Title: POST-FIRE PRINT FIXTURING OF LOW TEMPERATURE CO-FIRED CERAMIC SUBSTRATES

Abstract: The print head (28) and screen assembly of a semi-automatic screen printer is raised above its normal printing height and selective attachment of several different fixtures (46, 48, 30) on the nest plate (14) for holding the substrate in a desired position during a screen printing operation for printing gold on LTCC substrates.

Published:
— with international search report
— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

(88) Date of publication of the international search report: 15 June 2006

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.
**INTERNATIONAL SEARCH REPORT**

**A. CLASSIFICATION OF SUBJECT MATTER**

INV. B41F15/08 H05K3/12 H05K13/00

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)
B41F H05K

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

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>US 5 694 843 A (CHEN ET AL) 9 December 1997 (1997-12-09) column 1, lines 28-65 column 2, lines 16-22 figure 1</td>
<td>1,31</td>
</tr>
<tr>
<td>X</td>
<td>US 2 963 964 A (KLUMP WARREN L) 13 December 1969 (1960-12-13) column 1, line 55 - column 2, line 2</td>
<td>1,31</td>
</tr>
<tr>
<td>X</td>
<td>US 4 216 717 A (HALL, CHARLES E ET AL) 12 August 1980 (1980-08-12) column 1, lines 4-8, 28-35 column 3, lines 44-61</td>
<td>1,4, 5, 31</td>
</tr>
<tr>
<td>A</td>
<td>US 2003/131742 A1 (KANDA SHINJI) 17 July 2003 (2003-07-17) paragraph [0054]; figure 11</td>
<td>1,31</td>
</tr>
</tbody>
</table>

Further documents are listed in the continuation of Box C.

See patent family annex.

- **X** 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 claims or which is cited to establish the publication date of another document 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**

2 February 2006

**Date of mailing of the international search report**

20.04.2006

**Name and mailing address of the ISA/V**

European Patent Office, P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk Tel.: (31-70) 340-3040, Tx.: 31 651 epo nl Fax: (31-70) 340-3016

Authorized officer:

Curt, D.
<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>GB 1 275 750 A (JOHN FRANK BOWER) 24 May 1972 (1972-05-24) page 1, lines 58-83</td>
<td>1,31</td>
</tr>
</tbody>
</table>
INTERNATIONAL SEARCH REPORT

Box 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 8.4(a).

Box 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 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.:

1-20, 31-33

Remark on Protest

☐ The additional search fees were accompanied by the applicant’s protest.

☐ No protest accompanied the payment of additional search fees.

Form: PCT/KSA/210 (continuation of first sheet (2)) (January 2004)
This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-20,31-33
   Screenprinting apparatus with a set of spacers
   
2. claims: 21-24,34
   Apparatus for printing on the side of ceramic material
   
3. claims: 25-27,35
   Apparatus for printing on top and bottom surface of laminate assembly
   
4. claims: 28-30,36
   Apparatus with fixture for green ceramic tape
<table>
<thead>
<tr>
<th>Patent document cited in search report</th>
<th>Publication date</th>
<th>Patent family member(s)</th>
<th>Publication date</th>
</tr>
</thead>
<tbody>
<tr>
<td>US 5694843 A</td>
<td>09-12-1997</td>
<td>NONE</td>
<td></td>
</tr>
<tr>
<td>US 2963964 A</td>
<td>13-12-1960</td>
<td>NONE</td>
<td></td>
</tr>
<tr>
<td>US 4216717 A</td>
<td>12-08-1980</td>
<td>GB 1599182 A</td>
<td>30-09-1981</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EP 1344647 A1</td>
<td>17-09-2003</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HK 1056341 A1</td>
<td>24-03-2006</td>
</tr>
<tr>
<td></td>
<td></td>
<td>JP 2003205595 A</td>
<td>22-07-2003</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TW 583095 B</td>
<td>11-04-2004</td>
</tr>
<tr>
<td>GB 1275750 A</td>
<td>24-05-1972</td>
<td>NONE</td>
<td></td>
</tr>
</tbody>
</table>