



(51) International Patent Classification:

H04B 1/3827 (2015.01) A47J 36/32 (2006.01)
F24C 7/08 (2006.01)

(21) International Application Number:

PCT/EP2020/050705

(22) International Filing Date:

13 January 2020 (13.01.2020)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

201910058181.6 22 January 2019 (22.01.2019) CN

(71) Applicant: **ELECTROLUX APPLIANCES AKTIEBOLAG** [SE/SE]; S:t Göransgatan 143, 105 45 Stockholm (SE).

(72) Inventors: **CHEN, Songliang**; Electrolux(Hangzhou) Domestic Appliances Co., Ltd #950, No. 18 Road, Economical & Technological Development Area, Hangzhou, Zhejiang 310018 (CN). **WU, Peng**; Electrolux(Hangzhou) Domestic Appliances Co., Ltd #950, No. 18 Road, Economical & Technological Development Area, Hangzhou, Zhe-

jiang 310018 (CN). **KAISER, Kersten**; Electrolux Rothenburg GmbH Factory and Development Bodelschwingstr. 1, 91541 Rothenburg ob der Tauber (DE).

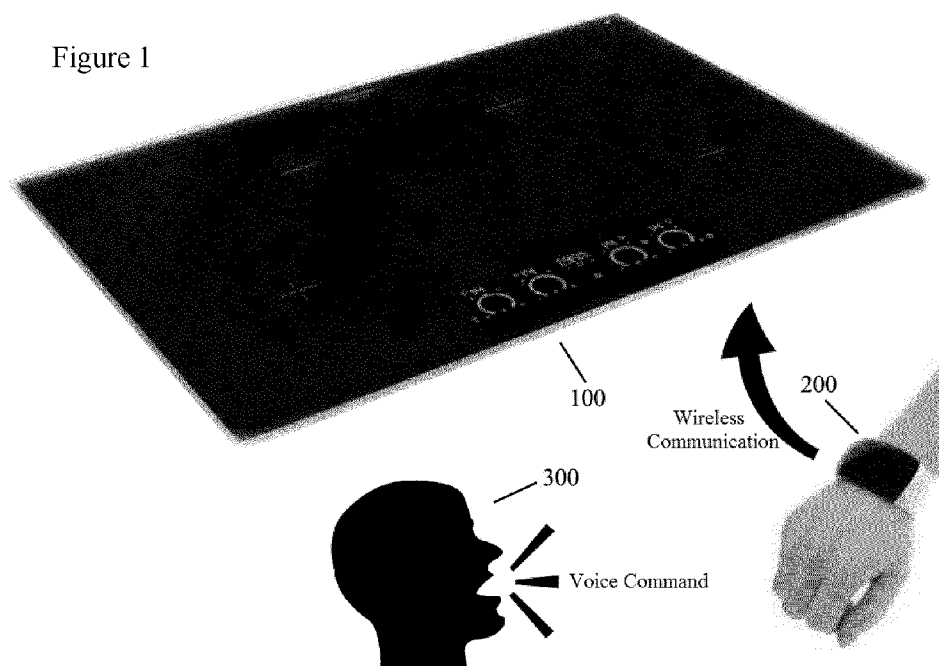
(74) Agent: **ELECTROLUX GROUP PATENTS**; S:t Göransgatan 143, 105 45 Stockholm (SE).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV,

(54) Title: KITCHEN EQUIPMENT AND METHOD FOR OPERATING THE SAME

Figure 1



(57) Abstract: A kitchen equipment and a method for operating the kitchen equipment are provided. The kitchen equipment includes: a communication unit configured to receive a signal from a wearable device worn by a user via wireless communication; a processing unit configured to process the received signal to determine an operation to be performed; and an execution unit configured to perform the determined operation.

MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM,
TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW,
KM, ML, MR, NE, SN, TD, TG).

Published:

— *with international search report (Art. 21(3))*

KITCHEN EQUIPMENT AND METHOD FOR OPERATING THE SAME

FIELD

5 **[0001]** The present disclosure relates to a kitchen equipment and a method for operating the kitchen equipment, and in particular to a kitchen equipment which has communication function and thus facilitates operation of a user and a method for operating the kitchen equipment.

BACKGROUND

10 **[0002]** When cooking with a conventional hob, a user needs to manually operate elements such as button or knob provided on the hob to perform operations such as turning up/down power or turning off power. However, when both hands of the user are occupied, for example, when the user holds a pan in one hand and holds a spatula for stirring in the other hand, the user cannot operate the hob with hand, for example, to turn up or turn down power. This
15 causes inconvenience to the user in cooking.

[0003] Therefore, it is desired to provide a solution that may enable the user to control the hob or other kitchen equipments without operations by hands.

SUMMARY OF INVENTION

20 **[0004]** In view of the above technical problem, a kitchen equipment is provided according to the present disclosure. The kitchen equipment includes: a communication unit configured to receive a signal from a wearable device worn by a user via wireless communication; a processing unit configured to process the received signal to determine an operation to be performed; and an execution unit configured to perform the determined operation.

25 **[0005]** Besides, a system for operating a kitchen equipment is provided according to the present disclosure. The system includes a wearable device worn by a user and the kitchen equipment. The wearable device includes: an acquisition unit configured to acquire a signal from the user; a processing unit configured to process the acquired signal to determine an operation to be performed by the kitchen equipment and generate a signal indicating the
30 operation; and a transmitting unit configured to transmit the signal indicating the operation to

the kitchen equipment via wireless communication. The kitchen equipment includes: a receiving unit configured to receive the signal indicating the operation from the wearable device via the wireless communication; and an execution unit configured to perform the operation according to the received signal.

5 **[0006]** Besides, a method performed by a kitchen equipment is provided according to the present disclosure. The method includes: receiving a signal from a wearable device worn by a user via wireless communication; processing the received signal to determine an operation to be performed; and performing the determined operation. Further, the signal originates from the user and is forwarded by the wearable device to the kitchen equipment.

10 **[0007]** In addition, a method for operating a kitchen equipment is provided according to the present disclosure. The method includes: acquiring, by a wearable device worn by a user, a signal from the user; processing, by the wearable device, the acquired signal to determine an operation to be performed by the kitchen equipment; generating, by the wearable device, a signal indicating the operation; transmitting, by the wearable device, the signal indicating the
15 operation to the kitchen equipment via wireless communication; and performing, by the kitchen equipment, the operation according to the received signal.

BRIEF DESCRIPTION OF THE DRAWINGS

20 **[0008]** Figure 1 is a schematic diagram of a scene to which the present disclosure is applied;

[0009] Figure 2 is a flowchart of a process according to a first embodiment of the present disclosure;

[0010] Figures 3A to 3B are block diagrams showing schematic configurations of a kitchen equipment and a wearable device according to the first embodiment of the present disclosure;

25 **[0011]** Figure 4 is a flowchart of a process according to a second embodiment of the present disclosure; and

[0012] Figures 5A to 5B are block diagrams showing schematic configurations of a kitchen equipment and a wearable device according to the second embodiment of the present disclosure.

DETAILED DESCRIPTION OF EMBODIMENTS

[0013] Figure 1 shows a schematic diagram of a scene to which the present disclosure is applied. As shown in Figure 1, a user 300 may issue operation command to a wearable device 200 worn by the user 300 during cooking, such as a voice command for turning up power, turning down power, turning off power, setting timing or recommending recipe. Although the wearable device 200 is shown in Figure 1 as a wristband, the wearable device 200 may be implemented in different forms such as smart watch, smart glasses, smart ring, smart necklace and the like that may be worn on different body parts of the user 300.

[0014] The kitchen equipment 100 may wirelessly communicate with the wearable device 200, via for example Bluetooth communication, Zigbee communication, Wireless Fidelity (WiFi) communication and the like. In this case, the wearable device 200 wirelessly transmits a signal indicating the operation command of the user 300 to the kitchen equipment 100. Then, the kitchen equipment 100 may perform operation such as turning up or down power according to the received signal. For explanation purposes, the kitchen equipment 100 is shown in a form of hob in Figure 1, and the present disclosure will be described by taking the hob as an example of the kitchen equipment hereinafter. However, it should be understood that the present disclosure may be applied to the kitchen equipments other than the hob.

[0015] In the way as mentioned above, the user 300 may operate the hob 100 without hands, thereby avoiding inconvenience in operating the hob 100 when both hands are occupied and greatly increasing operating flexibility of the user 300.

[0016] Two implementations of the present disclosure will be described below. Figure 2 shows a flowchart of a process according to a first embodiment of the present disclosure.

[0017] As shown in Figure 2, in step S201, the wearable device 200 acquires a command signal from the user 300, such as a voice command signal. In step S202, the wearable device 200 performs analog-to-digital conversion on the acquired voice signal, and transmits the converted digital signal to the hob 100 via wireless communication such as Bluetooth, Zigbee or WiFi communications. It should be noted that, the wireless communication between the wearable device 200 and the hob 100 is not limited in the present disclosure, and the communication can be implemented by those skilled in the art with any appropriate wireless communication technology.

[0018] In step S203, the hob 100 determines the operation required by the user 300 by processing the received digital signal. As an example, the hob 100 may determine content of the voice command of the user 300 based on the received digital signal by using voice recognition technology, and then determine the operation corresponding to the content of the command. It should be noted that, the operation of step S203 is not limited in the present disclosure, and may be implemented by those skilled in the art with any known technology.

[0019] In step S204, the hob 100 performs the operation determined in step S203. For example, the operation may include turning up power, turning down power, turning off power, setting timing, recommending recipe or cooking method, and the like.

[0020] In the way as mentioned above, even when both hands of the user 300 are occupied during cooking, the user 300 can easily control the hob 100 via the wearable device 200 by the voice command.

[0021] Figures 3A and 3B respectively shows schematic configurations of the hob 100 and the wearable device 200 according to the first embodiment.

[0022] As shown in Figure 3A, the hob 100 includes a communication unit 111, a processing unit 121 and an execution unit 131. It should be noted that, in order not to make the gist of the present disclosure obscure, the same configurations as those of the conventional hob (such as manually-operated knob or button, and heating element) are omitted in Figure 3A.

[0023] The communication unit 111 is configured to perform wireless communication with the wearable device 200. For example, the communication unit 111 may be a communication module capable of performing Bluetooth communication, Zigbee communication or WiFi communication and the like.

[0024] The processing unit 121 is configured to perform various processes to be performed by the hob 100, such as the processing in step S203. The processing unit 121 may be implemented as a processor such as central processing unit (CPU), microprocessor and the like.

[0025] The execution unit 131 is configured to perform the corresponding operation according to the processing result of the processing unit 121. For example, the execution unit 131 may perform the operation of turning up power when the processing unit 121 determines

that the user 300 wants to turn up the power. When the processing unit 121 determines that the user 300 requires a recommended recipe, the execution unit 131 may audibly or visually output the recommended recipe or cooking method to the user 300. In this case, the execution unit 131 may be implemented as display or speaker for example.

5 **[0026]** In addition, although not shown in Figure 3A, a storage unit may be further included in the hob 100. The storage unit is configured to store programs executed by the processing unit 121 or data necessary for the processing. The processing unit 121 performs the above processes by executing the programs. The storage unit may be implemented as hard disk, non-volatile memory, and the like, for example.

10 **[0027]** As shown in Figure 3B, the wearable device 200 includes an acquisition unit 211, a conversion unit 221 and a communication unit 231. Similar to Figure 3A, the same configurations as those of the conventional wearable device are omitted in Figure 3B.

15 **[0028]** The acquisition unit 211 is configured to acquire a command signal from the user 300, such as a voice command signal. The conversion unit 221 is configured to perform analog-to-digital conversion on the acquired command signal. The communication unit 231 is configured to transmit the converted digital signal to the hob 100 via wireless communication such as Bluetooth, Zigbee, WiFi and the like.

[0029] Figure 4 shows a flowchart of a process according to a second embodiment of the present disclosure.

20 **[0030]** As shown in Figure 4, in step S401, the wearable device 200 acquires a command signal from the user 300, such as a voice command signal.

25 **[0031]** In step S402, the wearable device 200 determines the operation which the user 300 wants the hob 100 to perform by processing the acquired signal. As an example, the wearable device 200 may determine content of the voice command of the user 300 from the acquired signal by using voice recognition technology, and then determine the operation of the hob 100 corresponding to the content of the command. Then, the wearable device 200 generates a signal indicating the determined operation. The operation of step S402 is not limited in the present disclosure, and may be implemented by those skilled in the art with any known technology.

30 **[0032]** In step S403, the wearable device 200 transmits the signal indicating the operation to

the hob 100 via wireless communication. In step S404, the hob 100 performs the corresponding operation according to the received signal, such as turning up power, turning down power, turning off power, setting timing, recommending recipe or cooking method, and the like.

5 **[0033]** Although not shown in Figure, 4, the hob 100 may further generate and transmit an acknowledgement signal to the wearable device 200 in step S404. The acknowledgement signal indicates that the hob 100 has received the signal indicating the operation. Then the wearable device 200 may inform the user 300 of the receipt of the acknowledgement signal from the hob 100, so that the user 300 can be aware of that the hob 100 has received his/her
10 command. In particular, the wearable device 200 may inform the user 300 in a perceivable manner, for example, via vibration.

[0034] In this way, the user 300 can easily control the hob 100 by voice without hands.

[0035] Figures 5A and 5B respectively show schematic configurations of the hob 100 and the wearable device 200 according to the second embodiment of the present disclosure.

15 **[0036]** As shown in Figure 5A, the hob 100 includes a communication unit 112 and an execution unit 122. Similar to Figure 3A, the same configurations as those of the conventional hob are omitted in Figure 5A.

[0037] The communication unit 112 is configured to wirelessly receive a signal from the wearable device 200, for example via Bluetooth, Zigbee or WiFi. The execution unit 122 is
20 configured to perform the corresponding operation according to the received signal, such as changing power, setting timing, audibly or visually outputting the recommended recipe or cooking method, and the like.

[0038] Besides, in the case that the hob 100 feedbacks the acknowledgement signal, the hob 100 further includes a feedback unit 132, which is configured to generate and transmit the
25 acknowledgement signal to the wearable device 200. The acknowledgement signal indicates that the hob 100 has received the signal indicating the operation.

[0039] As shown in Figure 5B, the wearable device 200 includes an acquisition unit 212, a processing unit 222 and a communication unit 232. Similar to Figure 3B, the same configurations as those of the conventional wearable device are omitted in Figure 5B.

30 **[0040]** The acquisition unit 212 is configured to acquire a command signal from the user

300, such as a voice command signal. The processing unit 222 is configured to perform various processes to be performed by the wearable device 200, such as the processing in step S402. The communication unit 232 is configured to transmit the signal indicating the operation which is generated by the processing unit 222 to the hob 100, via wireless communication such as Bluetooth, Zigbee, WiFi and the like.

[0041] Besides, in the case that the wearable device 200 receives the signal fed back from the hob 100, the wearable device 200 further includes an informing unit 242, which is configured to inform the user 300 of the receipt of the acknowledgement signal from the hob 100 in a perceivable manner, for example via vibration. This means that the hob 100 has received the command of the user 300.

[0042] In addition, although not shown in Figure 5B, a storage unit may be further included in the wearable device 200. The storage unit is configured to store programs executed by the processing unit 222 or data necessary for the processing.

[0043] The solutions of the present disclosure have been described in conjunction with embodiments. As compared with the conventional hob, the hob according to the present disclosure is capable of receiving the voice command from the user (for example, via the wearable device), and performing the corresponding operation according to the voice command. Therefore, convenience and flexibility in cooking operation of the user are greatly increased. Moreover, as compared with the conventional hob which is provided with only operable elements such as button or knob, the hob according to the present disclosure provides an extended user interface with which easy and convenient human-machine interaction can be achieved.

[0044] The solutions of the present disclosure have been described by taking the hob as an example of the kitchen equipment. However, the present disclosure is not limited to the hob, and may be applied to other kitchen equipments such as oven, microwave oven, electric cooker and the like, as long as they have the same or similar functions as the above-described hob 100.

[0045] The methods described in the above embodiments may be implemented by software, hardware or a combination thereof. Programs included in the software may be pre-stored in a storage medium arranged inside or outside a device. As an example, when being executed, the programs are written into a random-access memory (RAM) and executed by a processor (such

as CPU), so as to perform the processes described herein.

[0046] Devices and units described herein are only logical and do not strictly correspond to physical devices or entities. For example, the function of each unit described herein may be implemented by multiple physical entities, or the functions of multiple units described herein may be implemented by a single physical entity. In addition, features, components, elements, steps and the like described in an embodiment is not limited to the embodiment, and may be applied to other embodiments, for example by replacing specific features, components, elements, steps and the like in the other embodiments or combining with them.

[0047] The scope of the present disclosure is not limited to the embodiments and technical effects which have been described in detail in conjunction with the drawings. It should be understood by those skilled in the art that, various modifications or changes may be made to the embodiments discussed herein depending on design requirements and other factors, without deviating from the principle and spirit of the present disclosure. The scope of the present disclosure is defined by the appended claims or equivalents thereof.

[0048] Moreover, the present disclosure may be configured as follows.

(1) A kitchen equipment, including:

a communication unit configured to receive a signal from a wearable device worn by a user via wireless communication;

a processing unit configured to process the received signal to determine an operation to be performed; and

an execution unit configured to perform the determined operation.

(2) The kitchen equipment according to (1), where the received signal includes a voice signal, and the processing unit is further configured to:

perform voice recognition on the voice signal, to determine the operation corresponding to the voice signal.

(3) The kitchen equipment according to (2), where the received signal includes a digital signal indicating the operation which is generated by collecting and converting a voice of the user by the wearable device.

(4) The kitchen equipment according to (1) to (3), where the wireless communication includes one or more of Bluetooth communication, Zigbee communication and Wireless

Fidelity (WiFi) communication.

(5) The kitchen equipment according to (1) to (3), where the operation includes one or more of turning up power, turning down power, turning off power, setting timing and recommending recipe

5 (6) The kitchen equipment according to (1) to (3), wherein the kitchen equipment comprises one or more of hob, oven, microwave oven and electric cooker.

(7) A system for operating a kitchen equipment, including:

a wearable device worn by a user, including:

an acquisition unit configured to acquire a voice signal from the user;

10 a processing unit configured to process the acquired voice signal to determine an operation to be performed by the kitchen equipment and generate a signal indicating the operation; and

a transmitting unit configured to transmit the signal indicating the operation to the kitchen equipment via wireless communication; and

15 the kitchen equipment, including:

a receiving unit configured to receive the signal indicating the operation from the wearable device via the wireless communication; and

an execution unit configured to perform the operation according to the received signal.

20 (8) The system according to (7), where the processing unit of the wearable device is further configured to:

perform voice recognition on the voice signal, to determine the operation corresponding to the voice signal.

25 (9) The system according to (7), where the kitchen equipment further includes a feedback unit configured to generate an acknowledgement signal indicating that the kitchen equipment has received the signal indicating the operation, and transmit the acknowledgement signal to the wearable device, and

where the wearable device further includes an informing unit configured to inform the

user of receipt of the acknowledgement signal in a perceivable manner.

(10) The system according to (7) to (9), where the wireless communication includes one or more of Bluetooth communication, Zigbee communication and Wireless Fidelity (WiFi) communication.

5 (11) The system according to (7) to (9), where the operation includes one or more of turning up power, turning down power, turning off power, setting timing and recommending recipe.

(12) The system according to (7) to (9), where the kitchen equipment includes one or more of hob, oven, microwave oven and electric cooker.

10 (13) A method performed by a kitchen equipment, including:
receiving a signal from a wearable device worn by a user via wireless communication;
processing the received signal to determine an operation to be performed; and
performing the determined operation.

(14) The method according to (13), where the received signal includes a voice signal,
15 and the method further includes:

performing voice recognition on the voice signal, to determine the operation corresponding to the voice signal.

(15) A method for operating a kitchen equipment, including:
acquiring, by a wearable device worn by a user, a voice signal from the user;
20 processing, by the wearable device, the acquired voice signal to determine an operation to be performed by the kitchen equipment;
generating, by the wearable device, a signal indicating the operation;
transmitting, by the wearable device, the signal indicating the operation to the kitchen equipment via wireless communication; and
25 performing, by the kitchen equipment, the operation according to the received signal.

(16) The method according to (15), where the method further includes:

performing, by the wearable device, voice recognition on the voice signal, to determine

the operation corresponding to the voice signal.

(17) The method according to (15), where the method further includes:

transmitting, by the kitchen equipment, an acknowledgement signal indicating that the kitchen equipment has received the signal indicating the operation, to the wearable device;

5 and

informing, by the wearable device, the user of receipt of the acknowledgement signal in a perceivable manner.

CLAIMS

1. A kitchen equipment, comprising:

a communication unit configured to receive a signal from a wearable device worn by a user via wireless communication;

5 a processing unit configured to process the received signal to determine an operation to be performed; and

an execution unit configured to perform the determined operation.

2. The kitchen equipment according to claim 1, wherein the received signal comprises a voice signal, and the processing unit is further configured to:

10 perform voice recognition on the voice signal, to determine the operation corresponding to the voice signal.

3. The kitchen equipment according to claim 2, wherein the received signal comprises a digital signal indicating the operation which is generated by collecting and converting a voice of the user by the wearable device.

15 4. The kitchen equipment according to any one of claims 1 to 3, wherein the wireless communication comprises one or more of Bluetooth communication, Zigbee communication and Wireless Fidelity (WiFi) communication.

5. The kitchen equipment according to any one of claims 1 to 3, wherein the operation comprises one or more of turning up power, turning down power, turning off power, setting
20 timing and recommending recipe.

6. The kitchen equipment according to any one of claims 1 to 3, wherein the kitchen equipment comprises one or more of hob, oven, microwave oven and electric cooker.

7. A system for operating a kitchen equipment, comprising:

a wearable device worn by a user, comprising:

25 an acquisition unit configured to acquire a voice signal from the user;

a processing unit configured to process the acquired voice signal to determine an operation to be performed by the kitchen equipment, and generate a signal indicating the operation; and

a transmitting unit configured to transmit the signal indicating the operation to the kitchen equipment via wireless communication; and

the kitchen equipment, comprising:

a receiving unit configured to receive the signal indicating the operation from the
5 wearable device via the wireless communication; and

an execution unit configured to perform the operation according to the received signal.

8. The system according to claim 7, wherein the processing unit of the wearable device is further configured to:

10 perform voice recognition on the voice signal, to determine the operation corresponding to the voice signal.

9. The system according to claim 7, wherein the kitchen equipment further comprises a feedback unit configured to generate an acknowledgement signal indicating that the kitchen equipment has received the signal indicating the operation, and transmit the acknowledgement
15 signal to the wearable device, and

wherein the wearable device further comprises an informing unit configured to inform the user of receipt of the acknowledgement signal in a perceivable manner.

10. The system according to any one of claims 7 to 9, wherein the wireless communication comprises one or more of Bluetooth communication, Zigbee communication
20 and Wireless Fidelity (WiFi) communication.

11. The system according to any one of claims 7 to 9, wherein the operation comprises one or more of turning up power, turning down power, turning off power, setting timing and recommending recipe.

12. The system according to any one of claims 7 to 9, wherein the kitchen equipment
25 comprises one or more of hob, oven, microwave oven and electric cooker.

13. A method performed by a kitchen equipment, comprising:

receiving a signal from a wearable device worn by a user via wireless communication;

processing the received signal to determine an operation to be performed; and

performing the determined operation.

14. The method according to claim 13, wherein the received signal comprises a voice signal, and the method further comprises:

performing voice recognition on the voice signal, to determine the operation
5 corresponding to the voice signal.

15. A method for operating a kitchen equipment, comprising:

acquiring, by a wearable device worn by a user, a voice signal from the user;

processing, by the wearable device, the acquired voice signal to determine an operation
to be performed by the kitchen equipment;

10 generating, by the wearable device, a signal indicating the operation;

transmitting, by the wearable device, the signal indicating the operation to the kitchen
equipment via wireless communication; and

performing, by the kitchen equipment, the operation according to the received signal.

16. The method according to claim 15, wherein the method further comprises:

15 performing, by the wearable device, voice recognition on the voice signal, to determine
the operation corresponding to the voice signal.

17. The method according to claim 15, wherein the method further comprises:

transmitting, by the kitchen equipment, an acknowledgement signal indicating that the
kitchen equipment has received the signal indicating the operation, to the wearable device;

20 and

informing, by the wearable device, the user of receipt of the acknowledgement signal in
a perceivable manner.

Figure 1

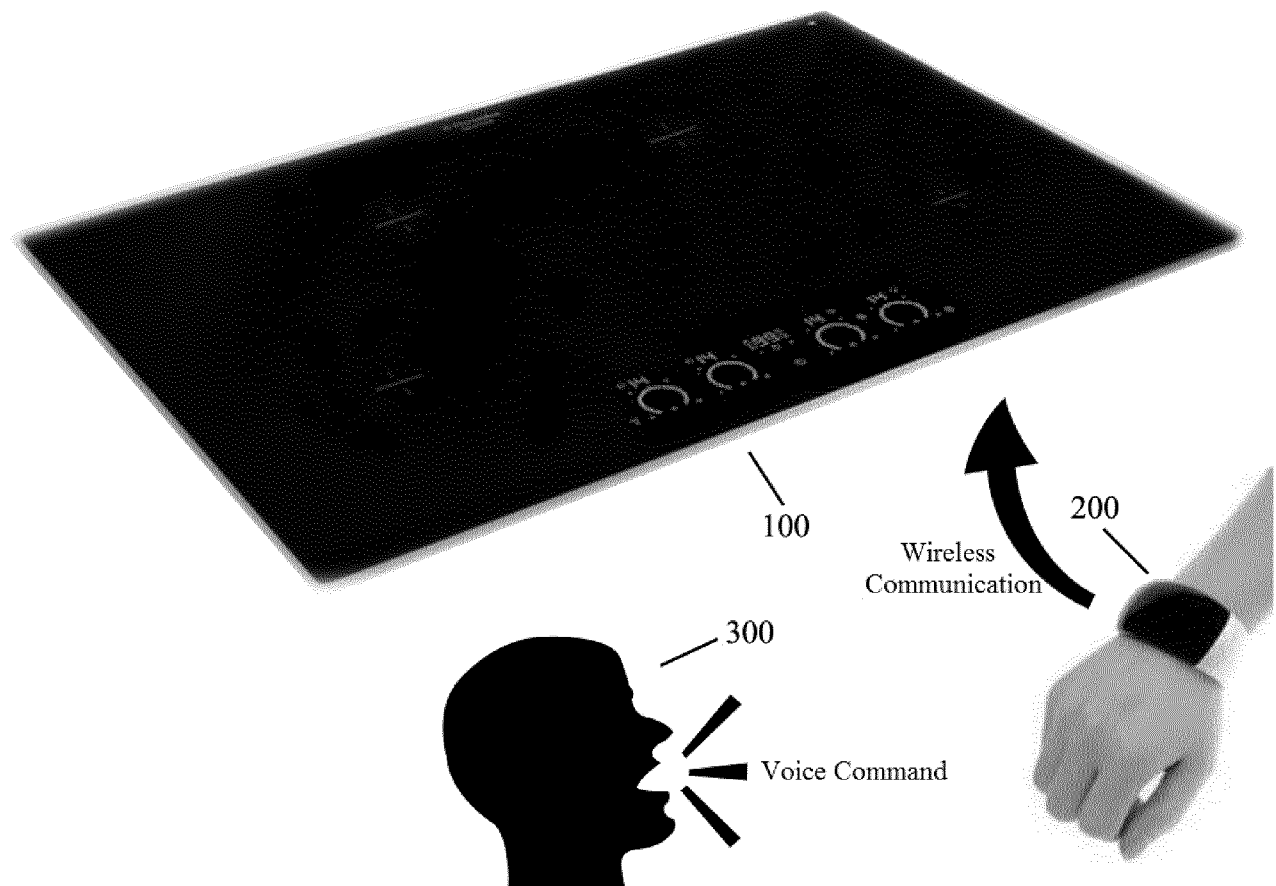


Figure 2

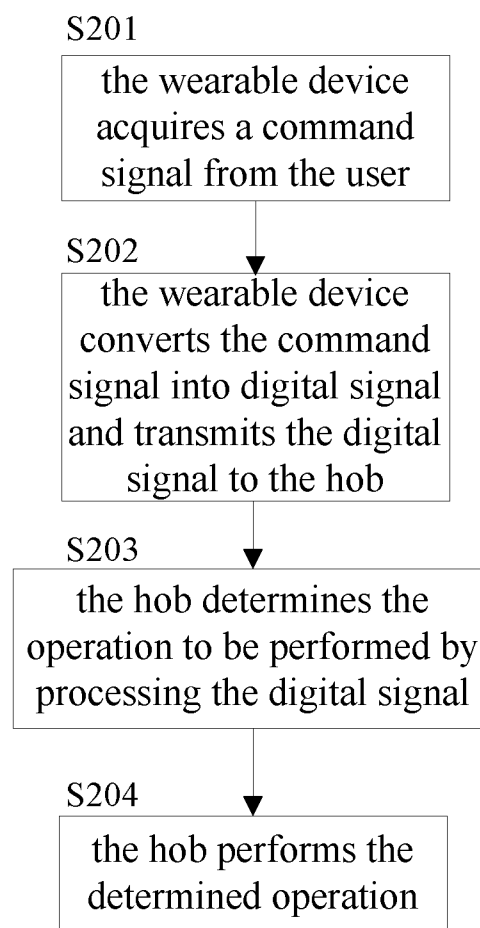


Figure 3A

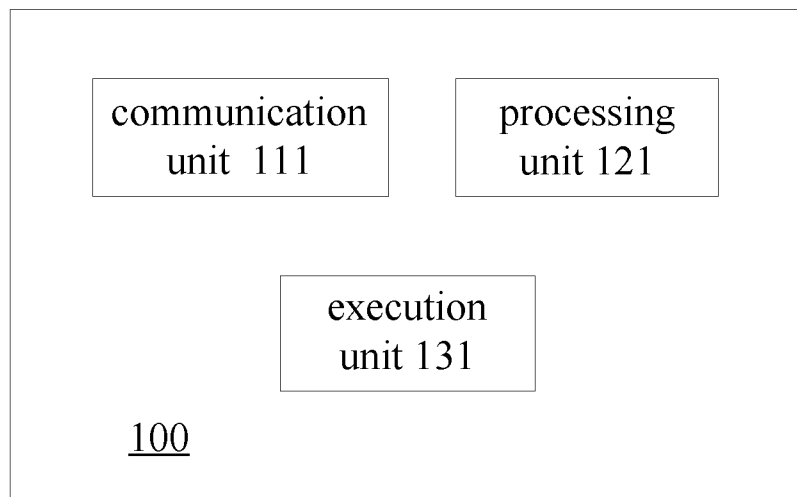


Figure 3B

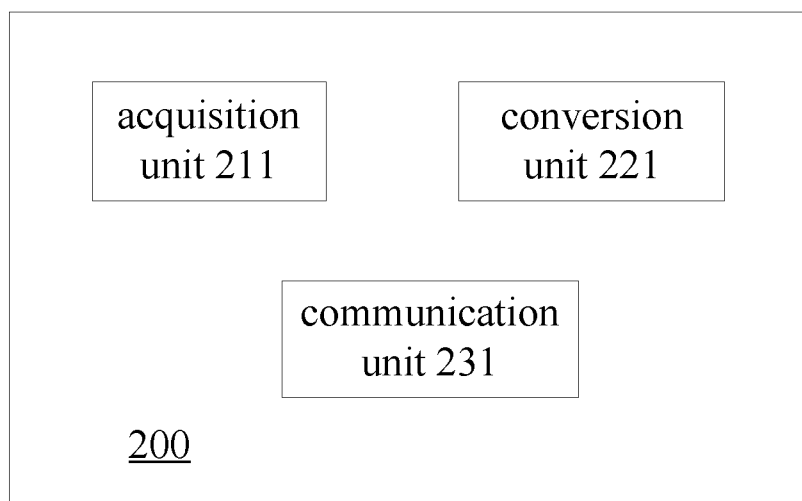


Figure 4

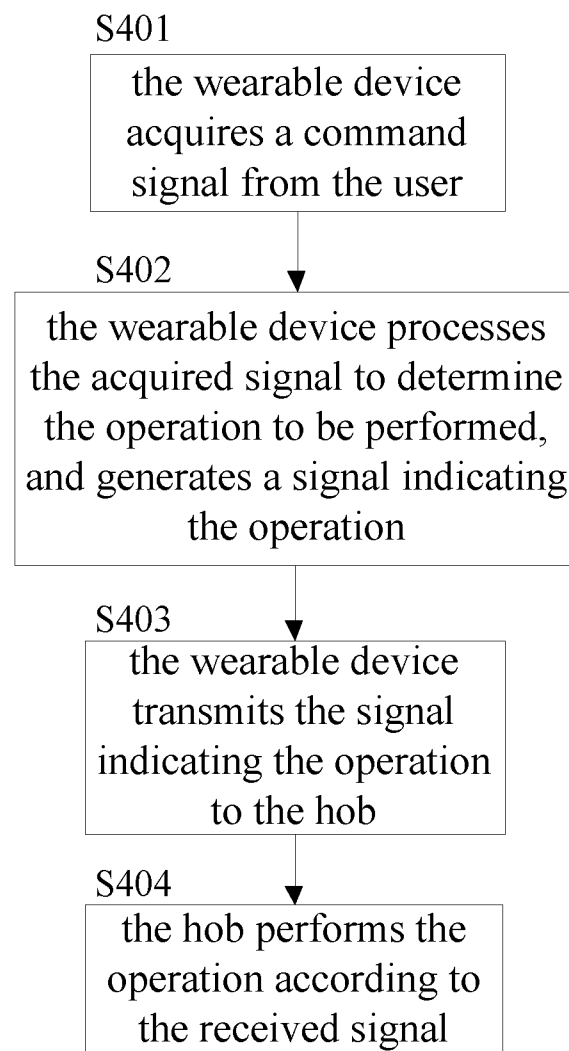


Figure 5A

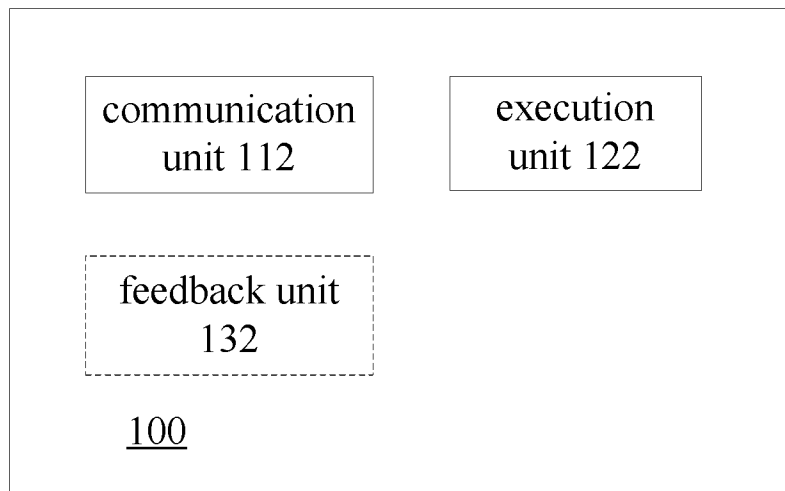
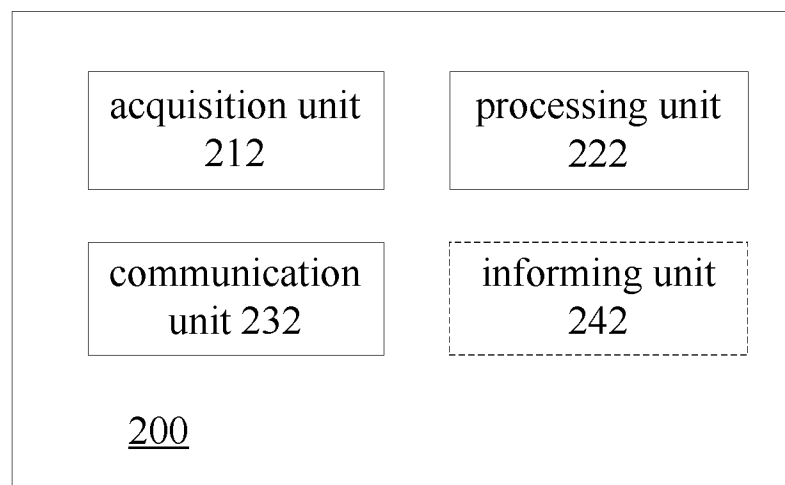


Figure 5B



INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2020/050705

A. CLASSIFICATION OF SUBJECT MATTER
INV. H04B1/3827 F24C7/08 A47J36/32
ADD.

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)
H04B F24C 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 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	EP 0 619 568 A1 (WHIRLPOOL CO [US]) 12 October 1994 (1994-10-12) column 14, line 1 - line 24 figures 1-3	1,6,12, 13
X	----- EP 3 163 428 A1 (LG ELECTRONICS INC [KR]) 3 May 2017 (2017-05-03) paragraphs [0053], [0131] paragraph [0275] - paragraph [0277] paragraph [0281] - paragraph [0283] figures 1, 23-24b	1,4-7, 10-13,15
X	----- WO 2018/024913 A1 (KONINKLIJKE PHILIPS NV [NL]) 8 February 2018 (2018-02-08) page 5, line 18 - line 20 page 6, line 1 - line 14 figures 1,5 ----- -/-	1,2,4, 6-9, 12-17



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

25 March 2020

Date of mailing of the international search report

03/04/2020

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

Avilés Martínez, L

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2020/050705

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2018/062691 A1 (BARNETT JR THOMAS CHARLES [US]) 1 March 2018 (2018-03-01) paragraphs [0062], [0075], [0078], [0126], [0127] figures 1,3,4B,6B,8 -----	1-8, 10-16
X	US 2018/073744 A1 (JI SOOK-YOUNG [KR] ET AL) 15 March 2018 (2018-03-15) paragraph [0068] - paragraph [0070] figures 1,11A, -----	1,7,13, 15
X	US 9 791 936 B1 (KOVACH ARAM [US]) 17 October 2017 (2017-10-17) column 7, line 60 - column 8, line 35 figures 1,4 claims 1-3 -----	1-6

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2020/050705

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0619568	A1	12-10-1994	CA 2120276 A1 06-10-1994
		DE 69418377 D1 17-06-1999	
		DE 69418377 T2 30-12-1999	
		EP 0619568 A1 12-10-1994	
		US 5378874 A 03-01-1995	
EP 3163428	A1	03-05-2017	CN 107040644 A 11-08-2017
		EP 3163428 A1 03-05-2017	
		KR 20170048990 A 10-05-2017	
		US 2017115940 A1 27-04-2017	
WO 2018024913	A1	08-02-2018	JP 2019528525 A 10-10-2019
		KR 20190000908 U 15-04-2019	
		WO 2018024913 A1 08-02-2018	
US 2018062691	A1	01-03-2018	US 2018062691 A1 01-03-2018
		US 2019028134 A1 24-01-2019	
US 2018073744	A1	15-03-2018	CN 109564002 A 02-04-2019
		EP 3482141 A1 15-05-2019	
		KR 20180028739 A 19-03-2018	
		US 2018073744 A1 15-03-2018	
		WO 2018048094 A1 15-03-2018	
US 9791936	B1	17-10-2017	NONE