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(54) **CONTROL ELEMENT FOR CONTROLLING A LOCK SYSTEM OF A HOUSEHOLD APPLIANCE**

(57) A control element (200) for a household appliance (100) is described. The control element (200) comprises a plurality of different touch-sensitive areas (201, 202, 203, 301, 303); and a control unit (101). The control unit (101) is configured to determine whether or not the plurality of different touch-sensitive areas (201, 202, 203, 301, 303) has been touched concurrently, and to control a lock system of the household appliance (100) in dependence on whether or not the plurality of different touch-sensitive areas (201, 202, 203, 301, 303) has been touched concurrently.

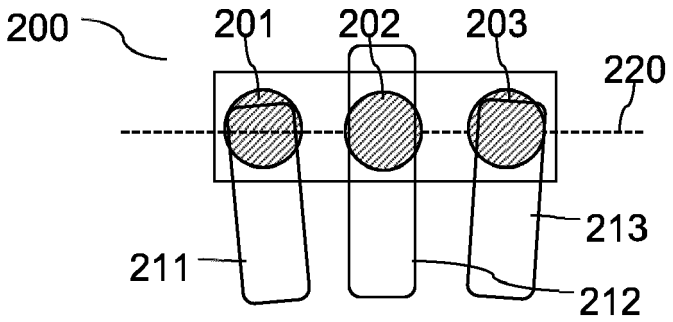

FIG. 2

EP 4 108 993 A1

Description

TECHNICAL FIELD OF THE INVENTION

[0001] The present document relates to a household appliance such as an oven or a hob, which comprises a lock system, in particular for locking the user interface of the household appliance.

BACKGROUND OF THE INVENTION

[0002] A household appliance typically comprises a user interface which allows a user to select an operating program of the appliance and/or to set a parameter, such as the duration and/or the temperature, of an operating program. Furthermore, the household appliance may comprise a lock function or lock system for locking the user interface, thereby preventing another user, notably a child, from modifying a selected operating program and/or a chosen parameter. Hence, the household appliance may comprise a child-lock function. The lock function may be activated or deactivate by pressing a particular control element on the user interface of the household appliance.

SUMMARY OF THE INVENTION

[0003] Children may figure out how to deactivate the child-lock function, which may impact the operating safety and/or the reliability of the household appliance. The present document addresses the technical problem of increasing the safety and/or reliability of a lock system of a household appliance in a comfortable manner. The technical problem is solved by each one of the independent claims. Preferred examples are described in the dependent claims.

[0004] According to an aspect, a control element for a household appliance is described. The household appliance may be an oven, a hob, a dishwasher, a washing machine, etc. The control element may be configured to be included into a control panel of the household appliance.

[0005] The household appliance comprises a lock system for locking a user interface and/or for locking access to an operating room of the household appliance. In particular, the lock system may prevent a user from changing a setting of the household appliance via the user interface and/or from accessing the operating room (e.g., the interior of an oven), if the lock system is activated. On the other hand, settings of the household appliance may be changed and/or the operating room may be accessed, if the lock system is deactivated.

[0006] The control element comprises a plurality of different touch-sensitive areas. The different touch-sensitive areas may be logically and/or physically isolated from one another. In particular, the plurality of different touch-sensitive areas may be such that it may be determined for each one of the plurality of different touch-sensitive areas individually whether or not the respective touch-sensitive area has been or is being touched.

[0007] The control element comprises a control unit (e.g., as part of the household appliance) which is configured to determine whether or not the plurality of different touch-sensitive areas has been touched concurrently (i.e., at the same time). In other words, it may be determined whether the different touch-sensitive areas have been touched at the same time (e.g., for at least a pre-determined duration, such as one or more seconds). In yet other words, it may be determined whether two or more different touch-sensitive areas have been touched at the same time (possibly for at least a pre-determined duration).

[0008] The control unit is further configured to control the lock system of the household appliance in dependence on whether or not the plurality of different touch-sensitive areas has been touched concurrently. In particular, the control unit may be configured to activate or deactivate the lock system of the household appliance, if it is determined that the plurality of different touch-sensitive areas has been touched concurrently (for at least the pre-determined duration). On the other hand, the control unit may be configured to maintain the lock system of the household appliance unchanged (and to ignore the touch event at the control element), if it is determined that the plurality of different touch-sensitive areas has not been touched concurrently (for at least the pre-determined duration).

[0009] Hence, a control element is described, which allows a user to control the lock system of a household appliance in a reliable and comfortable manner.

[0010] The plurality of different touch-sensitive areas may comprise an inner touch-sensitive area and an outer touch-sensitive area, which are separated by an intermediate, non-touch-sensitive, isolation area. The inner touch-sensitive area may have a circular, oval or rectangular shape. The isolation area may be ring-shaped and may completely enclose the inner touch-sensitive area. Furthermore, the outer touch-sensitive area may be ring-shaped and/or may completely or partially enclose the isolation area. In particular, the outer touch-sensitive area may be located in a plurality of different, in particular opposite, directions around the isolation area. By way of example, the outer touch-sensitive area may comprise a plurality of different segments which are located in a corresponding plurality of different directions around the isolation area. By way of example, the outer touch-sensitive area may comprise a first segment at a directional angle of 0°, a second segment at a directional angle of 90°, a third segment at a directional angle of 180° and/or a fourth segment at a directional angle of 270°.

[0011] The inner touch-sensitive area, the isolation area and the outer touch-sensitive area may be such that a (single) finger with a pre-determined child fingertip size cannot touch the inner touch-sensitive area and the outer touch-sensitive area, notably the plurality of different segments of the outer touch-sensitive area, concurrently.

The inner touch-sensitive area may be located at the center of the control element, and the control element may be designed such that the center of a finger of a user touches the inner touch-sensitive area. The inner touch-sensitive area, the isolation area and the outer touch-sensitive area may be such that in this touch situation a (single) finger with the pre-determined child fingertip size cannot touch the inner touch-sensitive area and the outer touch-sensitive area, notably the plurality of different segments of the outer touch-sensitive area, concurrently. The child fingertip size may be 250mm^2 or less, or 200mm^2 or less.

[0012] On the other hand, the inner touch-sensitive area, the isolation area and the outer touch-sensitive area may be such that (notably in the above-mentioned touch situation) a (single) finger with a pre-determined adult fingertip size can touch the inner touch-sensitive area and the outer touch-sensitive area (notably the plurality of different segments of the outer touch-sensitive area) concurrently. The adult fingertip size is larger than the child fingertip size. The adult fingertip size may be greater than 200mm^2 or greater than 250mm^2.

[0013] Hence, a control element is described which makes use of different touch-sensitive areas that partly enclose one another, thereby enabling the detection of a touch event caused by a child in a reliable manner and thereby increasing the safety and reliability of the lock system in a particularly comfortable manner.

[0014] As indicated above, the outer touch-sensitive area may enclose the inner touch-sensitive area in a plurality of different directions, in particular in at least two opposite directions. In particular, the outer touch-sensitive area may comprise a plurality of different segments in the plurality of different directions with respect to the inner touch-sensitive area (wherein the control element may be such that a touch event can be detected in each one of the different segments separately).

[0015] The control unit may be configured to determine whether or not the outer touch-sensitive area has been concurrently touched at the plurality of different directions, in particular whether or not the plurality of different segments of the outer touch-sensitive area has been touched concurrently.

[0016] Furthermore, the control unit may be configured to control the lock system of the household appliance in dependence on whether or not the outer touch-sensitive area has been concurrently touched at the plurality of different directions, in particular in dependence on whether or not the plurality of different segments of the outer touch-sensitive area has been touched concurrently.

[0017] In particular, the control unit may be configured to activate or deactivate the lock system of the household appliance, if it is determined that the outer touch-sensitive area has been concurrently touched at the plurality of different directions, in particular that the plurality of different segments of the outer touch-sensitive area has been touched concurrently (in addition to the inner touch-sensitive area). On the other hand, the touch event at the control element may be ignored.

[0018] By taking into account different segments and/or different directions of a touch event of the outer touch-sensitive area, the reliability for controlling the lock system may be further increased.

[0019] Alternatively, or in addition, the control element may comprise different touch-sensitive areas (notably at least or exactly three different touch-sensitive areas) which are arranged on a straight line and which are arranged such that the plurality of different touch-sensitive areas can be touched concurrently by different fingers of a user's hand, respectively. By arranging different touch-sensitive areas on a straight line, the reliability for controlling the lock system may be improved.

[0020] The different touch-sensitive areas may be spaced apart from one another such that the different touch-sensitive areas can be touched concurrently using different fingers (notably the index finger, the middle finger and the ring finger) of one typical hand of an adult. On the other hand, the different touch-sensitive areas may be spaced apart from one another such that the different touch-sensitive areas cannot be touched concurrently by different fingers of one typical hand of a child aged 8 years of less, or aged 6 years or less. As a result of this, touch events which are performed by a child can be detected in a reliable manner, thereby further increasing the reliability for controlling the lock system.

[0021] As indicated above, the plurality of different touch-sensitive areas may comprise or may be three different touch-sensitive areas which are arranged such that the three different touch-sensitive areas can be touched concurrently with the index finger, the middle finger and the ring finger of one hand, respectively. By making use of three different touch-sensitive areas an optimal compromise between comfort-of-use and reliability may be achieved.

[0022] The control unit may be configured to determine a plurality of fingertip sizes of a corresponding plurality of fingertips having concurrently touched the corresponding plurality of different touch-sensitive areas. Furthermore, the control unit may be configured to control, in particular activate or deactivate, the lock system of the household appliance in dependence of the plurality of fingertip sizes.

[0023] In particular, the control unit may be configured to compare the plurality of fingertip sizes with the pre-determined child fingertip size and/or with the pre-determined adult fingertip size. The lock system of the household appliance may then be controlled, in particular activated or deactivated, in dependence of the comparison. Activation or deactivation of the lock system may be performed, if it is determined that the fingertip sizes are each or in average larger than the pre-determined child fingertip size and/or the pre-determined adult fingertip size. Otherwise, the touch event may be ignored.

[0024] The pre-determined child fingertip size and/or the pre-determined adult fingertip size and/or the size of a typical finger of a child and/or of an adult may be de-

termined experimentally, e.g., using measurement data for a relatively high number (e.g., 100 or more, or 1000 or more) fingers of differently aged users.

[0025] By measuring and taking into account the fingertip sizes, the reliability for controlling the lock system may be further increased without impacting the comfort-of-use.

[0026] According to another aspect, a further control element (and a further corresponding method) for a household appliance is described. It should be noted that all the features and/or aspects, which have been described in the context of a control element are also applicable to this control element (standalone or in combination).

[0027] The control element comprises an outer touch-sensitive area which surrounds a, non-sensitive, isolation area. The isolation area may have a circular or oval or rectangular shape. The isolation area may cover the entire center of the control element. The outer touch-sensitive area may be segmented as described above.

[0028] The isolation area and the outer touch-sensitive area may be such that a finger with a pre-determined child fingertip size cannot touch the isolation area (in particular the center of the isolation area) and the outer touch-sensitive area concurrently. Furthermore, the isolation area and the outer touch-sensitive area may be such that a finger with a pre-determined adult fingertip size can touch the isolation area (notably the center of the isolation area) and the outer touch-sensitive area concurrently. As indicated above, the adult fingertip size is typically larger than the child fingertip size.

[0029] The control unit may be configured to determine whether or not the outer touch-sensitive area has been touched. Furthermore, the control unit may be configured to control the lock system of the household appliance in dependence on whether or not the outer touch-sensitive area has been touched. In particular, the control unit may be configured to activate or deactivate the lock system of the household appliance, if it is determined that the outer touch-sensitive area has been touched (for at least the pre-determined duration). On the other hand, the control unit may be configured to maintain the lock system of the household appliance unchanged (and to ignore the touch event at the control element), if it is determined that the outer touch-sensitive area has not been touched (for at least the pre-determined duration). As a result of this, the lock system of a household appliance may be controlled in a reliable and comfortable manner.

[0030] As indicated above, the outer touch-sensitive area may enclose the isolation area in a plurality of different directions, in particular in at least two opposite directions. In particular, the outer touch-sensitive area may comprise a plurality of different segments in the plurality of different directions with respect to the isolation area (wherein the control element may be such that a touch event can be detected in each one of the different segments separately). Example directions are 0°, 90°, 180° and/or 270°.

[0031] The control unit may be configured to determine whether or not the outer touch-sensitive area has been concurrently touched at the plurality of different directions, in particular whether or not the plurality of different segments of the outer touch-sensitive area has been touched concurrently.

[0032] Furthermore, the control unit may be configured to control the lock system of the household appliance in dependence on whether or not the outer touch-sensitive area has been concurrently touched at the plurality of different directions, in particular in dependence on whether or not the plurality of different segments of the outer touch-sensitive area has been touched concurrently.

[0033] In particular, the control unit may be configured to activate or deactivate the lock system of the household appliance, if it is determined that the outer touch-sensitive area has been concurrently touched at the plurality of different directions, in particular that the plurality of different segments of the outer touch-sensitive area has been touched concurrently (in addition to the inner touch-sensitive area). On the other hand, the touch event at the control element may be ignored.

[0034] By taking into account different segments and/or different directions of a touch event of the outer touch-sensitive area, the reliability for controlling the lock system may be further increased.

[0035] According to a further aspect, a household appliance is described. The appliance comprises a lock system for locking a user interface and/or for locking access to an operating room of the household appliance. Furthermore, the appliance comprises a (lock) control element configured to control the lock system, wherein the control element is designed as described in the present document.

[0036] According to a further aspect, a method for controlling a lock system of a household appliance using a control element is described, wherein the control element comprises a plurality of different touch-sensitive areas. The method comprises determining whether or not the plurality of different touch-sensitive areas has been touched concurrently. In addition, the method comprises controlling the lock system of the household appliance in dependence on whether or not the plurality of different touch-sensitive areas has been touched concurrently.

[0037] According to a further aspect, a software program is described. The software program may be adapted for execution on a processor and for performing the method steps outlined in the present document when carried out on the processor.

[0038] According to another aspect, a storage medium is described. The storage medium may comprise a software program adapted for execution on a processor and for performing the method steps outlined in the present document when carried out on the processor.

[0039] According to a further aspect, a computer program product is described. The computer program may comprise executable instructions for performing the method steps outlined in the present document when ex-

ecuted on a computer.

[0040] It should be noted that the methods and systems including its preferred embodiments as outlined in the present document may be used stand-alone or in combination with the other methods and systems disclosed in this document. In addition, the features outlined in the context of a system are also applicable to a corresponding method. Furthermore, all aspects of the methods and systems outlined in the present document may be arbitrarily combined. In particular, the features of the claims may be combined with one another in an arbitrary manner.

BRIEF DESCRIPTION OF THE FIGURES

[0041] The invention is explained below in an exemplary manner with reference to the accompanying drawings, wherein

Figure 1 shows an example household appliance;
Figure 2 shows an example control element for a lock function;
Figure 3 shows another control element for a lock function;
Figure 4 illustrates the dependency of the size of a fingertip and the age of a user;
Figure 5 shows the control element of Fig. 3 without an inner touch-sensitive area; and
Figure 6 shows a flow chart of an example method for controlling a household appliance.

DETAILED DESCRIPTION OF THE FIGURES

[0042] As outlined above, the present document is directed at providing a particularly reliable and safe lock-function for a household appliance without impacting the comfort-of-use of the household appliance. In this context, Fig. 1 shows a household, in particular a kitchen, appliance 100 which comprises a control panel 110 with a first lock control element 112 and with a display 111. A user may set an operating program and/or a parameter for operating the appliance 100 via the first lock control element 112. The selected operating program and/or the selected parameter may be indicated on the display 111. A control unit 101 of the household appliance 100 may operate the appliance 100 in dependence of the selected operating program and/or of the selected parameter.

[0043] The appliance 100 may further comprise a second lock control element 113 (also referred to as control element) for locking the appliance 100, in particular for locking the control panel 110 and/or the user interface of the appliance 100 with regards to user inputs. The second lock control element 113 may be pressed by a user for a pre-determined duration, thereby locking the control panel 110 and/or the user interface. Furthermore, access to an operating room of the appliance 100 may be locked, e.g., by locking a door 102 of the appliance 100.

[0044] The lock function of a household appliance 100 may be used for safety reasons, in particular for preventing a child to change settings of the appliance 100 and/or from accessing the operating room of the appliance 100. In the present document, measures are described for further increasing the safety and/or reliability of a lock function without increasing the comfort-of-use of the lock function.

[0045] Fig. 2 shows the second lock control element 113, 200 which comprises a plurality of touch-sensitive areas 201, 202, 203, in particular three touch areas. The plurality of touch-sensitive areas 201, 202, 203 are each configured to sense a touch event by an index finger 211, 212, 213 of a user of an appliance 100. The control unit 101 of the appliance 100 may be configured to determine whether or not the plurality of touch-sensitive areas 201, 202, 203 has been touched concurrently. By way of example, it may be verified whether the user has touched at the same time a first touch-sensitive area 201 with the index finger 211 a second sensing area 202 with the middle finger 212 and a third sensing area 203 with the ring finger (213). Furthermore, it may be determined whether or not the concurrent touch event has lasted at least for a pre-determined minimum duration (e.g., one or more, or two or more seconds). If it is determined that the plurality of separated touch-sensitive areas 201, 202, 203 has been touched concurrently (for at least the pre-determined minimum duration), the appliance 100 may be locked (or un-locked).

[0046] The plurality of touch-sensitive areas 201, 202, 203 may be arranged on the straight line 220, as illustrated in Fig. 2. As a result of this, the user needs to align the fingertips of the fingers 211, 212, 213 of one hand for concurrently touching the plurality of touch-sensitive areas 201, 202, 203. By aligning the plurality of touch-sensitive areas 201, 202, 203 on the straight line 220, accidental touch events can be avoided in a reliable manner without substantially reducing the comfort-of-use.

[0047] Hence, a scheme for locking and/or un-locking an appliance 100 is described, which requires a user to put three different fingers 211, 212, 213 (index, middle, ring) on the straight line 220 for locking or un-locking the appliance 100. For this purpose, a sub-area may be defined on a touch sensitive display 111 of the appliance 100. Inside this sub-area, the touch-sensitive straight line 220 may be integrated. The user needs to press three fingers 211, 212, 213 on the straight line 220 at the same time. With this action, the lock system of the appliance 100 may be activated or deactivated. Since the middle finger 212 is typically longer with respect to the other two fingers 211, 213, the user may need to move the middle finger 212 a little downwards in order to align the fingertips on the straight line 220, thereby avoid an accidental actuation of the control element 200 in a reliable manner.

[0048] Fig. 3 shows a lock control element 200 which comprises an inner touch-sensitive area 301 which is surrounded by an isolation area 302, wherein the isolation area 302 is further surrounded by an outer touch-sensitive area 303. The isolation area 302 is configured to

isolate the inner touch-sensitive area 301 from the outer touch-sensitive area 303 such that separate touch events may be detected for the inner touch-sensitive area 301 and for the outer touch-sensitive area 303, respectively.

[0049] As illustrated in Fig. 4, the fingertip size 311 of a user's index finger 211 depends on the age 312 of the user. Fig. 4 shows a characteristic indicating the fingertip size 311 as a function of age 312. The characteristic may be determined using experimental measurement data of the fingertip size 311 of differently aged users.

[0050] The isolation area 302 and the outer sensing area 303 of the lock control element 200 may be designed such that

- the fingertip size 311 of a child's index finger 211 (e.g., aged 6 years or less) is smaller than the combined size of the inner touch-sensitive area 301 and the isolation area 302; and
- the fingertip size 311 of an adult's index finger 211 (e.g., aged 16 years or more) is larger than the combined size of the inner touch-sensitive area 301 and the isolation area 302.

[0051] In other words, the different touch-sensitive areas 301, 303 and the isolation area 302 of the lock control element 200 may be designed such that

- a typical child's index finger 211 (e.g., of a child aged 6 years or less) cannot touch the inner touch-sensitive area 301 and the outer touch-sensitive area 303 concurrently; and
- a typical adult's index finger 211 (e.g., of an adult aged 16 years or more) can touch the inner touch-sensitive area 301 and the outer touch-sensitive area 303 concurrently.

[0052] For this purpose, the diameter of the isolation area 302 may be selected based on the average size 313 of the fingertip of a user at a certain age 314 (e.g., 16 years old).

[0053] Hence, a lock control element 200 adapted to the fingertip size 311 of users is described. If the fingertip size 311 of the fingertip is bigger than the isolation area 302, the lock system can be activated or deactivated. Otherwise, with a small-sized finger, it is not possible to control the lock system.

[0054] As indicated in Fig. 4, the fingertip size 311 of humans increases with increasing age 312. This characteristic is used for selecting the sizes of the different touch-sensitive areas 301, 303 and the isolation area 302 of a lock control element 200.

[0055] The lock control element 200 may be implemented as a rectangular shaped touch-sensitive areas 301, 303 and the isolation area 302 on a touch-sensitive display. The user may press an index finger 211 on the touch-sensitive areas 301, 303 and the isolation area 302 in order to activate or deactivate the lock feature. Within the touch sensitive area 301, 303, there is an isolation area 302 where no detection is possible.

[0056] The isolation area 302 may be e.g., 200mm^2, so that it is larger than the fingertip size 311 of a typical child of around 6 years. This means that children who are less than 6 years old cannot control the lock system, because their fingertip size 311 is smaller than the isolation area 302.

[0057] The lock control element 200 may be designed such that even if a child touches somewhere on the touch-sensitive area 301, 303, the lock system will not react. For this purpose, it may be necessary that in addition to touching the inner touch-sensitive area 301, a peripheral touch on the outer touch area 303 may be necessary for providing a complete connection. In other words, a user needs to touch the inner and outer touch-sensitive areas 301, 303 at the same time, in order to control the lock mechanism. As an adult's index finger 211 is typically larger than the isolation area 302, an adult's index finger 211 is typically able to touch the touch-sensitive areas 301, 303 completely and to thereby activate or deactivate the lock function. On the other hand, a child's index finger 211 is typically not able to touch the touch-sensitive areas 301, 303 completely, such that a child cannot activate or deactivate the lock function.

[0058] Fig. 5 shows a control element 200 similar to the control element 200 of Fig. 3, however without the inner touch-sensitive area 301. Instead, the entire inner section of the control element 200 is covered by the non-sensitive isolation area 302. The aspects which have been described with regards to the control element 200 of Fig. 3 are also applicable to the control element of Fig. 5. By reducing the number of different touch-sensitive isolation areas 302, the cost of the control element 200 may be reduced, without impacting the reliability for controlling the lock function of a household appliance 100.

[0059] A control unit 101 (of the control element 200) may be configured to determine whether or not the outer touch-sensitive area 303 of the control element 200 has been touched. The touch system of the appliance 100 may be activated or deactivate, if it is determined that the outer touch-sensitive area 303 of the control element 200 has been touched. Otherwise, the touch event may be ignored.

[0060] Fig. 6 shows a flow chart of a (possibly computer-implemented) method for controlling a lock system of a household appliance 100 using a control element 200 which comprises a plurality of different touch-sensitive areas 201, 202, 203, 301, 303. The different touch-sensitive areas 201, 202, 203, 301, 303 may be isolated from one another. As outlined in the context of Fig. 2, the different touch-sensitive areas 201, 202, 203 may be arranged on the straight line 220. Alternatively, or in addition, the different touch-sensitive areas 301, 303 may be arranged in an encapsulated manner, with one touch-sensitive area 303 enclosing another touch-sensitive area 301 (as shown e.g., in Fig. 3).

[0061] The different touch-sensitive areas 301, 303 may be implemented using a touch sensitive layer, e.g.,

a capacitive and/or a resistive layer.

[0062] The method comprises determining whether or not the plurality of different touch-sensitive areas 201, 202, 203, 301, 303 has been touched concurrently (by a user with one or more fingers 211, 212, 213).

[0063] Furthermore, the method comprises controlling the lock system of the household appliance 100 in dependence on whether or not the plurality of different touch-sensitive areas 201, 202, 203, 301, 303 has been touched concurrently. In particular, the lock system may be activated or deactivated, if it is determined that the plurality of different touch-sensitive areas 201, 202, 203, 301, 303 has been touched concurrently. On the other hand, the user input may be ignored.

[0064] Hence, measures are described for increasing the difficulty level for controlling the lock system of an appliance 100 using touch events, while not (substantially) increasing the comfort-of-use for controlling the lock system. By doing this, the safety and reliability of an appliance may be increased in a comfortable manner.

[0065] It should be noted that the description and drawings merely illustrate the principles of the proposed methods and systems. Those skilled in the art will be able to implement various arrangements that, although not explicitly described or shown herein, embody the principles of the invention and are included within its spirit and scope. Furthermore, all examples and embodiment outlined in the present document are principally intended expressly to be only for explanatory purposes to help the reader in understanding the principles of the proposed methods and systems. Furthermore, all statements herein providing principles, aspects, and embodiments of the invention, as well as specific examples thereof, are intended to encompass equivalents thereof.

REFERENCES

[0066]

100. Household appliance
101. Control unit
102. Locking door
110. Control panel
111. Display
112. First lock control element
113. Second lock control element
200. Control element
201. First touch-sensitive area
202. Second touch-sensitive area
203. Third touch-sensitive area
211. Index finger
212. Middle finger
213. Ring finger
220. Straight line
301. Inner touch-sensitive area
302. Isolation area
303. Outer touch-sensitive area
311. Fingertip size
312. Age
313. Average size
314. Certain Age

Claims

1. Control element (200) for a household appliance (100); wherein the control element (200) comprises

   - a plurality of different touch-sensitive areas (201, 202, 203, 301, 303); and
   - a control unit (101) configured to

     - determine whether or not the plurality of different touch-sensitive areas (201, 202, 203, 301, 303) has been touched concurrently; and
     - control a lock system of the household appliance (100) in dependence on whether or not the plurality of different touch-sensitive areas (201, 202, 203, 301, 303) has been touched concurrently.

2. Control element (200) of claim 1, wherein the plurality of different touch-sensitive areas (301, 303) comprises an inner touch-sensitive area (301) and an outer touch-sensitive area (303) which are separated by an intermediate, non-sensitive, isolation area (302).

3. Control element (200) of claim 2, wherein

   - the inner touch-sensitive area (301) has a circular, oval or rectangular shape; and/or
   - the isolation area (302) is ring-shaped and/or completely encloses the inner touch-sensitive area (301); and/or
   - the outer touch-sensitive area (303) is ring-shaped and/or completely or partially encloses the isolation area (302), at least in a plurality of different, in particular opposed, directions.

4. Control element (200) of any of claims 2 to 3, wherein the inner touch-sensitive area (301), the isolation area (302) and the outer touch-sensitive area (303) are such that

   - An index finger (211) with a pre-determined child fingertip size cannot touch the inner touch-sensitive area (301) and the outer touch-sensitive area (303) concurrently; and
   - An index finger (211) with a pre-determined adult fingertip size can touch the inner touch-sensitive area (301) and the outer touch-sensitive area (303) concurrently; wherein the adult fingertip size is larger than the child fingertip size.

5. Control element (200) of claim 4, wherein the child fingertip size is 250mm^2 or less, or 200mm^2 or less.

6. Control element (200) of any of claims 2 to 5, wherein

- the outer touch-sensitive area (303) encloses the inner touch-sensitive area (301) in a plurality of different directions, in particular in at least two opposite directions; and
- the control unit (101) is configured to

  - determine whether or not the outer touch-sensitive area (303) has been concurrently touched at the plurality of different directions; and
  - control the lock system of the household appliance (100) in dependence on whether or not the outer touch-sensitive area (303) has been concurrently touched at the plurality of different directions.

7. Control element (200) of claim 6, wherein

- the outer touch-sensitive area (303) comprises a plurality of different segments in the plurality of different directions with respect to the inner touch-sensitive area (301); and
- the control unit (101) is configured to

  - determine whether or not the plurality of different segments of the outer touch-sensitive area (303) has been touched concurrently; and
  - control the lock system of the household appliance (100) in dependence on whether or not the plurality of different segments of the outer touch-sensitive area (303) has been touched concurrently.

8. Control element (200) of any of the previous claims, wherein the different touch-sensitive areas (201, 202, 203) are arranged on the straight line (220) and are arranged such that the plurality of different touch-sensitive areas (201, 202, 203) can be touched concurrently by different fingers (211, 212, 213) of a user's hand, respectively.

9. Control element (200) of any of the previous claims, wherein the different touch-sensitive areas (201, 202, 203) are spaced apart from one another such that

- the different touch-sensitive areas (201, 202, 203) can be touched concurrently by different fingers (211, 212, 213) of one typical hand of an adult; and
- the different touch-sensitive areas (201, 202, 203) cannot be touched concurrently by different fingers (211, 212, 213) of one typical hand of a child aged 8 years of less.

10. Control element (200) of any of the previous claims, wherein the plurality of different touch-sensitive areas (201, 202, 203) comprises three different touch-sensitive areas (201, 202, 203) which are arranged such that the three different touch-sensitive areas (201, 202, 203) can be touched concurrently with the index finger (211), the middle finger (212) and the ring finger (213) of one hand, respectively.

11. Control element (200) of any of the previous claims, wherein the control unit (101) is configured to

- activate or deactivate the lock system of the household appliance (100), if it is determined that the plurality of different touch-sensitive areas (201, 202, 203, 301, 303) has been touched concurrently; and/or
- maintain the lock system of the household appliance (100) unchanged, if it is determined that the plurality of different touch-sensitive areas (201, 202, 203, 301, 303) has not been touched concurrently.

12. Control element (200) of any of the previous claims, wherein the control unit (101) is configured to

- determine a plurality of fingertip sizes of a corresponding plurality of fingertips having concurrently touched the corresponding plurality of different touch-sensitive areas (201, 202, 203); and
- control, in particular activate or deactivate, the lock system of the household appliance (100) in dependence of the plurality of fingertip sizes.

13. Control element (200) for a household appliance (100); wherein the control element (200) comprises

- an outer touch-sensitive area (303) which surrounds a, non-sensitive, the isolation area (302); wherein the isolation area (302) and the outer touch-sensitive area (303) are such that

  - an index finger (211) with a pre-determined child fingertip size cannot touch the isolation area (302) and the outer touch-sensitive area (303) concurrently; and
  - an index finger (211) with a pre-determined adult fingertip size can touch the isolation area (302) and the outer touch-sensitive area (303) concurrently; wherein the adult fingertip size is larger than the child fingertip size; and

- a control unit (101) configured to

- determine whether or not the outer touch-sensitive area (303) has been touched; and
- control a lock system of the household appliance (100) in dependence on whether or not the outer touch-sensitive area (303) has been touched.

14. Household appliance (100) comprising,

- a lock system for locking a user interface and/or for locking access to an operating room of the household appliance (100); and
- a control element (200) according to any of the previous claims, configured to control the lock system.

15. A method for controlling a lock system of a household appliance (100) using a control element (200) which comprises a plurality of different touch-sensitive areas (201, 202, 203, 301, 303); wherein the method comprises,

- determining whether or not the plurality of different touch-sensitive areas (201, 202, 203, 301, 303) has been touched concurrently; and
- controlling the lock system of the household appliance (100) in dependence on whether or not the plurality of different touch-sensitive areas (201, 202, 203, 301, 303) has been touched concurrently.

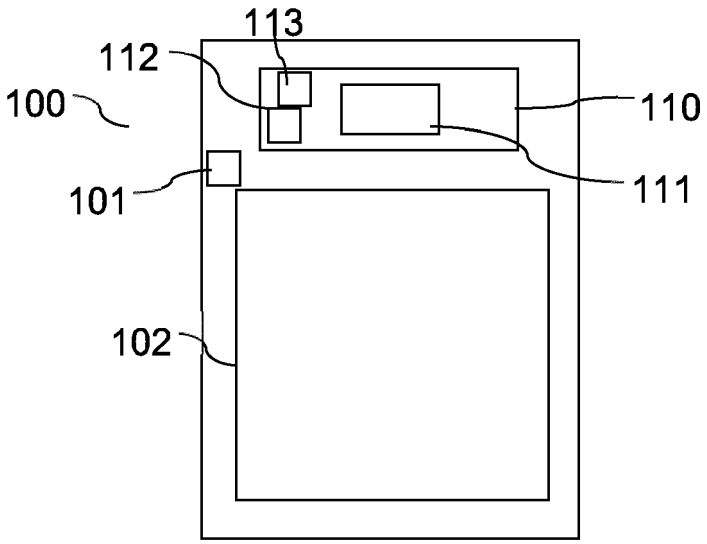

FIG. 1

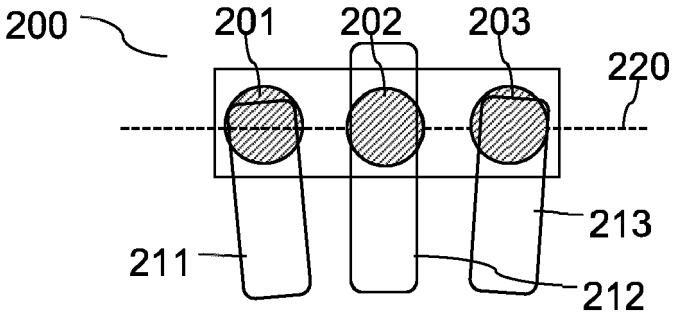

FIG. 2

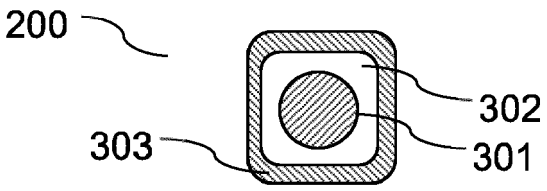

FIG. 3

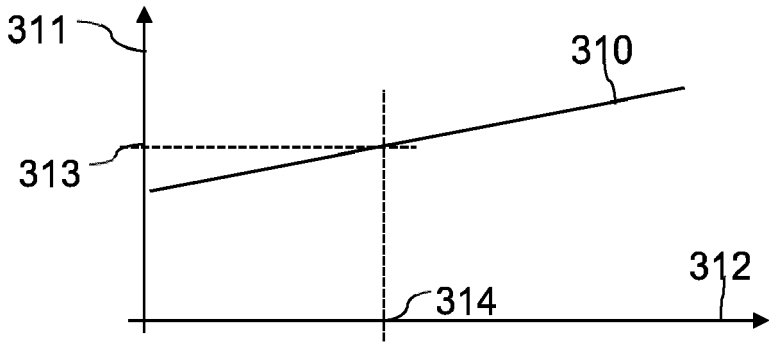

FIG.4

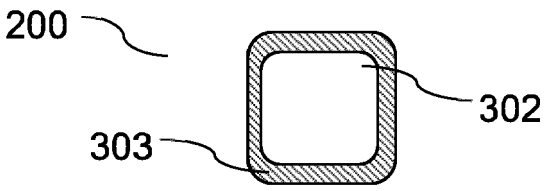

FIG.5

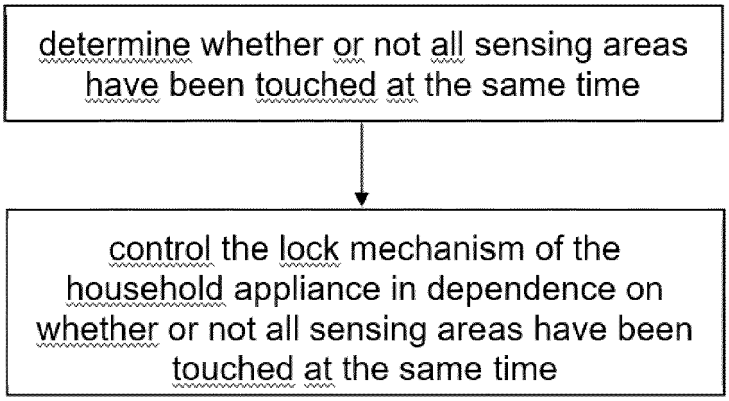
determine whether or not all sensing areas have been touched at the same time
control the lock mechanism of the household appliance in dependence on whether or not all sensing areas have been touched at the same time

FIG. 6

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EUROPEAN SEARCH REPORT

Application Number
EP 22 17 5894

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Place of search	Date of completion of the search	Examiner
The Hague	10 October 2022	Jalal, Rashwan

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