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— *of inventorship (Rule 4.17(iv))*

(54) **Title:** SELF-STERILIZING DOOR HANDLE WITH AUTOMATICALLY AND HORIZONTALLY ROTATING COVER

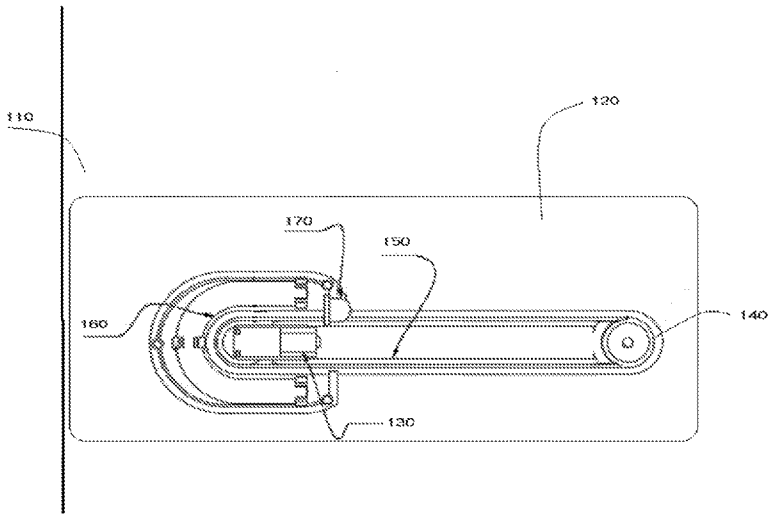

Fig 1

(57) **Abstract:** The current invention is about a method, system and apparatus for sterilizing a door handle comprising an automatically and horizontally rotating a door handle cover to allow the germicide process. Current invention is configured to attach to a door. The germicide source is an ultraviolet light. The invention further comprises a motor configured to change the position of the cover into a horizontally rotating position such that the cover rotates during application of the germicide.

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DESCRIPTION

TITLE OF INVENTION: SELF-STERILIZING DOOR HANDLE WITH AUTOMATICALLY AND HORIZONTALLY ROTATING COVER

FIELD OF THE INVENTION

This invention relates generally to sterilization of door handles and more particularly to sterilization of a door handle through exposure of automatically and horizontally rotating cover to ultraviolet light.

BACKGROUND OF THE INVENTION

Door handles are usually a common surface that are used by many people in their daily life especially in public or crowded places such as: airports, malls, schools, hospitals, subways, workplaces etc. So they may be considered as an infection spreading factor. Since the door handle is a common surface that is used by many people at the same day, and the importance of sterilizing it, many solutions where presented, such as manual sterilization which needs time, material and staff or solutions that are of high cost changes or installations to the existing door handles.

SUMMARY OF INVENTION

The present invention provides a kind of self-sterilizing door handle with an automatically and horizontally rotating door handle cover that can be convenient to overcome defects in the prior art.

The present invention is achieved through the following technical solutions:

Self-sterilizing door handle is characterized in that it is equipped with an ultraviolet lamp at door handle body side, an automatically and

horizontally rotating door handle cover, one or motor, and one or more sensor.

The invention has the beneficial effects as follows: this is with the self-sterilizing door handle , is fit to each family and uses, and is easy to use, effectively sterilizes door handle at any time, a to avoid spread of germicides among people.

The present invention seeks to provide a solution to these problems by providing a self-sterilizing door handle method, system and apparatus whereby provided with automatically and horizontally rotating cover that is exposed to a germicidal UVC light while rotating. Which allows continuous sterilization of the handle surface. Present invention also can be installed as replacement for most of the common door handles without any major high cost changes to the door and does not need continuous supply of consumables or materials.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 illustrates in an exemplary embodiment of door comprises a doorplate is attached to door.

FIG. 2 illustrates an exemplary usage scenario in which a door user will interact with the door according to steps identified in.

FIG. 3 illustrates a system comprising a door configured with a door handle sterilizer apparatus mounted to a doorplate.

DETAILED DESCRIPTION

Various modifications and additions can be made to the exemplary embodiments discussed without departing from the scope of the present invention. For example, while the embodiments described refer to particular features, the scope of this invention also includes embodiments having different combinations of features and embodiments that do not

include all of the described features. Accordingly, the scope of the present invention is intended to embrace all such alternatives, modifications, and variations as fall within the scope of the claims, together with all equivalents thereof.

The self-sterilizing door handle can be powered by a variety of different power sources. Illustrative but non-limiting examples of suitable power sources include a DC power source (such as one or more batteries) or an AC power source such as a cord connection. In addition, an integrated solar panel can collect electrical energy from ambient light and can store the collected electrical energy in the DC power source until needed.

A preferred embodiment of the current disclosure a method for sterilizing a door handle is provided. An ultra violet lamp and a door handle are positioned a position whereby the lamp sterilizes a handle from germs. The ultra violet lamp and the door handle are positioned into position that allows the sterilization process whereby the door handle is still accessible to the user to open the door.

In accordance with an embodiment, a door handle system is provided. The door handle system comprises a door handle, an automatically and horizontally rotating door handle cover, and an ultraviolet lamp as a germicide source configured to disinfect the door handle. The door handle system further comprises a motor configured to change the relative position of automatically and horizontally rotating cover such that the cover rotates to provide diffuse and continuous germicide process.

In accordance with an embodiment, an apparatus that is configured to attach to a door comprising a self-sterilizing door handle is provided. The apparatus comprises a doorplate configured to attach to the door, an automatically and horizontally rotating door handle cover, and an ultra violet lamp configured to disinfect the door handle. The apparatus further

comprises a motor configured to change the relative position of the automatically and horizontally rotating cover covering door handle by rotation during the germicide process.

In accordance with certain embodiments, the germicide process comprises illuminating an ultraviolet light while automatic horizontally rotation of the cover of the door handle such that the door handle remains stationary.

In accordance with an embodiment, a motion or pressure sensor may installed to the door handle and generate a signal based on the sensing. According to certain embodiments of the current invention, information to initiate the germicide process may be received and a command may be transmitted, the command comprising information to start the germicide process.

In an exemplary embodiment, illustrated in FIG. 1, door 110 comprises a doorplate 120 is attached to door 110. Doorplate 120 is further attached to control unit, door handle 150, an automatically and horizontally rotating door handle cover and an ultra violet lamp as a germicide source 160. In an exemplary embodiment, control box 130 is mechanically connected to one or motor mounted on the door handle 150, handle 150 Control box 130 may be configured to rotate the cover 140 automatically and horizontally on the door.

In certain embodiments sensor system may comprise a plurality of sensors. The plurality of sensors may comprise sensors of various types, for example: a motion sensor or a pressure sensor to detect motion or pressure to the door handle 150.

In an exemplary embodiment, control box 130 may comprise power system. In certain embodiments power system may receive power via a connection to the electrical system of a building in which it operates. In certain embodiments, power system may receive power from a wireless source. In certain embodiments, power system may receive power from a solar cell or a similar local power source. In an exemplary embodiment, germicide source may be deactivated by a termination signal that is received from control box 130.

In certain embodiments, germicide source 160 may emit ultraviolet light to kill germs or otherwise prevent the spread of germs. In an exemplary embodiment, germicide source 160 may comprise an ultraviolet light that provides ultraviolet light whose emitted dose has been selected to efficiently disinfect the surface of the automatically rotating cover of the door handle 150. Ultraviolet light with a wavelength may sometimes be referred to as ultraviolet-C light.

In certain embodiments, germicidal source 160 may execute a germicide process to disinfect door handle 150. For example, in an embodiment where germicidal source 160 comprises an ultraviolet light, a germicide process may be a time period during which door handle 150 is illuminated with the ultraviolet light.

In certain embodiments, cover 140 may be selected to have characteristics appropriate for a particular germicide source 160. For example, in an embodiment in which into germicide source 160 comprises an ultraviolet light source, cover 140 may be a material that will block ultraviolet light. For example, exposure to ultraviolet light can be damaging to the eyes of people or pets and potentially damaging to individuals who have sensitive skin. Furthermore, exposure to ultraviolet light can be harmful to certain objects. In an exemplary embodiment, cover 140 may comprise a material that is opaque to ultraviolet light such as a metal sheet or rubber or an appropriately selected plastic.

In an exemplary usage scenario a door user will interact with door 110 according to steps identified in FIG. 2. In step 250, user turns door handle 150 to an open position performing pressure or motion to the door handle. In step 251, the door user releases door handle 150. In step 252, automatically and horizontally rotating cover rotation of the door handle cover 150 is in position for exposure to germicide source 160. In step 253, door 110 returns to its closed position. In step 254, germicide process is complete and sensor system may confirm successful completion of sterilization process. In step 255, germicide process is initiated to sterilize door handle 150. In step 256, cover 140 and door handle 150 return to the door open position.

FIG. 3 shows a system comprising a door configured with a door handle sterilizer apparatus mounted to a doorplate in accordance with an embodiment. Door comprises doorplate 320, handle 350 and a door handle cover 340. The apparatus is further connected to box 330 which comprises various elements of door handle sterilizer 360 as shown. Box 330 may be mounted on door 310. In an embodiment, door handle 350 and doorplate 320 may be mounted on an existing door 310 as part of an "after-market" device to provide door handle sterilization to a door that has already been installed in an environment.

In various embodiments, the method steps described herein, including the method steps described may be performed in an order different from the particular order described or shown. In other embodiments, other steps may be provided, or steps may be eliminated, from the described methods.

The foregoing Detailed Description is to be understood as being in every respect illustrative and exemplary, but not restrictive, and the scope of the invention disclosed herein is not to be determined from the Detailed Description, but rather from the claims as interpreted according to the full

breadth permitted by the patent laws. It is to be understood that the embodiments shown and described herein are only illustrative of the principles of the present invention and that various modifications may be implemented by those skilled in the art without departing from the scope and spirit of the invention. Those skilled in the art could implement various other feature combinations without departing from the scope and spirit of the disclosure.

CLAIMS

1. A method for sterilizing a door handle comprising:

- rotating a door handle cover;

- activating the germicide process; and

- positioning the cover to allow the germicide process.

2. The method of claim 1, wherein the germicide process comprises:

- illuminating an ultraviolet light.

3. The method of claim 1, wherein the door handle cover rotates automatically and horizontally, while the door handle remains stationary.

4. The method of claim 1, further comprising:

- sensing motion or pressure to the door; and

- generating a signal based on the sensing.

5. The method of claim 1, further comprising:

receiving information associated with the germicide process; and

transmitting a command comprising information associated with the germicide process.

6. A door handle system comprising:

- a door handle;

- a door handle cover;

- a germicide source configured to disinfect the door handle;

- a motor configured to change the position of the cover into an automatically horizontally rotating position such that the cover rotates during application of the germicide.

7. The system of claim 6, wherein the motor is configured to rotate the cover horizontally.

8. The system of claim 6, wherein the germicide source comprises:

an ultraviolet light.

9. The system of claim 6, wherein the motor is configured to rotate the cover automatically and horizontally while the door handle remains stationary.

10. The system of claim 6, further comprising:

- a sensor configured to detect motion or pressure to the door; and

- an interface configured to generate a signal based on the detection of motion or pressure.

11. An apparatus configured to attach to a door comprising a door handle, the apparatus comprising:

- a doorplate configured to attach to the door;

- a cover;

- a germicide source configured to disinfect the door handle; and

a motor configured to change the position of the cover into a horizontally rotating position such that the cover rotates during application of the germicide.

12.The apparatus of claim 11, wherein the germicide source comprises:

an ultraviolet light.

13.The apparatus of claim 11, wherein the motor is configured to automatically and horizontally rotate the cover while the door handle remains stationary.

14.The apparatus of claim 11, further comprising:

a sensor configured to detect motion or pressure to the door; and

an interface configured to generate a signal based on the detection of the object.

FIGURES

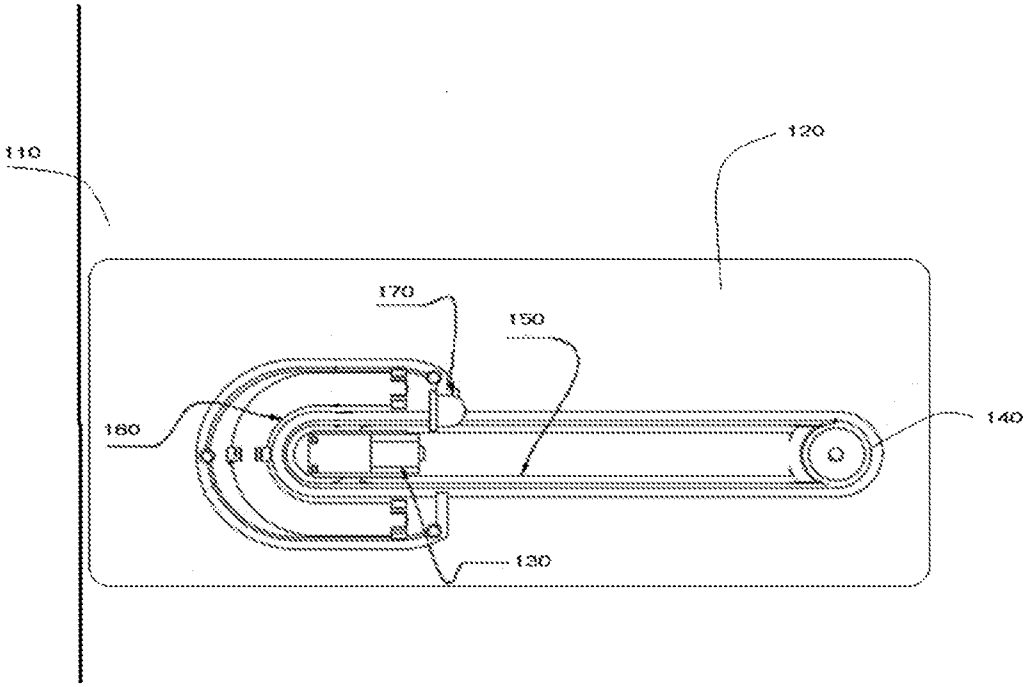

Fig 1

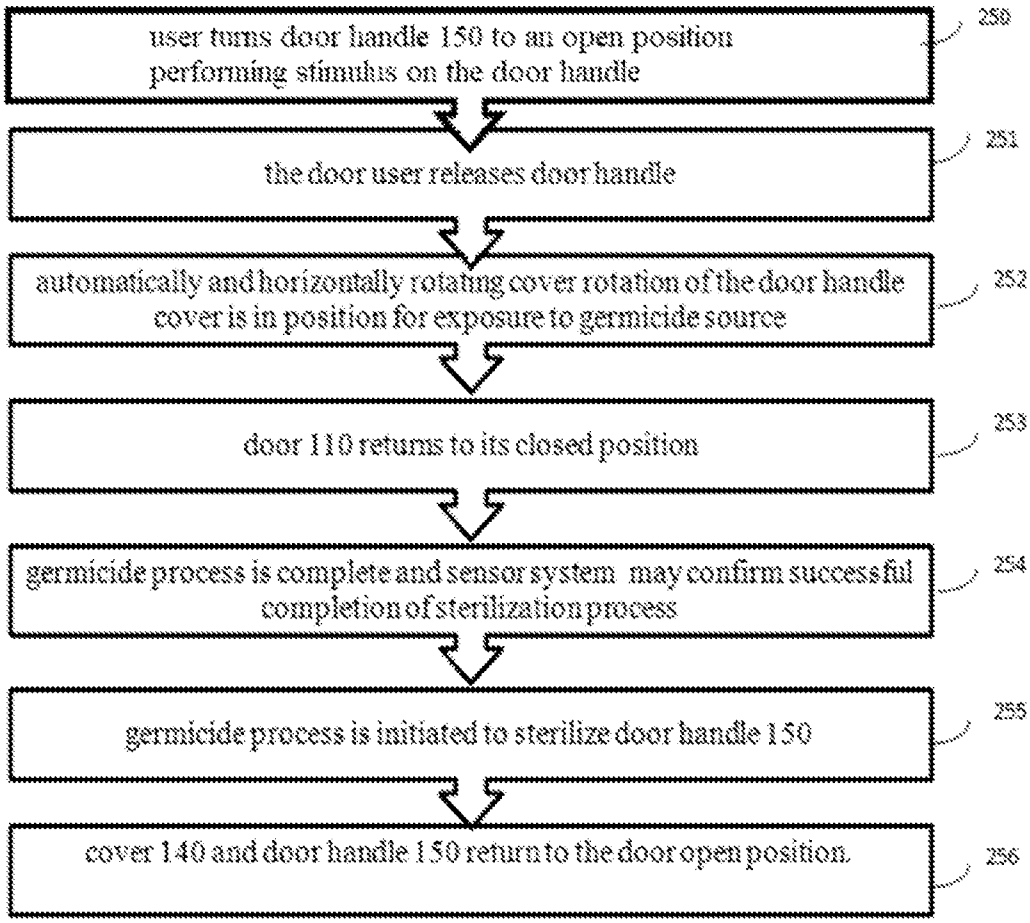
user turns door handle 150 to an open position performing stimulus on the door handle
250
the door user releases door handle
251
automatically and horizontally rotating cover rotation of the door handle cover is in position for exposure to germicide source
252
door 110 returns to its closed position
253
germicide process is complete and sensor system may confirm successful completion of sterilization process
254
germicide process is initiated to sterilize door handle 150
255
cover 140 and door handle 150 return to the door open position.
256

Fig 2

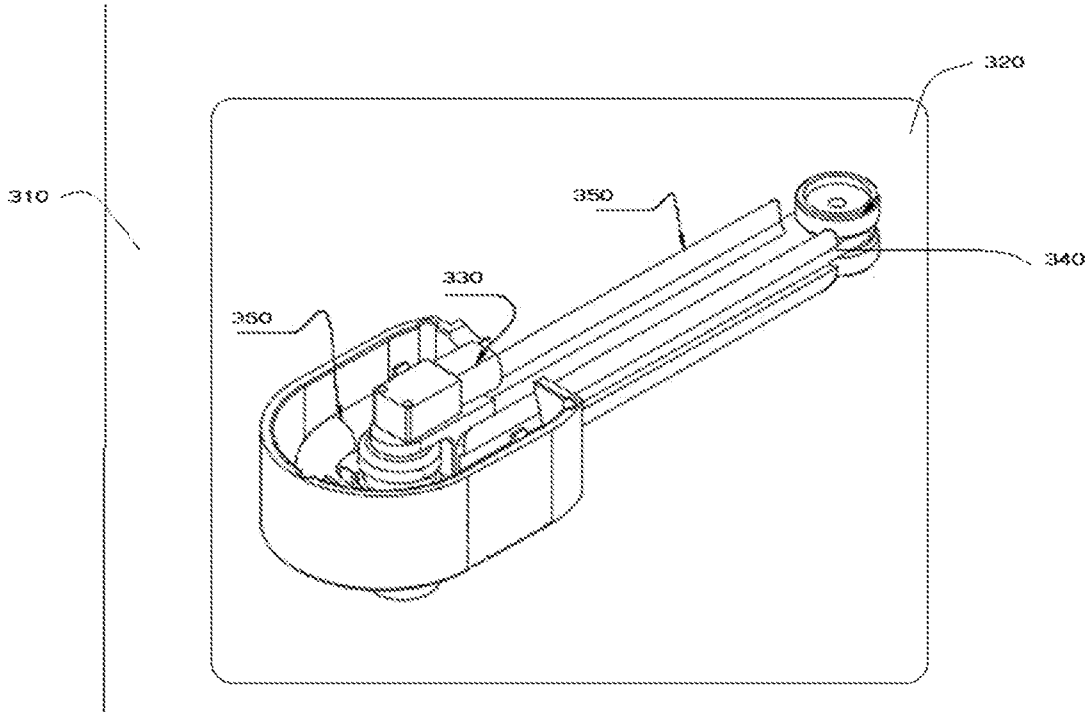

Fig 3

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB2020/059572

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - A47L 25/04; A47L 25/00; A61L 2/10; A61L 2/24; A61L 2/26; E05B 1/00 (2021.01)
CPC - A47L 25/04; A47L 25/00; A61L 2/10; A61L 2/24; A61L 2/26; E05B 1/00; E05B 1/0069 (2021.02)

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)
see Search History document

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

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 9,015,905 B1 (MINIMAX, INC.) 28 April 2015 (28.04.2015) entire document	1-14
A	US 2007/0145292 A1 (JONES) 28 June 2007 (28.06.2007) entire document	1-14
A	US 2009/0145992 A1 (LAVY) 11 June 2009 (11.06.2009) entire document	1-14
A	US 2012/0176241 A1 (PASCH et al) 12 July 2012 (12.07.2012) entire document	1-14

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

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"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	Date of mailing of the international search report
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