



- (51) **International Patent Classification:**
E04B 1/76 (2006.01) *B05B 13/04* (2006.01)
B05B 13/00 (2006.01)
- (21) **International Application Number:**
PCT/GB2014/051604
- (22) **International Filing Date:**
23 May 2014 (23.05.2014)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**
1309324.0 23 May 2013 (23.05.2013) GB
1311928.4 3 July 2013 (03.07.2013) GB
- (71) **Applicant:** **Q-BOT LIMITED** [GB/GB]; Riverside Business Park, Bendon Valley, Wandsworth, London, Greater London SW18 4UQ (GB).
- (72) **Inventors:** **LIPINSKI, Tomasz B**; 38A Cumberland Rd, Hanwell, Greater London, W7 2EB (GB). **CHILDS, Peter RN**; 15 Princes Square, Hove, Sussex, BN3 4GE (GB). **HOLLOWAY, Mathew**; 87A Goodrich Road, East Dulwich, Greater London, SE22 0EP (GB).
- (74) **Agent:** **HGF Limited**; 140 London Wall, London, Greater London, EC2Y 5DN (GB).
- (81) **Designated States** (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM,

AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

- (84) **Designated States** (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

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:**
15 January 2015

(54) **Title:** METHOD OF COVERING A SURFACE OF A BUILDING AND ROBOT THEREFOR

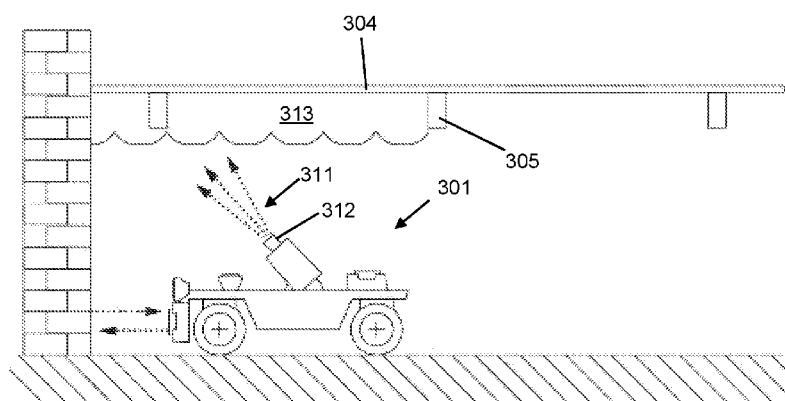


FIG. 32

(57) **Abstract:** A method of covering a surface of a building, the method comprising spraying an expandable foam material onto the surface and allowing the foam material to solidify whereby to form a covering of the surface and a robotic vehicle configured to carry out the method.

INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2014/051604

A. CLASSIFICATION OF SUBJECT MATTER
INV. E04B1/76 B05B13/00 B05B13/04
ADD.

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)
E04F E04B B05B

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

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 1 300 352 A (SHELL INT RESEARCH [NL]) 20 December 1972 (1972-12-20) page 1, line 11 - line 15 page 1, line 40 - line 77 page 2, line 20 - line 81 figures -----	1,2,7,9, 16-19
X	GB 2 062 049 A (DEANE D) 20 May 1981 (1981-05-20) page 1, line 42 - line 48 page 1, line 68 - line 80 page 2, line 27 - line 114 figures -----	1-10
X	US 4 210 098 A (HARRISON DAVID V [GB] ET AL) 1 July 1980 (1980-07-01) column 2, line 5 - line 24 ----- -/-	1-3,5,6, 9,11-13

☒ 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 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

"&" document member of the same patent family

Date of the actual completion of the international search

18 November 2014

Date of mailing of the international search report

27/11/2014

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040,
Fax: (+31-70) 340-3016

Authorized officer

Schork, Willi

INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2014/051604

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 93/03854 A1 (SPERBER HENRY [US]) 4 March 1993 (1993-03-04) page 7, line 22 - page 8, line 27; figures 4-7 -----	1-3,8,10
X	US 4 167 151 A (MURAOKA MAMORU ET AL) 11 September 1979 (1979-09-11) column 1, line 13 - line 15 column 2, line 8 - line 27 figures 1,4 -----	1,2,8
A	US 6 000 484 A (ZORETICH CARL [US] ET AL) 14 December 1999 (1999-12-14) figures 6, 7 -----	20-26
A	US 6 126 766 A (HUNTER JR JOHN P [US]) 3 October 2000 (2000-10-03) figure 2 -----	20-26
A	US 2004/140379 A1 (DEXTER SHANE [US]) 22 July 2004 (2004-07-22) figure 4 -----	20-26

INTERNATIONAL SEARCH REPORT

International application No.
PCT/GB2014/051604

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.:

1-13, 16-26
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 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.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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

1. claims: 1-13, 16-19

to enable thin finishing layers of coating material as covering

2. claims: 14, 15, 27-29

to monitor the thickness of the layer foam sprayed by a robotic device

3. claims: 20-26

to improve the possibilities of a robotic device for spraying foam in a surface to reach all the parts of said surface, independently of the robot's base surface

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/GB2014/051604

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
GB 1300352	A	20-12-1972	DE 2218756 A1	02-11-1972
			FR 2136494 A5	22-12-1972
			GB 1300352 A	20-12-1972
			IT 954714 B	15-09-1973
			JP S5551630 B1	25-12-1980
			NL 7205168 A	24-10-1972
			NO 136446 B	31-05-1977
			SE 383985 B	12-04-1976

GB 2062049	A	20-05-1981	NONE	

US 4210098	A	01-07-1980	CA 1115046 A1	29-12-1981
			DE 2844153 A1	19-04-1979
			FR 2405755 A1	11-05-1979
			GB 1552885 A	19-09-1979
			JP S5462243 A	19-05-1979
			NL 7810172 A	18-04-1979
			NO 783419 A	18-04-1979
			SE 7810575 A	12-04-1979
			US 4210098 A	01-07-1980

WO 9303854	A1	04-03-1993	AU 2460492 A	16-03-1993
			CA 2109848 A1	04-03-1993
			JP H06509747 A	02-11-1994
			US 5421922 A	06-06-1995
			WO 9303854 A1	04-03-1993

US 4167151	A	11-09-1979	NONE	

US 6000484	A	14-12-1999	NONE	

US 6126766	A	03-10-2000	NONE	

US 2004140379	A1	22-07-2004	CN 1488448 A	14-04-2004
			US 2004140379 A1	22-07-2004
