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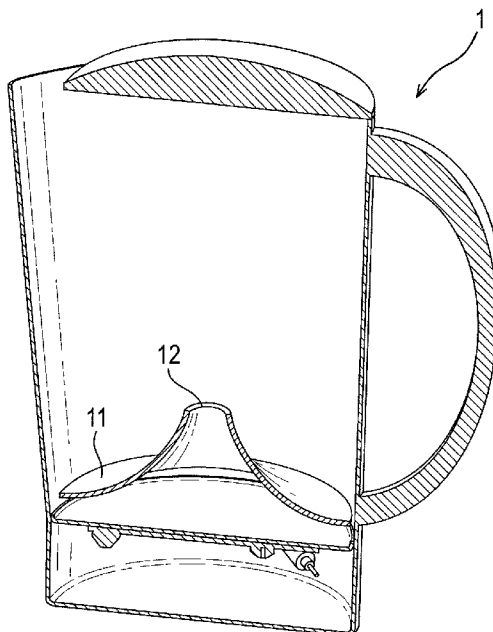
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- (72) **Inventors; and**
- (75) **Inventors/Applicants** (for US only): **WRIGHT, Peter, Hallam** [GB/GB]; Otter Controls Ltd, Hardwick Square

(54) **Title:** ELECTRIC WATERHEATER



(57) **Abstract:** An electric water heater (1) comprises an element plate (5) with an electric heating element (6) on the underside and a heat diffusion layer (7) between the heating element and the element plate, wherein the heat diffusion layer is substantially thicker than the element plate so as to reduce noise generated while heating water. The element plate may have a noise reduction surface coating- (9) and/or treatment (10), the treatment preferably comprising surface roughening. The element plate may be incorporated in a vessel including an inhibitor (11) for inhibiting noise.



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INTERNATIONAL SEARCH REPORT

International application No
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A. CLASSIFICATION OF SUBJECT MATTER INV. A47027/21				
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) A47J				
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 , WPI Data, PAJ				
C. DOCUMENTS CONSIDERED TO BE RELEVANT				
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.		
X	NL 1 015 204 C2 (NEDAP NV [NL]) 19 November 2001 (2001-11-19)	35, 36, 39-43, 47, 49-51, 59, 60, 63-71, 73, 74		
Y	page 3, line 7 - page 6, line 6; figures	1-19, 72, 75		
Y	GB 2 386 532 A (STRIX LTD) 17 September 2003 (2003-09-17) cited in the application page 2, line 8 - page 8, line 24; figures	1-19, 72, 75		
----- V -				
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;"><input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C.</td> <td style="width: 50%; border: none;"><input checked="" type="checkbox"/> See patent family annex.</td> </tr> </table>			<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C.	<input checked="" type="checkbox"/> See patent family annex.
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C.	<input checked="" type="checkbox"/> See patent family annex.			
* Special categories of cited documents :				
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;"> "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 </td> <td style="width: 50%; border: none;"> "T¹" 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 "X¹" 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 "Y¹" 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 </td> </tr> </table>			"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 ¹ " 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 ¹ " 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 ¹ " 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
"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 ¹ " 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 ¹ " 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 ¹ " 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 <p style="text-align: center; font-size: 1.2em;">19 March 2008</p>		Date of mailing of the international search report <p style="text-align: center;">15/07/2008</p>		
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016		Authorized officer <p style="text-align: center; font-size: 1.2em;">De Terlizzi , Marino</p>		

INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2007/004797

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP 1 566 123 A (STRIX LTD [GB]) 24 August 2005 (2005-08-24) cited in the application paragraphs [0009] - [0051]; figures -----	18,19
X	EP 1 651 009 A (STRIX LTD [GB]) 26 April 2006 (2006-04-26) paragraphs [0051] - [0085]; figure 7a -----	1,4,5
X	FR 985 184 A (HOFFMAN H. ET AL.) 16 July 1951 (1951-07-16) the whole document -----	69

INTERNATIONAL SEARCH REPORT

International application No.
PCT/GB2007/004797

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 allsearchable 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.:

see annex

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: 1-19,35-75

An electric heating vessel comprising a noise inhibitor or structure arranged to promote coalescence of rising steam bubbles and a method of reducing heating noise in an electric heating vessel by providing such structure

2. claims: 20-34

An electric water heater comprising an element plate contacting water on the upper side and contacting an heating element and thermal sensor on the lower side, the upper side of the element plate having a noise reduction coating in the area above the heating element and sensor, and being free of coating in another area

3. claims: 76-87

An electric water heater comprising an element plate contacting water on the upper side and in thermal contact with an heating element on the underside, and a heat diffusion layer for diffusing heat from the heating element to the underside of the element plate, the heat diffusion layer being thicker than the element plate

4. claims: 88-112

An electric water heater comprising an element plate contacting water on the upper side and in thermal contact with an heating element on the underside, the upper side being roughened by a surface treatment

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/GB2007/004797

Patent document cited in search report	Publication date	Publication date	Patent family member(s)	Publication date
NL 1015204	C 2	19-11-2001	NONE	
GB 2386532	A	17-09-2003	NONE	
EP 1566123	A	24-08-2005	CN 1672619 A GB 2411332 A	28-09-2005 24-08-2005
EP 1651009	A	26-04-2006	NONE	
FR 985184	A	16-07-1951	NONE	