

Date of mailing of the international search report

27/07/2009

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/GB2008/003950

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 allsearchable 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.:

see additional sheet(s)

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.

INTERNATIONAL SEARCH REPORT

International Application No. PCT/GB2008 /003950

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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

1. claims: 1-4

A method for reducing a vehicle tyre, with the specific sequence of cutting steps defined in claim 1.

2. claims: 5-7,16-17

A method of recovering tread lugs from a disused tyre, including relative movement and rotation between tyre and jet in order to obtain a substantially bald tyre without remaining tread patterns (claims 5-7).

An apparatus for recovering tread lugs from a disused tyre, including relative movement and rotation between tyre and jet in order to obtain a substantially bald tyre without remaining tread patterns (claims 16-17).

3. claims: 8-10, 13-15, 18-21

A method of removing a bead and a sidewall portion by means of first and second second pressurised cutting water jets (claims 8-10).

An apparatus for reducing a vehicle tyre comprising at least first and second pressurised cutting water jets (claims 13-15).

A bead and sidewall removal station comprising second pressurised cutting water jets (claims 18-21).

4. claims: 11-12,22-31

A method of reducing a tread band by means of a pressurised abrasive cutting water jet (claims 11-12).

A tread band reducing station (claims 22-23).

Methods and apparatuses according to the drawings (claims 24-31).

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/GB2008/003950

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
FR 2798089	A	09-03-2001	NONE
DE 19818566	A1	28-10-1999	NONE
WO 9215438	A	17-09-1992	CA 2105581 A1 06-09-1992 EP 0574490 A1 22-12-1993 FI 933863 A 03-09-1993 HU 75439 A2 28-05-1997 JP 6504740 T 02-06-1994