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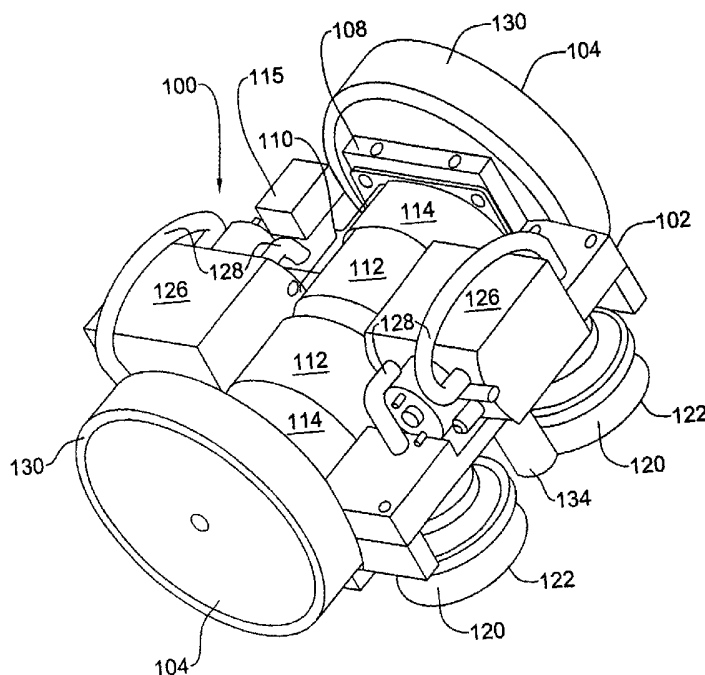
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For two-letter codes and other abbreviations, refer to the "Guid-
ance Notes on Codes and Abbreviations" appearing at the begin-
ning of each regular issue of the PCT Gazette.

(54) Title: VEHICLE WITH A MECHANISM FOR ATTACHMENT TO A SURFACE



(57) Abstract: A vehicle having two motor-powered wheels (104) and surface engaging vacuum cups (120) that generate a surface-attachment force sufficient to hold the vehicle against a surface and to maintain a wheel traction sufficient to permit the wheels to move the vehicle on the surface. The vehicle, that can easily move and maneuver on the surface, may serve as a platform for a cleaning assembly for cleaning vertical glass surfaces of a building.

WO 2003/013944 A3

INTERNATIONAL SEARCH REPORT

International Application No
PCT/IL 02/00638

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 B62D57/024 E04G23/00 A47L1/02

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 B62D E04G B63B B64F B05B A47L

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	EP 0 221 543 A (URAKAMI) 13 May 1987 (1987-05-13)	1, 3, 6, 7, 9
Y	column 9, line 18 - line 57; figures 1-3, 5, 9	17-21, 29-33
Y	US 4 800 607 A (FUKUTOMI) 31 January 1989 (1989-01-31) abstract	17-21, 29-33
A	column 4, line 19 - line 55; figures 2, 4	48-52
X	EP 0 878 381 A (MITSUBISHI HEAVY INDUSTRIES) 18 November 1998 (1998-11-18) figures 1, 2	1-3, 5, 10-13
X	US 4 029 164 A (URAKAMI) 14 June 1977 (1977-06-14) column 2, line 56 - column 3, line 36; figures 1, 2	1, 3, 5-7
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☒ 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

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G document member of the same patent family

Date of the actual completion of the international search

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INTERNATIONAL SEARCH REPORT

Internati Application No
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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 00 10864 A (URAKAMI) 2 March 2000 (2000-03-02) abstract; figures ---	1, 3, 5-7
A	US 4 971 591 A (RAVIV ET AL.) 20 November 1990 (1990-11-20) cited in the application column 6, line 10 - line 17; figures 13-15 ---	1, 6-8, 10-15, 17-19, 22, 23, 29-32
X	US 3 719 168 A (KAZEE) 6 March 1973 (1973-03-06) abstract; figure 2 ---	48, 49
X	DE 81 474 C (RIENER ET AL.) 11 June 1895 (1895-06-11) claim; figures 1-3 ---	48, 49
A	GB 2 091 134 A (BRITT TECH CORPORATION) 28 July 1982 (1982-07-28) ---	
A	FR 2 662 378 A (CHAMBRE DE COMMERCE ET D'INDUSTRIE DE BAYONNE) 29 November 1991 (1991-11-29) -----	

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IL 02/00638

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.:

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: 1-47

A vehicle with a mechanism for attachment to a surface

2. Claims: 48-52h

A liquid spraying device

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/IL 02/00638

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 221543	A	13-05-1987	CA 1268007 A1 DE 3680291 D1 EP 0221543 A2 JP 2117376 C JP 8018247 B JP 63150147 A KR 9410351 B1 US 4809383 A US 4860400 A US 4688289 A	24-04-1990 22-08-1991 13-05-1987 06-12-1996 28-02-1996 22-06-1988 22-10-1994 07-03-1989 29-08-1989 25-08-1987
US 4800607	A	31-01-1989	NONE	
EP 878381	A	18-11-1998	JP 10151586 A EP 0878381 A1 US 6011455 A WO 9822330 A1	09-06-1998 18-11-1998 04-01-2000 28-05-1998
US 4029164	A	14-06-1977	NONE	
WO 0010864	A	02-03-2000	JP 2000062659 A WO 0010864 A1	29-02-2000 02-03-2000
US 4971591	A	20-11-1990	NONE	
US 3719168	A	06-03-1973	NONE	
DE 81474	C		NONE	
GB 2091134	A	28-07-1982	US 4408720 A AU 541300 B2 AU 7850881 A BE 891006 A1 CA 1195962 A1 DE 3145109 A1 DK 3182 A FR 2497692 A1 IT 1210599 B JP 57122960 A LU 83874 A1 NL 8105028 A NZ 198725 A PT 74284 A , B SE 8200150 A ZA 8107291 A	11-10-1983 03-01-1985 22-07-1982 01-03-1982 29-10-1985 29-07-1982 16-07-1982 16-07-1982 14-09-1989 31-07-1982 07-05-1982 02-08-1982 14-12-1984 01-02-1982 16-07-1982 29-12-1982
FR 2662378	A	29-11-1991	FR 2662378 A1	29-11-1991