ROOM AIR PURIFIER WITH RFID READER

Background

Room air purifiers are often used to purify (e.g., to remove at least some fine particles from) ambient air e.g. in rooms of houses, condominiums, apartments, offices, and so on.

Summary

In broad summary, herein is disclosed a room air purifier comprising an RFID reader and a wireless communication unit, and methods of using such a room air purifier.

An aspect of the disclosure provides a room air purifier including a housing, an electric motor, at least one RFID reader, and a wireless communication unit. The housing defines an air inlet, an air outlet, and an airflow path therethrough. The housing includes an air filter receptacle that is configured to receive at least one disposable air filter so that a filter medium of the disposable air filter is in the airflow path. The electric motor is mounted within the housing and includes a fan connected thereto, the fan positioned in the airflow path and configured to motivate air to pass through the filter medium of the disposable air filter. The at least one RFID reader is positioned and configured to read an RFID tag that is attached to the at least one disposable air filter, and to communicate information that is read from the RFID tag, to a main control unit of the room air purifier. The wireless communication unit allows the main control unit of the room air purifier to communicate information that is read from the RFID tag by the RFID reader, to an external device.

Another aspect of the disclosure provides a remotely monitorable room air purifier system including a room air purifier and a portable external device. The room air purifier includes a housing, an electric motor, at least one RFID reader, and a wireless communication unit. The housing defines an air inlet, an air outlet, and an airflow path therethrough. The housing includes an air filter receptacle that is configured to receive at least one disposable air filter so that a filter medium of the disposable air filter is in the airflow path. The electric motor is mounted within the housing and includes a fan connected thereto, the fan positioned in the airflow path and configured to motivate air to pass through the filter medium of the disposable air filter. The at least one RFID reader is positioned and configured to read an RFID tag that is attached to the at least one disposable air filter, and to communicate information that is read from the RFID tag, to a main control unit of the room air purifier. The wireless communication unit allows the main control unit of the room air purifier to communicate information that is read from the RFID tag by the RFID reader, to an external device. The portable external device is configured to receive information communicated by the wireless communication unit of the room air purifier, such that operation of the room air purifier can be monitored by way of the portable external device.

Another aspect of the disclosure provides a method of operating a room air purifier. The method includes reading information from an RFID tag of a disposable air filter installed within the room air purifier; over a time interval during which the room air purifier is operating to purify room air, collecting a first data set indicative of the average concentration of fine particles in the air purified by the room air purifier; over the time interval, collecting a second data set indicative of the average speed with which an

electric motor-driven fan of the room air purifier operates; collecting a third data set indicative of the length of the time interval; combining the first, second and third data sets into fourth, combined data set, and using the fourth data set to obtain an estimate of the usable lifetime remaining for the disposable air filter; and wirelessly communicating the estimate of the usable lifetime of the disposable air filter to an external device, along with at least some of the information that was read from the RFID tag of the disposable air filter.

These and other aspects will be apparent from the detailed description below. In no event, however, should this broad summary be construed to limit the claimable subject matter, whether such subject matter is presented in claims in the application as initially filed or in claims that are amended or otherwise presented in prosecution.

Brief Description of the Drawings

Fig. 1 is a front-side perspective view of an exemplary room air purifier as disclosed herein.

Fig. 2 is a front-side perspective partially exploded view of an exemplary room air purifier with a front cover panel omitted to show an exemplary air filter assembly.

Fig. 3 is a front-side perspective partially exploded view of an exemplary room air purifier with a front cover panel omitted and with an air filter assembly shown in exploded view.

Fig. 4 is a front-side perspective view of an exemplary disposable air filter as disclosed herein.

Fig. 5 is a front-side perspective view of an exemplary room air purifier as disclosed herein, with a front cover panel, air filter assembly, and other internal components omitted to show an electric motor-driven fan of the room air purifier.

Fig. 6 is a block diagram illustrating exemplary components of a room air purifier.

Like reference numbers in the various figures indicate like elements. Some elements may be present in identical or equivalent multiples; in such cases only one or more representative elements may be designated by a reference number but it will be understood that such reference numbers apply to all such identical elements. Unless otherwise indicated, all figures and drawings in this document are not to scale and are chosen for the purpose of illustrating different embodiments of the invention. In particular the dimensions of the various components are depicted in illustrative terms only, and no relationship between the dimensions of the various components should be inferred from the drawings, unless so indicated. As used herein, the term “front” refers to a major side of the room air purifier that comprises an air inlet; “rear” refers to the opposite side of the room air purifier. However, these terms are used purely for convenience of description and have no limiting meaning with regard to how a room air purifier is positioned or oriented within a room. Similarly, “bottom” or “lower” end refers to the end of a room air purifier that is lowermost in ordinary operation of the room air purifier and that may be configured to rest on a floor or other horizontal surface. However, noting that in some instances a room air purifier may be e.g. attached to a wall rather than e.g. resting on a floor, this term is likewise not limiting. The terms