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(71) Applicant: **ELECTROLUX APPLIANCES AKTIEBOLAG**
105 45 Stockholm (SE)

(72) Inventors:
- **HÄUTLE, Ulrich**
  91541 Rothenburg ob der Tauber (DE)
- **KLING, Jennifer**
  91541 Rothenburg ob der Tauber (DE)
- **HOFFMANN, Harald**
  91541 Rothenburg ob der Tauber (DE)
- **REUL, Kurt**
  91541 Rothenburg ob der Tauber (DE)

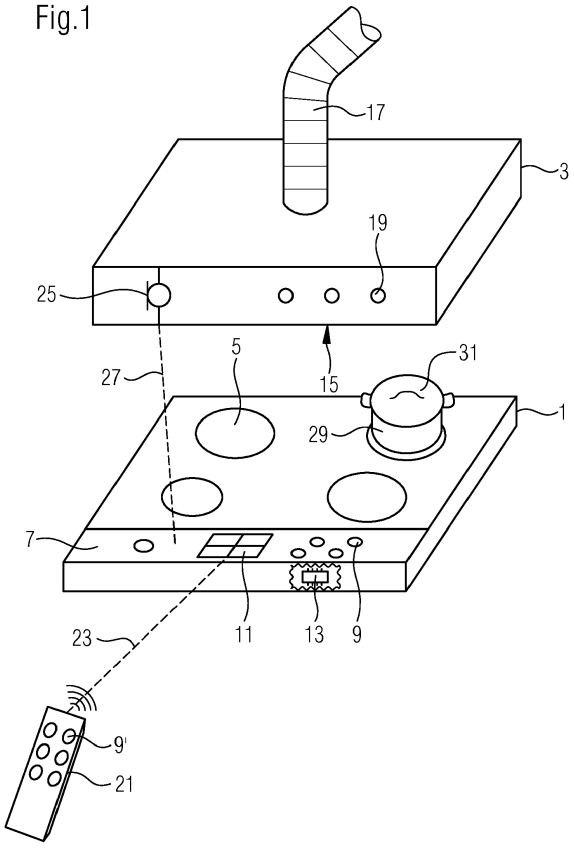
(74) Representative: **Electrolux Group Patents**
AB Electrolux
Group Patents
105 45 Stockholm (SE)

(54) METHOD AND SYSTEM FOR CONTROLLING A HOUSEHOLD APPLIANCE, IN PARTICULAR A COOKING APPLIANCE

(57) The present invention relates to a method for controlling a household appliance (1), in particular a cooking appliance, for example a cooking hob. The method comprises the following steps:
- transmission of an information signal, in particular a command signal, to a user interface (7) of the household appliance (1) by a user of the household appliance (1) with the help of a remote control device (21),
- starting a time period for waiting for a confirmation signal from the user,
- receiving the user's confirmation signal via a confirmation key or confirmation trigger arrangement (25),
- processing the information signal by a control unit (13) of the household appliance (1).
The confirmation signal indicates the user's presence close by the household appliance (1).

The present invention also relates to a system for controlling a household appliance (1), in particular a cooking appliance, for example a cooking hob.

Fig.1



EP 3 653 937 A1

Description

[0001] The present invention relates to a method for controlling a household appliance, in particular a cooking appliance, e. g. a cooking hob. Further, the invention relates to a system for controlling a household appliance, in particular a cooking appliance, e. g. a cooking hob.

[0002] A remote control of many household appliances is not generally allowed due to legal safety requirements. In particular, the remote control of a cooking hob is not allowed. However, the control of household appliances by remote device, e.g. smartphones or tablets, and/or by using human voice is increasing and desired by many users. The control of the household appliance by the remote device could be allowed, if the distance between the user and the household appliance would be controlled to be within a safe value in order to allow a manual control or intervention of the household appliance.

[0003] It is an object of the present invention to provide a method and/or a system for controlling a household appliance, wherein the distance between the household appliance and a user is reliably controlled by low complexity.

[0004] With respect to the method, the object is achieved by the features of claim 1. With respect to the system, the object is achieved by the features of claim 7.

[0005] According to the present invention a method for controlling a household appliance, in particular a cooking appliance, for example a cooking hob, is provided, comprising the following steps:

- transmission of an information signal, in particular a command signal, to a control unit and/or a user interface of the household appliance by a user of the household appliance with the help of a remote control device,
- starting a time period for waiting for a confirmation signal from the user,
- receiving the user's confirmation signal via a confirmation key or confirmation trigger arrangement,
- processing the information signal by a control unit of the household appliance.

[0006] The invention also provides that the confirmation signal, sourcing from the user, indicates the user's presence close by or next to the household appliance.

[0007] The main idea of the present invention is that the household appliance, in particular the cooking hob, is controlled by the remote control device and respective user's commands are processed only, if not only the command signal for the control of the household appliance, but also the confirmation signal for confirming the user's presence near by the household appliance is received by the household appliance, in particular by its control unit and/or its user interface. A predefined value for the user's distance to the household appliance may be set.

[0008] The control unit is not processing the information signal, in particular the command signal, as long as not having received the confirmation signal. Preferably after receipt of the information signal, or alternatively by simultaneous receipt, the control unit is waiting for receiving the confirmation signal. The control unit may stay in the waiting state ad infinitum. A preferred method, however, provides a predefined time interval, in the space thereof the confirmation signal is accepted by the control unit or the user interface.

[0009] The time interval may be predefined with a range of any conceivable duration. It may be feasible, though, to define a period with a duration of 1 to 300 seconds, preferably with a duration of 5 to 180 seconds and more preferably with a duration of 10 to 300 seconds.

[0010] In order to increase the safety of the controlling of the household appliance, a further step may be comprised which provides a communication of the received information signal, in particular the command signal, by the control unit or the user interface after the receipt thereof. The communication may be performed by displaying the information signal on a display on the control unit or the user interface or a voice output of the received information signal by means of a loudspeaker.

[0011] The confirmation signal may be activated, in particular actively activated, by the user, particularly after having observed the communication of the information signal by the control unit or the user interface. Alternatively, the confirmation signal is triggered by the presence of the user merely by his physical presence close by the household appliance.

[0012] The confirmation signal may be realized by pressing or activating a confirmation button by the user. This confirmation button may be a wired button or a wirelessly connected key, possibly even a software key. The button may be arranged or designed in a way that only an authorized user is able to press or activate it. Additionally or alternatively, the confirmation signal may be a direct, in particular physical, operation of a device or appliance by the user, which device or appliance is arranged near by the household appliance. Another option for a confirmation signal may be a presence detection signal which identifies a user's, particularly an authorized user's, presence close by the household appliance. Such a presence detection and indication may be realized by an infrared signal, a camera signal, a photo sensor signal, a light beam signal and/or an acoustic signal. Particularly preferred is a confirmation signal, which ensures confirmation of line of sight of the user to the hob. For example, the confirmation signal may be conveyed by direct contact of user and hob, particularly physical or semi-physical interaction of the user and the hob. Physical interaction as used herein preferably means direct contact of user and appliance or a confirmation signal input means capable of transmitting the confirmation signal to the hob control unit. Semi-physical interaction as used herein preferably means the indirect interaction such as voice signal transfer, gesture signal or the like. For receiving a confirmation signal in the form of a voice signal a confirmation signal input means is capable of receiving an au-

dio, preferably vocal signal, and is capable of transmitting the confirmation signal to the hob control unit. For receiving a confirmation signal in the form of a gesture signal a confirmation signal input means may comprise a light path, which may be interrupted to generate the confirmation signal.

[0013] According to the present invention a system for controlling a household appliance, in particular a cooking appliance, for example a cooking hob, is provided. The system comprises

- a control unit controlling the operation of the household appliance and processing commands issued by a user of the household appliance,
- a control unit or the user interface of the household appliance receiving the user's commands and transmitting the commands to the control unit ,
- a first transmission path for transmitting the user's commands to the control unit or the user interface by means of remote control,
- a remote control device connected to the transmission path and receiving the user's commands,
- a second transmission path for transmitting a confirmation signal from the user to the control unit or the user interface,
- a confirmation key or confirmation trigger arrangement connected to the second transmission path and receiving the user's confirmation signal,
- a timer controlling a time period which depends on the receipt of the user's command by the user interface and/or the control unit.

[0014] The inventive system is further characterized in that the first and/or the second transmission path/paths is/are wired or wireless and that the confirmation signal indicates or suggests the user's presence close by the household appliance.

[0015] The first transmission path and the second transmission path may be congruent or identical. But preferably, in order to increase the system security, the first transmission path is different and independent from the second transmission path.

[0016] In a preferred embodiment, the remote control device is a voice control, which enables the user to provide the information signal, particularly a command, to the household appliance, in particular the control unit and/or the user interface thereof. The voice control may be connected to or implemented in a digital or virtual assistant, for example "Google Home" (trademark, registered by Google LLC with effect for many countries), "ALEXA" (trademark, registered by Amazon Technologies, Inc. with effect for many countries) or "SIRI" (trademark, registered by Apple Inc. with effect for many countries), or the like. Additionally or alternatively, the remote control device may be a near field remote control device, in particular an infrared or Bluetooth remote control device.

[0017] Preferably, the voice control arrangement, in particular the digital or virtual assistant, is positioned next to the household appliance. In such arrangement, it sends a position identification signal to the household appliance.

[0018] The confirmation key or confirmation trigger arrangement may be a key, preferably a physical key, in particular a knob or a button, which is arranged at the household appliance. It may be a specific knob or button only dedicated for the purpose of providing a confirmation signal.

[0019] A further embodiment provides for the confirmation key or confirmation trigger arrangement being arranged in and/or monitoring the installation location, in particular the installation room, of the household appliance.

[0020] In a more preferred embodiment, the confirmation key or confirmation trigger arrangement is or is allocated to a camera, a microphone, a vibration sensor, an infrared sensor and/or a light beam monitoring the environment or surroundings of the household appliance. In that, the confirmation key or confirmation trigger arrangement is arranged next to the household appliance.

[0021] Particularly the confirmation key or confirmation trigger arrangement may be capable of receiving and optionally operating a presence detection signal, capable of identifying a user or a user's presence, in particular an authorized user's, presence close by the household appliance. The presence detection signal in particular may be an infrared signal, a camera signal, a photo sensor signal, a light beam signal, a gesture signal, a modulated or unmodulated electromagnetic signal, particularly selected from the group comprising RFID, a short range device, or an acoustic signal.

[0022] The invention may be specifically designed for a household appliance which is a cooking hob, wherein the confirmation key or the confirmation trigger arrangement is arranged at an appliance, in particular another household appliance, which may be an oven or an exhaust hood.

[0023] Further, a specific embodiment of the invention may provide a system with different types of commands, wherein not all types are designated for being processed only after transmission of a confirmation signal, rather, only specific commands, for example starting the household appliance, need to be confirmed by a confirmation signal.

[0024] Novel and inventive features of the present invention are set forth in the appended claims.

[0025] The present invention will be described in further detail with reference to the drawing, in which

FIG 1 illustrates a schematic perspective view of a cooking arrangement comprising a cooking hob and an exhaust hood and a remote control device.

[0026] FIG 1 illustrates a schematic perspective view of a cooking arrangement comprising a cooking hob 1 and an exhaust hood 3. The cooking hob comprises a cooking area with four cooking zones 5 and an operator control panel comprising a control unit or the user interface 7. The control unit or the user interface 7 is equipped

with operating buttons 9 and a display unit 11. In the interior of the operator control panel, a micro control unit 13 is arranged for controlling the operation of the cooking hob 1. The control unit or the user interface 7 is internally connected with the micro control unit 13 for data exchange between these two components.

[0027] The exhaust hood 3 is arranged above the cooking hob 1 by fully covering the cooking area of the cooking hob 1 with its suction area 15. The vapour and/or fume which is/are resulting from the cooking processes are sucked by an exhaust fan (not shown) arranged inside the exhaust hood 3 and removed from the kitchen, in which the cooking arrangement is installed, to the environment by means of an exhaust tube 17. Hood operating buttons 19 are positioned on a front face of the exhaust hood 3 for the operation thereof by the user.

[0028] The operation of the cooking hob 1 can be performed twofold. On the one hand, a conventional, direct operation may be realized by the user manipulating the hob operating buttons 9 arranged on the control unit or the user interface 7 in order to set or modify the power level of the respective cooking zone 5. In a similar way, the exhaust hood 3 may be operated also directly in a conventional way by the user manipulating the hood operating buttons 19, thereby controlling the speed of the exhaust fan.

[0029] On the other hand, both the cooking hob 1 and the exhaust hood 3 may be operated by the user using a remote control device 21. Via a first transmission path 23 (in FIG. 1 only illustrated for the connection to the cooking hob 1), the remote control device 21 transmits the information signals to either the cooking hob 1 or to the exhaust hood 3. The first transmission path may be a WIFI or a near field connection. A switch button (not explicitly shown) is comprised by the remote control device 21 for selecting either control of the cooking hob 1 or control of the exhaust hood 3 by the remote control device 21. The user inputs the commands for the control of either the cooking hob 1 or the exhaust hood 3 by means of universal operating buttons 9' arranged on the remote control device 21.

[0030] While the exhaust hood 3 may be controlled via the remote control device 21 without any limitation, the operation of the cooking hob 1 is only allowed, following safety standards, in case of the user of the cooking hob 1 being in close distance to the cooking hob in order to be in a position to intervene in case of any unexpected or dangerous situation resulting from the cooking hob operation.

[0031] Therefore, even though the micro control unit 13 will receive a control command transmitted via the first transmission path 23 and forwarded by the control unit or the user interface 7, the micro control unit 13 will not immediately process the received control command. Rather, the micro control unit is waiting for also receiving a confirmation signal indicating the presence of the user in close distance to the cooking hob 1.

[0032] Said confirmation signal indicating the user's presence is provided by a microphone 25, also arranged at the front face of the exhaust hood 3. The microphone 25 is connected to the control unit or the user interface 7 of the cooking hob 1 by means of a second transmission path 27, which may be an infrared signal connection. The microphone 25 may be designed as a directional microphone in order to filter out or reduce the operational noise, sourcing from the operation of the exhaust fan or its driving motor.

[0033] The microphone 25 is adapted for receiving any sound or noise created by a user being in close distance to the cooking hob 1. Such sound or noise may be a vocal sound, a snipping with fingers or the like. The sound or noise may be also created by the user working on the kitchen, in particular handling with specific devices, e. g. bumping with a pot 29 positioned on a cooking zone 5 of the cooking hob 1, toggling with a lid 31 of the pot 29, operating a water tap (not shown) in the kitchen, etc.

[0034] As alternative solutions, the microphone 25 may be replaced in its function as a user's presence detector by a specific button or knob to be manipulated by the user in order to trigger a confirmation signal, by a camera or another type of kitchen observation system monitoring the user moving around, by a light beam device indicating the user passing the kitchen door or by another household appliance arranged next to the cooking hob 1 which other household appliance is directly operated by the user and is in a communication interlocking with the cooking hob 1.

List of reference numerals

[0035]

1	cooking hob
3	exhaust hood
5	cooking zone(s)
7	control unit or the user interface
9	hob operating buttons
9'	universal operating buttons
11	display unit
13	micro control unit
15	suction area
17	exhaust tube
19	hood operating buttons
21	remote control device
23	first transmission path
25	microphone
27	second transmission path
29	pot
31	lid

Claims

1. A method for controlling a household appliance (1), in particular a cooking appliance, for example a cooking hob, comprising the following steps

- transmission of an information signal, in particular a command signal, to a control unit (7), particularly a control unit comprising a user interface (7) of the household appliance (1) by a user of the household appliance (1) with the help of a remote control device (21),
- starting a time period for waiting for a confirmation signal from the user,
- receiving the user's confirmation signal via a confirmation key or confirmation trigger arrangement (25),
- processing the information signal by a control unit (13) of the household appliance (1),

wherein the confirmation signal indicates the user's presence close by the household appliance (1).

2. The method according to claim 1, **characterized in that** a time interval is predefined, in the space thereof the confirmation signal is accepted.

3. The method according to claim 2, **characterized in that** the time interval is a period with a duration of 1 to 300 seconds, preferably with a duration of 5 to 180 seconds, more preferably with a duration of 10 to 120 seconds.

4. The method according to any one of the claims 1 to 3, **characterized by** the further step

- communicating the information signal, in particular the command signal, by the user interface (7) after receipt of the information signal.

5. The method according to any one of the claims 1 to 4, **characterized in that** the confirmation signal is activated or triggered by the user.

6. The method according to any one of the claims 1 to 5, **characterized in that** the confirmation signal is at least one of

- pressing a confirmation button by the user, in particular a wired button or a wirelessly connected key,
- directly operating a device or appliance by the user, which device or appliance is arranged near by the household appliance (1),
- a presence detection signal, identifying a user's, in particular an authorized user's, presence close by the household appliance (1), in particular an infrared signal, a camera signal, a photo sensor signal, a light beam signal, a gesture signal, a modulated or unmodulated electromagnetic signal, particularly selected from the group comprising RFID, a short range device, or an acoustic signal.

7. A system for controlling a household appliance (1), in particular a cooking appliance, for example a cooking hob, comprising

- a control unit (13) controlling the operation of the household appliance (1) and processing commands issued by a user of the household appliance (1),
- a user interface (7) of the household appliance (1) receiving the user's commands and transmitting the commands to the control unit (13),
- a first transmission path (23) for transmitting the user's commands to the user interface (7) by means of remote control,
- a remote control device (21) connected to the first transmission path (23) and receiving the user's commands,
- a second transmission path (27) for transmitting a confirmation signal from the user to the user interface (7),
- a confirmation key or confirmation trigger arrangement (25) connected to the second transmission path (27) and receiving the user's confirmation signal,
- a timer controlling a time period which depends on the receipt of the user's command by the user interface (7) and/or the control unit (13),

wherein the first (23) and/or the second (27) transmission path/paths is/are wired or wireless, and wherein the confirmation signal indicates or suggests the user's presence close by the household appliance (1).

8. The system according to claim 7, **characterized in that** the first transmission path (23) is different and/or independent from the second transmission path (27).

9. The system according to claim 7 or 8, **characterized in that** the remote control device (21) is a voice control, in particular using a digital assistant, for example "Google Home", "ALEXA" or "SIRI", and/or a near field remote control device.

10. The system according to claim 9, **characterized in that** the voice control arrangement, in particular the digital assistant, is positioned next to the household appliance (1) sending a position identification signal to the household appliance (1).

11. The system according to any one of the claims 7 to 10,

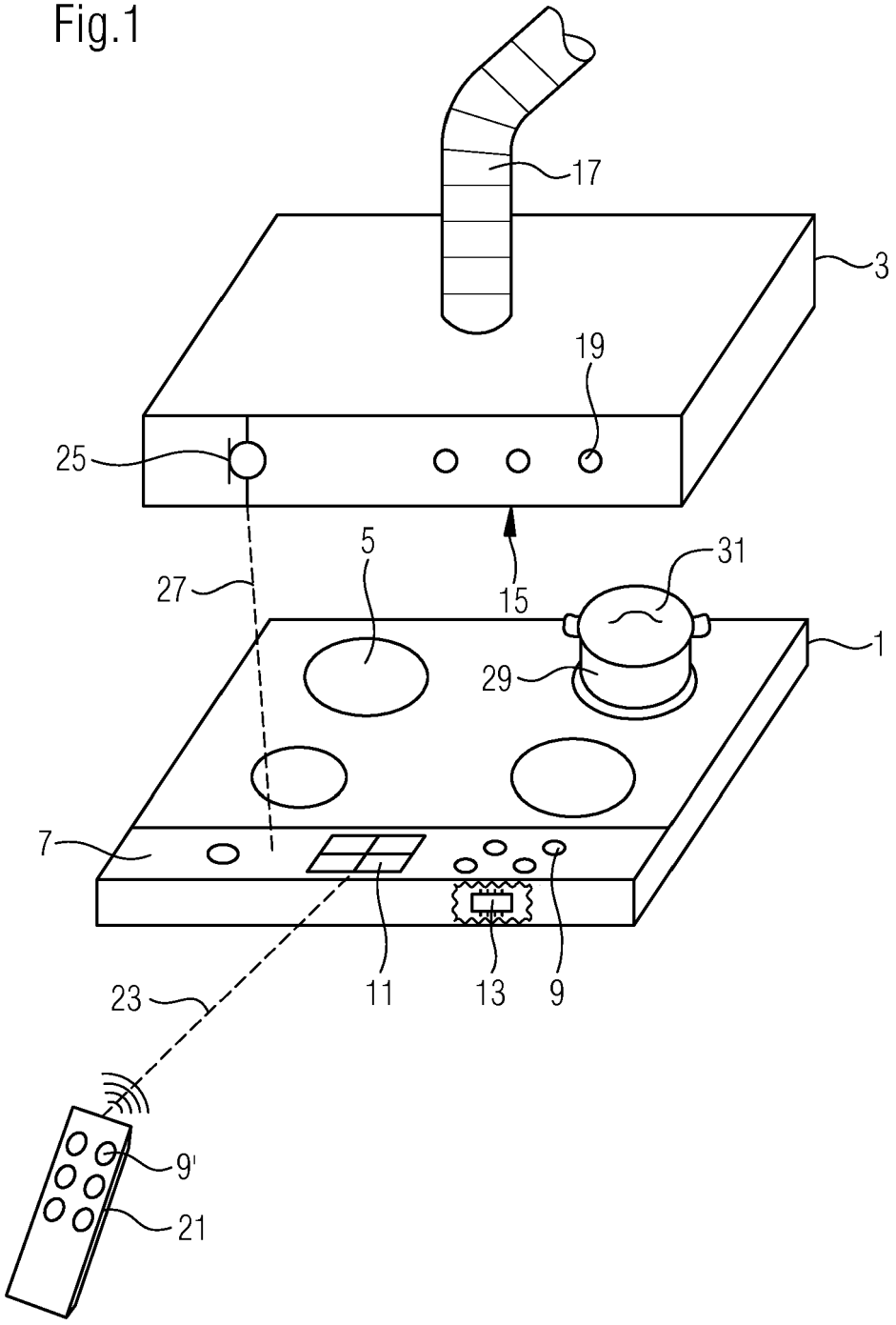
characterized in that
the confirmation key or confirmation trigger arrangement is a key, in particular a knob or button, preferably a specific knob or button, arranged at the household appliance (1).

12. The system according to any one of the claims 7 to 10,
characterized in that
the confirmation key or confirmation trigger arrangement is arranged in and/or monitors the installation location, in particular the installation room, of the household appliance (1) .

13. The system according to any one of the claims 7 to 12,
characterized in that
the confirmation key or confirmation trigger arrangement is or is allocated to a camera, a microphone (25), a vibration sensor, an infrared sensor and/or a light beam, arranged close to the household appliance (1).

14. The system according to any one of the claims 7 to 13,
characterized in that
the household appliance (1) is a cooking hob and the confirmation key or confirmation trigger arrangement is arranged at an oven or an exhaust hood (3) close to the cooking hob.

Fig.1



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EUROPEAN SEARCH REPORT

Application Number
EP 18 20 5952

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	CN 108 488 850 A (SHANGHAI HAIER ZHONGZHIFANG MAKER SPACE MFT CO LTD) 4 September 2018 (2018-09-04) * the whole document *	1,2,4-8, 11,12,14	INV. F24C7/08
X	US 2016/076777 A1 (WAIT KEITH WESLEY [US]) 17 March 2016 (2016-03-17) * paragraphs [0026], [0028], [0031] - [0033] *	1,2,4-13	
X	US 2010/073174 A1 (DUFOUR GEORGE [CA]) 25 March 2010 (2010-03-25) * paragraphs [0044], [0047]; figure 4 *	1,2,4-7	
X	US 2017/329358 A1 (FERGUSON WILLIAM MACDONALD [CA]) 16 November 2017 (2017-11-16) * paragraphs [0044], [0083], [0084] *	1-3,5-8, 11-14	
X	US 2006/263068 A1 (JUNG YONGJIN [JP]) 23 November 2006 (2006-11-23) * paragraphs [0069], [0261], [0277] *	1,7	

TECHNICAL FIELDS SEARCHED (IPC)

F24C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	26 April 2019	Canköy, Necdet

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
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L : document cited for other reasons

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EPO FORM 1503 03.82 (P04C01)

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Application Number
EP 18 20 5952

CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing claims for which payment was due.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☒ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

☐ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

☐ The present supplementary European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims (Rule 164 (1) EPC).

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LACK OF UNITY OF INVENTION
SHEET B

Application Number
EP 18 20 5952

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 18 20 5952

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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26-04-2019

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