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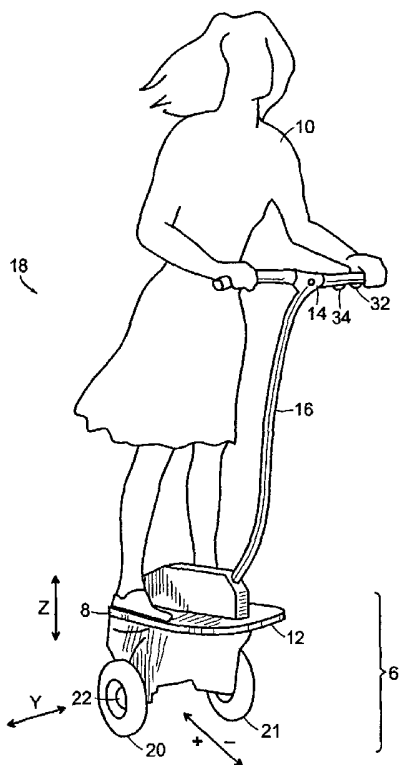
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- (21) International Application Number: PCT/US2003/018940
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[Continued on next page]

(54) Title: CONTROL FEATURES FOR A BALANCING TRANSPORTER



(57) Abstract: Methods for controlling the motion of a balancing transporter while supporting a rider or under riderless conditions and for safely limiting the speed of the transporter, and, additionally, for battery load sharing in order to maintain equal charge between dual power sources. The transporter has two laterally disposed primary wheels. In accordance with the methods, an input is received via a user input a control signal corresponding to the input received is generated. Then a torque is applied to the laterally disposed wheels so as to propel the transporter on the basis of at least the control signal, conditioned in accordance with methods described in the invention.

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INTERNATIONAL SEARCH REPORT

International Application No
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A. CLASSIFICATION OF SUBJECT MATTER
 IPC 7 G01R31/36 H02J7/00 B60L15/20 B62D51/00 B62D37/00
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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 7 G01R H02J B60L B62D

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 1 063 530 A (YAZAKI CORP) 27 December 2000 (2000-12-27) column 7, line 22 - column 11, line 27; figures 1,4	1-7
A	----- US 5 012 176 A (LAFORGE DAVID H) 30 April 1991 (1991-04-30) column 6, line 11 - column 7, line 5; figures 3,4	1-7
A	----- US 5 971 091 A (KRISTAL PHYLLIS K ET AL) 26 October 1999 (1999-10-26) column 3, line 23, paragraph 34 -----	1-7

Further documents are listed in the continuation of box C.

Patent family members are listed in 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

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Name and mailing address of the ISA

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 03/18940

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.:

1-7

Remark on Protest

- The additional search fees were accompanied by the applicant's protest.
- No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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

1. claims: 1-7

A method for estimating an instantaneous capability of a battery.

2. claims: 8-23,40-42

a transporter ...
limiting the speed based on the capability of the power source.

3. claims: 24-29

a transporter ...
including a control loop for maintaining stability with respect to tipping.

4. claims: 30-33

a balancing transporter and method therefore ...
whereby the acceleration is determined by the net torque experienced by the system.

5. claims: 34-39

a method and device for equalising the charge between two batteries

6. claims: 43-45

a method for maintaining stability of a riderless balancing transporter ...
detecting the absence of a user

7. claim: 46

a transporter for transporting a load
whereby the transporter is controlled by the attitude of the support platform

8. claims: 47-56

a method for conducting a riderless balancing transporter.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 03/18940

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