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(81) Designated States (unless otherwise indicated, for every

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Declarations under Rule 4.17:

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))

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))

[Continued on next page]

(54) Title: PLASTIC SURFACES HAVING SURFACE STRUCTURES AND METHODS OF MAKING THE SAME

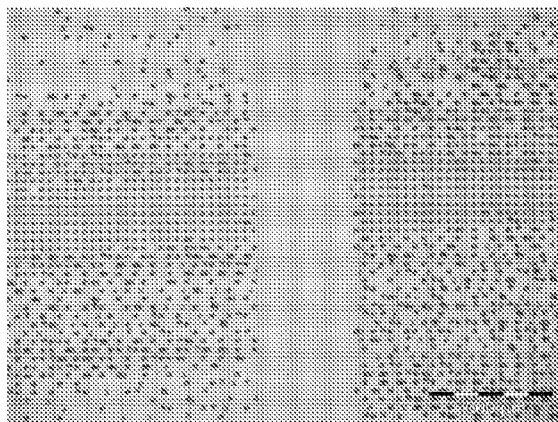


FIG. 1A

(57) Abstract: Various embodiments of the present invention relate to plastic surfaces having surface structures and methods of making the same. In various embodiments, the present invention provides a method of forming surface structures on a plastic. The method can include contacting a flowable resin composition to a surface of a metal form including surface structures on the contacted surface thereof, the surface structures having at least one dimension approximately parallel to the metal surface of about 100 nm to about 1 mm, to provide a solid plastic including corresponding surface structures on a surface thereof.



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23 February 2017

INTERNATIONAL SEARCH REPORT

International application No
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A. CLASSIFICATION OF SUBJECT MATTER
 INV. B23K26/402 B29C33/38 B29C33/42 B29C37/00
 ADD. B29C45/37

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)
 B23K B29C

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	US 4 923 608 A (FLOTTMANN THOMAS [DE] ET AL) 8 May 1990 (1990-05-08) column 1, line 8 - line 17 column 2, line 58 - line 66 column 3, line 6 - line 9 column 3, line 43 - line 68 column 4, line 30 - line 35 column 5, line 15 - line 20 example 2 claim 1 figures 3a,3b,4-6a	1,9-20
A	CN 102 799 063 B (UNIV BEIJING SCIENCE & TECH) 20 November 2013 (2013-11-20) the whole document	1,9-20
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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 11 January 2017	Date of mailing of the international search report 19/01/2017
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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 Fageot, Philippe
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INTERNATIONAL SEARCH REPORT

International 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.
A	EP 1 068 945 A2 (MATSUSHITA ELECTRIC IND CO LTD [JP]) 17 January 2001 (2001-01-17) paragraph [0030] claim 5 figure 1	1
X	----- US 2003/224144 A1 (KING VINCENT W [US] ET AL) 4 December 2003 (2003-12-04) paragraph [0001] - paragraph [0003] paragraph [0021] paragraph [0026] - paragraph [0027] paragraph [0032] - paragraph [0036] paragraph [0042] figures 1A-8,13A,13B	2,7-12
X	----- WO 2013/003373 A1 (3M INNOVATIVE PROPERTIES CO [US]; BOMMARITO G MARCO [US]; SCHOLZ MATTH) 3 January 2013 (2013-01-03)	2,9-12, 16-19
Y	page 1, line 4 - line 11 page 3, line 18 - line 31 page 8, line 8 - line 28 page 9, line 10 - line 24 page 11, line 18 - page 12, line 35 page 16, line 1 - line 33 page 18, line 4 - line 28 figures 1a-2,5a,6b,7a	3-6, 13-15,20
Y	----- US 2013/140744 A1 (NAKAI YUSUKE [JP] ET AL) 6 June 2013 (2013-06-06) paragraph [0030] - paragraph [0038] paragraph [0070] - paragraph [0073] paragraph [0185] - paragraph [0191] paragraph [0208] - paragraph [0209] figures 1-3	3-6, 13-15,20

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB2016/053392

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.:

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, 9-20

Claims 1 and 9 - 20 (when dependent on claim 1): a method of forming surface structures on a plastic, the method comprising treating a surface of a solid plastic with laser interference patterning and a lighting product.

2. claims: 2-20

Claims 2 - 20 (when dependent on claim 2): a method of forming surface structures on a plastic, the method comprising contacting a flowable resin composition to a surface of a metal form and a lighting product.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No PCT/IB2016/053392

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4923608	A	08-05-1990	DE 3742770 A1 29-06-1989 EP 0325752 A1 02-08-1989 JP H0243927 A 14-02-1990 US 4923608 A 08-05-1990

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