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[Continued on next page]

(54) Title: USER INTERFACE FOR WHITE GOODS AND ASSOCIATED MULTI-CHANNEL PROXIMITY SENSORS

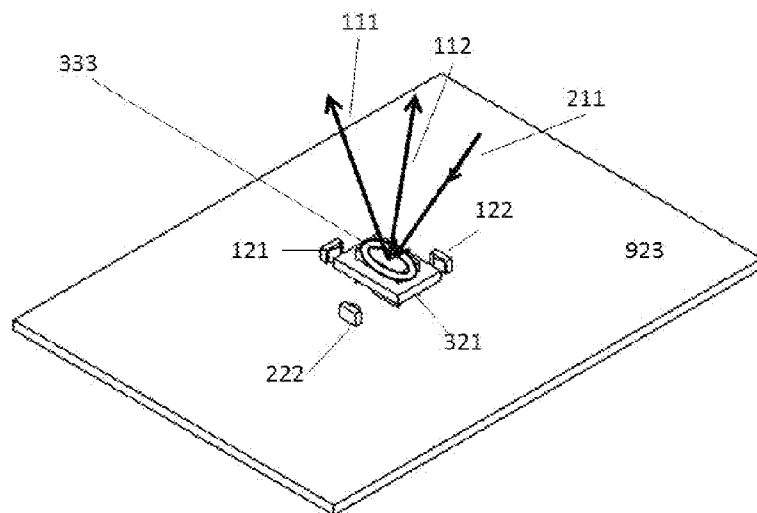


FIG. 30

(57) Abstract: A touch sensor including a housing, a light guide mounted in the housing, a light guide including an aperture through which light exits and enters the light guide, and an inner surface facing the interior of the housing, the sensor further includes two light emitters mounted in the housing for emitting light beams into the light guide that exit the aperture at diverging angles and a light receiver mounted in the housing for receiving reflected light beams entering the aperture at an angle of incidence different than the diverging angles.



TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

— *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))*

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2014/032109

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - F24C 15/18 (2014.01)

USPC - 345/175

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) - H05B 3/20, 5/00; F24C 7/00, 08, 15/00, 02, 10, 18; G06F 3/00, 01, 02, 03, 048, 0488; H03K 17/94, 945, 96 (2014.01)

USPC - 99/325, 326, 331; 126/1R, 19R, 58, 211, 217, 213, 190; 219/220, 385, 443.1, 446.1, 447.1; 345/173, 175; 200/52R, 61.02; 250/200, 215, 216, 221, 578.1

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

CPC - H05B 3/20, 5/00; F24C 7/00, 08, 082, 083, 086, 15/00, 02, 10, 18; G06F 3/00, 01, 02, 03, 048, 0488; H03K 17/94, 945, 96, 9627, 9631, 9638 (2014.09)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

PatBase, Google Patents, Google Scholar

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y	US 2009/0173730 A1 (BAIER et al) 09 July 2009 (09.07.2009) entire document	1 --- 2-13
X	US 6,722,142 B1 (PAGEL) 20 April 2004 (20.04.2004) entire document	16, 17
X --- Y	US 2009/0039068 A1 (BOUTWELL) 12 February 2009 (12.02.2009) entire document	18, 24 --- 8, 19-23
X	US 2005/0252754 A1 (ARNOLD) 17 November 2005 (17.11.2005) entire document	29-42
Y	US 5,658,478 A (ROESCHEL et al) 19 August 1997 (19.08.1997) entire document	2-6
Y	US 2006/0038793 A1 (PHILIPP) 23 February 2006 (23.02.2006) entire document	4-6
Y	US 2010/0182136 A1 (PRYOR) 22 July 2010 (22.07.2010) entire document	6
Y	US 2010/0147602 A1 (JUNG et al) 17 June 2010 (17.06.2010) entire document	7-13
Y	EP 2,189,727 A1 (FAEDO) 26 May 2010 (26.05.2010) entire document	7-13
Y	WO 2013/038293 A1 (GEURTS et al) 21 March 2013 (21.03.2013) entire document	11, 12
Y	US 2008/0236563 A1 (WILSDORF) 02 October 2008 (02.10.2008) entire document	19-23



Further documents are listed in the continuation of Box C.



* 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

19 September 2014

Date of mailing of the international search report

14 OCT 2014

Name and mailing address of the ISA/US

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2014/032109

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2006/0010890 A1 (FEINAUER et al) 19 January 2006 (19.01.2006) entire document	23
Y	US 2005/0029245 A1 (GEROLA et al) 10 February 2005 (10.02.2005) entire document	34, 35, 41, 42
Y	WO 2003/035961 A2 (BUKULMEZ et al) 01 May 2003 (01.05.2003) entire document	35, 42
A	US 2011/0253693 A1 (LYONS et al) 20 October 2011 (20.10.2011) entire document	1-13, 16-24, 29-42

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2014/032109

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 extra 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 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, 16-24, 29-42
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.

Continuation of Box III.

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I, claims 1-6, drawn to a cooktop; a surface to place pots; a plurality of heating elements and their corresponding control circuits; a plurality of sources of visible light.

Group II, claims 7-13, 16-24, drawn to a hollow for holding items; a door for opening and closing the hollow; a proximity sensor for detecting hand wave gestures.

Group III, claims 14-15, drawn to a stationary appliance housing having a socket for a mobile appliance control hub; a display panel mounted on an inner wall of the socket; a mobile housing configured to be inserted into the socket and removed therefrom; circuitry mounted in the mobile housing for wireless communication with the stationary appliance; a touchscreen mounted in the mobile housing; a rechargeable battery mounted in the mobile housing.

Group IV, claims 25-28, drawn to a touch sensitive panel on which a plurality of icons representing different settings are displayed, and comprising a demarcated area separate from the icons; a processor connected with the panel, operative to select an icon's setting in response to detecting a finger gliding from that icon into the demarcated area.

Group V, claims 29-42, drawn to a touch sensor having a housing; a light guide having an aperture; an inner surface facing the interior of the housing; two light emitters mounted in the housing; a light receiver mounted in the housing.

The inventions listed as Groups I, II, III, IV and V do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: the special technical feature of the Group I invention: a cooktop; a surface to place pots; a plurality of heating elements and their corresponding control circuits; a plurality of sources of visible light as claimed therein is not present in the invention of Groups II, III, IV or V. The special technical feature of the Group II invention: a hollow for holding items; a door for opening and closing the hollow; a proximity sensor for detecting hand wave gestures as claimed therein is not present in the invention of Groups I, III, IV or V. The special technical feature of the Group III invention: a stationary appliance housing having a socket for a mobile appliance control hub; a display panel mounted on an inner wall of the socket; a mobile housing configured to be inserted into the socket and removed therefrom; circuitry mounted in the mobile housing for wireless communication with the stationary appliance; a touchscreen mounted in the mobile housing; a rechargeable battery mounted in the mobile housing as claimed therein is not present in the invention of Groups I, II, IV or V. The special technical feature of the Group IV invention: a touch sensitive panel on which a plurality of icons representing different settings are displayed, and comprising a demarcated area separate from the icons; a processor connected with the panel, operative to select an icon's setting in response to detecting a finger gliding from that icon into the demarcated area as claimed therein is not present in the invention of Groups I, II, III or V. The special technical feature of the Group V invention: a touch sensor having a housing; a light guide having an aperture; an inner surface facing the interior of the housing; two light emitters mounted in the housing; a light receiver mounted in the housing as claimed therein is not present in the invention of Groups I, II, III or IV.

Groups I, II, III, IV and V lack unity of invention because even though the inventions of these groups require the technical feature of proximity sensors having infrared light emitters and infrared light receivers; and a processor, this technical feature is not a special technical feature as it does not make a contribution over the prior art. Specifically, US 2011/0253693 A1 (LYONS et al) 20 October 2011 (20.10.2011).

Lyons et al. teach proximity sensors having infrared light emitters and infrared light receivers (figure 1, paragraph 59); and a processor (figure 1).

Since none of the special technical features of the Group I, II, III, IV or V inventions are found in more than one of the inventions, unity of invention is lacking.