Abstract: A vapor phase rework station and methods for reworking a circuit board to remove and replace components soldered thereto. A nozzle is disposed over the target component and vapor is communicated from a vapor source to the interior volume of the nozzle. As the vapor heats the solder holding the target component to the circuit board, the vapor condenses within the interior volume. The condensed vapor is suctioned from the interior volume of the nozzle. A component gripping tool grips the target component and withdraws it from the circuit board. The reverse operation is performed to reflow the solder to attach a new component to the circuit board in the area from which the target component was previously removed.
### A - CLASSIFICATION OF SUBJECT MATTER

**IPC(8) - B23K 1/01 8 (2009.01)**

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(8) - B23K 1/01 8 (2009.01)**

USPC - 228/19, 119, 191, 264

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)

USPTO EAST System (US-PGPUB, USPAT, USOCR, FPRS, EPO, JPO, DERWENT), PatBase

### 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>Y</td>
<td>US 6,499,644 B2 (COX et al) 31 December 2002 (31 12 2002) entire document</td>
<td>1-6, 8-1 1</td>
</tr>
<tr>
<td>Y</td>
<td>US 5,102,082 A (GLOVATSKY et al) 07 April 1992 (07 04 1992) entire document</td>
<td>1-6, 8-1 1</td>
</tr>
<tr>
<td>A</td>
<td>US 4,580,716 A (BARRESI et al) 08 April 1986 (08 04 1986) entire document</td>
<td>1-13</td>
</tr>
</tbody>
</table>

Further documents are listed in the continuation of Box C

<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>
</table>

- * Special categories of cued 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

Date of the actual completion of the international search

26 May 2009

Date of mailing of the international search report

04 JUN 2009

Name and mailing address of the ISA/US

Mail Stop PCT, Attn I SA/US, Commissioner for Patents

P.O. Box 1450, Alexandria, Virginia 22313-1450

Facsimile No 571-273-3201

Form PCT/ISA/2 10 (second sheet) (April 2004)