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(54) DOOR ENTRANCE SYSTEM

TÜREINGANGSSYSTEM

SYSTÈME D'ENTRÉE À PORTE

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(56) References cited:
WO-A1-2009/144841 **US-A- 6 084 367**

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Description

[0001] The present invention relates to a door entrance system for connecting a first area and a second area with a low energy transfer between the areas. It specifically relates to a revolving door entrance system for connecting a first area and a second area.

Background of the invention

[0002] A door entrance system typically is used for allowing people to enter and leave public buildings such as stores, offices, garages and museums etc., where a large number of persons pass through each day. Buildings in areas with high pollution can have problems with polluted air entering into the buildings and the door entrance system is one of the openings in the buildings where pollution enters, since the doors of the door entrance system is opened and closed frequently.

[0003] US6084367A1 discloses an entrance system with at least two motor driven door elements which are movable independently from each other. The door elements may be independently controlled based on a preselected criteria.

[0004] The pollution can for instance relate to buildings in cities with general smog problems, building located next to roads with high traffic or buildings located close to areas with a high concentration of allergenic particles (or other particles) that enters into the building. To create a sustainable environment for the people working and living in such buildings there is thus a need for such polluted air to be kept out of, or at least reducing the amount entering the building via the door entrance system.

[0005] Further, buildings in areas with a temperature difference between the indoor temperature of a building and the outdoor temperature, colder or hotter, can have problems with that energy in the air from the outdoors is mixed with the indoor air, i.e. the indoor air is heated or cooled, and the door entrance system is one of the openings in the buildings where the energy is transferred since the doors of the door entrance system is opened and closed frequently. To reduce the energy consumption of buildings that is used to temper the air in the buildings, the energy transferred from the outdoor air to and from the indoor air should be as low as possible. To create a sustainable environment for the people working and living in such buildings and to reduce the energy consumption, there is thus a need to reduce the energy in the air that is transferred between the indoors and outdoors of the door entrance system of a building.

Summary of the invention

[0006] An object of the present disclosure is to provide a door entrance system, which seek to mitigate, alleviate, or eliminate one or more of the above-identified deficiencies in the art and disadvantages singly or in any combination.

[0007] An object of the present disclosure is to provide a door entrance system that enables an improved indoor climate that is safeguarded against unwanted air infiltration and enabling to take reduce the energy consumption of a building

[0008] An object of the present disclosure is to provide a door entrance system that reduces the amount of polluted air entering through the door entrance system from one area into another area that the door entrance system is operated between.

[0009] An object of the present disclosure is to provide a door entrance system that reduces the amount of hot or cold air entering through the door entrance system from one area into another area that the door entrance system is operated between.

[0010] In this disclosure, a solution to the problem outlined above is proposed. In the proposed solution, a door entrance system for regulating the access between a first area and a second area is disclosed. The door entrance system comprise a first opening configured to be connected to the first area, a second opening configured to be connected to the second area and a revolving door comprising two or more wings, wherein the revolving door is positioned between the first and second opening and configured to rotate the two or more wings to control access between the first and second area through the first and second opening and the door entrance system further comprise a first door leaf moveably between a first open position and a second open position to regulate a size/width of the first opening, the door entrance system further comprising a control unit connected to the first door leaf and to a first air sensor configured to measure parameters of the air in the first area, wherein the control unit is configured to move the first door leaf between the first and second open position to regulate the size of the first opening at least based on input from the first air sensor, wherein the control unit is connected to a second air sensor configured to measure parameters of the air in the second area and is configured to move the first door leaf between the first and second open position to regulate the size of the first opening at least based on input from the first air sensor and/or the second air sensor.

[0011] By the door entrance system according to the above, air from the first area is restricted to enter into the second area by reducing the width of the first opening and thereby is also pollution, hot/cold air, humid air from the first area restricted to enter via the door entrance system and affect the second area. The width could be reduced when the need is high and increased again when there is a low need and/or when other parameters such as the amount of persons passing through the door entrance system is high and there is a need of the full capacity, i.e. the full width of the opening, of the door entrance system. A further advantage is that the door entrance system could be used in enhancing the air quality of a building in an efficient and robust way. A further advantage is that the door entrance system could be used in lowering the energy consumption of a building in an efficient and

robust way. By reducing the width of the opining the time of that air in the revolving door could be mixed with and/or transferred to the first and second area 2, is reduced.

[0012] According to an aspect the door entrance system comprise a second door leaf moveably between a first open position and a second open position to regulate a size of the second opening.

[0013] According to an aspect the first and/or second door leaf is slideably moveably between the first open position and the second open position.

[0014] According to an aspect the first air sensor is configured to measure one or more parameters of the temperature, the wind direction, the humidity, the amount of pollution and the speed of the air in the first area.

[0015] According to an aspect the second air sensor is configured to measure one or more parameters of the temperature, the wind direction, the humidity, the amount of pollution and the speed of the air in the second area.

[0016] According to an aspect the control unit is connected to the revolving door and configured to regulate the rotation of the at least two wings at least based on input from the first and/or second air sensor.

[0017] According to an aspect the revolving door comprise four of more wings and the control unit is configured to rotate the wings of the revolving door in full turns. Put in another way the wings is turned in even numbers of 360°.

[0018] According to an aspect the door entrance system comprise a first arc shaped wall at a side of the first and second opening and a second arc shaped wall at an other side of the first and second opening.

[0019] According to an aspect an inner end of the first and second arc shaped wall define the first opening and an outer end of the first and second arc shaped wall define the second opening.

[0020] According to an aspect the first and second arc shaped wall is at least partly hollow and the first and second door leaf is configured to at least partly be positioned in a hollow part of the first and/or second arc shaped wall.

[0021] According to an aspect the first and/or second door leaf is moveably to a third closed position to close the first and/or second opening.

[0022] According to an aspect the first opening is open between 100- 70% of its width when the first door leaf is positioned in the first open position and the first opening is open between 90-30% of its width when the first door leaf is positioned in the second open position.

[0023] According to an aspect the second opening is open between 100- 70% of its width when the second door leaf is positioned in the first open position and the second opening is open between 90-30% of its width when the second door leaf is positioned in the second open position.

[0024] In this disclosure, a further solution to the problem outlined above is proposed. In the proposed solution, a method for regulating a door entrance system comprising the steps of measuring, in the first air sensor, parameters of the air in the first area, comparing, in the control unit, the parameters of the air in the first area with pre-set values of the parameters in the control unit, and regulating the width of the first opening and/or second opening if the parameters of the air in the first area is below or above the pre-set values of the parameters, the method further comprise the steps of measuring, in the second air sensor, parameters of the air in the second area, comparing, in the control unit, parameters of the air in the first area with parameters of the air in the second area, and regulating the width of the first opening and/or second opening if the parameters of the air in the first area is below or above the pre-set values of the parameters.

[0025] Generally, all terms used in the claims are to be interpreted according to their ordinary meaning in the technical field, unless explicitly defined otherwise herein. All references to "a/an/the [element, device, component, means, etc.]" are to be interpreted openly as referring to at least one instance of said element, device, component, means, etc., unless explicitly stated otherwise. Further, by the term "comprising" it is meant "comprising but not limited to" throughout the application.

Brief description of the drawings

[0026] The foregoing will be apparent from the following more particular description of the example embodiments, as illustrated in the accompanying drawings in which like reference characters refer to the same parts throughout the different views. The drawings are not necessarily to scale, emphasis instead being placed upon illustrating the example embodiments and aspects.

Figure 1 discloses a schematic view of a door entrance system according to an aspect of the invention arranged in a building and its surroundings.

Figure 2 disclose a front schematic view from the first area of a door entrance system according to an aspect of the invention with the first door leaf in the second open position.

Figure 3a disclose a schematic view of a door entrance system according to an aspect of the invention comprising a revolving door system with the first door leaf in the first open position and the second door leaf in the second open position.

Figure 3b disclose a schematic view of a door entrance system according to an aspect of the invention comprising a revolving door system with the first door leaf in the second open position and the second door leaf in the second open position.

Figure 3c disclose a schematic view of a door entrance system according to an aspect of the invention comprising a revolving door system with the first door leaf in the first open position and the second door leaf in the first open position.

Figure 3d disclose a schematic view of a door entrance system according to an aspect of the invention comprising a revolving door system with the first door leaf in the second open position and the second

door leaf in the first open position.

Figure 4 discloses a schematic view of a door entrance system according to an aspect of the invention comprising a revolving door system with a three-winged revolving door.

Figure 5 discloses a schematic view of a door entrance system according to an aspect of the invention comprising a revolving door system with a two-winged revolving door.

Figure 6 disclose a schematic view of a door entrance system according to an aspect of the invention comprising a four winged revolving door system with the first door leaf in the third closed position and the second door leaf in the third closed position.

Figure 7 disclose a method according to an aspect of the invention.

Detailed description

[0027] Aspects of the present disclosure will be described more fully hereinafter with reference to the accompanying figures. The assembly disclosed herein can, however, be realized in many different forms and should not be construed as being limited to the aspects set forth herein.

[0028] The terminology used herein is for the purpose of describing particular aspects of the disclosure only, and is not intended to limit the disclosure. As used herein, the singular forms "a", "an" and "the" are intended to include the plural forms as well, unless the context clearly indicates otherwise.

[0029] Unless otherwise defined, all terms (including technical and scientific terms) used herein have the same meaning as commonly understood by one of ordinary skill in the art to which this disclosure belongs. It will be further understood that terms used herein should be interpreted as having a meaning that is consistent with their meaning in the context of this specification and the relevant art and will not be interpreted in an idealized or overly formal sense unless expressly so defined herein.

[0030] The present invention relates to door entrance systems that is mounted in buildings and that allows people to enter and leave the building in an easy and efficient manner. Further, the present invention relates to door entrance systems that enables low energy transfer between the two sides of the entrance systems and that enables a low energy consumption in heating and/or cooling a building. The present invention also relates to door entrance systems which enables a low transfer of air between the two sides of the entrance system and that enables a low transfer of polluted air into the building/room that the entrance system is located at.

[0031] In fig 1 a door entrance system 1 is disclosed. The door entrance system 1 is arranged in a building 100. The building 100 is located close to a road 110 where vehicles 101 pass by. The building 100 is also located close to trees 102, which at some parts of the year releases particles in the form of pollen.

[0032] The door entrance system 1 is mounted in the building 100 and connects a first area 2 and a second area 3. The first area 2 is according to an aspect the outside 2 of the building and the second area 3 is the inside 3 of the building 100. According to an aspect the door entrance system 1 is according to an aspect arranged inside a building 100 and the first and second areas 2, 3 are different rooms or areas in the building 100.

[0033] The first area 2 comprise air A with a number of different parameters. The second area 3 also comprise air A with a number of different parameters. The parameters of the air A is according to an aspect the temperature of the air. The parameters of the air A is according to an aspect the humidity of the air. The parameters of the air A is according to an aspect the speed of the air, i.e. the wind speed of the air. The parameters of the air A is according to an aspect the amount of pollution in the air. The parameters of the air A is according to an aspect the amount of particles in the air. The parameters of the air A is according to an aspect the direction of the air, i.e. the wind direction.

[0034] When the first area 2 is the outside, the parameters of the air are the parameters of the outside air A. When the second area 3 is the inside of the building, the parameters are parameters of the parameters of the air A the building. The parameters of the air A in the first and second area 2, 3 depends on many different things such as weather, temperature, wind and ventilation systems. However, the parameters of the air in the first and second area 2, 3 also depends on the number of persons passing or entering the door entrance system 1, elevators moving in the building 60 etc. The parameters of the air in the first and second area 2, 3 thus constantly changes in front of the door entrance system 1.

[0035] The door entrance system 1 comprises, as disclosed in fig 1-6, a first opening 10, a second opening 20, a revolving door 30 and a first door leaf 40. The first opening 10 is configured to be connected to the first area 2, as is disclosed in fig 1. The second opening 20 is configured to be connected to the second area 3, as is disclosed in fig 1. The revolving door 30 comprising two or more wings 31. According to an aspect the revolving door 30 is a two winged 31 revolving door 30, i.e. the revolving door 30 comprise two wings 31 as disclosed in figure 5. According to an aspect the revolving door 30 is a three winged 31 revolving door 30, i.e. the revolving door 30 comprise three wings 31 as disclosed in figure 4. According to an aspect the revolving door 30 is a four winged 31 revolving door 30, i.e. the revolving door 30 comprise four wings 31 as disclosed in figure 1-4 and 6.

[0036] The revolving door 30 is positioned between the first and second opening 10, 20. Put in another way, a third area 90 is located between the first and second openings 10, 20 and the revolving door 30 is positioned in said third area. The revolving door 30 is configured to rotate the wings 31. By controlling the rotation of the wings 31 the entrance system can control the access between the first and second area 2, 3 through the first

and second opening 10, 20. If there are a large amount of people that would like to enter through the entrance system 1, the speed of the rotation of the wings 31 could be increased.

[0037] The third area 90 is an area between the first area 2 and the second area 3. According to an aspect the third area 90 is a vestibule or a hall in the door entrance system 1. According to an aspect the third area 90 comprises the first opening 10 and the second opening 20. The first opening 10 is configured to be connected to the first area 2. The second opening 20 is configured to be connected to the second area 3 to connect the door entrance system 1 to the first area 2. When a person in the first area 2 enters into the second area 3 via the door entrance system 1, the person passes through the first opening 10 into the third area 90 and the revolving door 30 and thereafter leaves the third area 90 by passing through the second opening 20 and entering into the second area 3. The door entrance system 1 is also suitable for persons to pass through the door entrance system 1 in the opposite direction, i.e. from the second area 3 to the first area 2. Put in another way, the door entrance system 1 is configured to assist persons to pass it in both directions.

[0038] The first and second area 10, 20 are according to an aspect the area directly in front of the first and second opening 31, 32. The size of the first and second areas could vary from different systems and could be set/adjusted based on the location at which the door entrance system is installed and its surroundings.

[0039] The first door leaf 40 is moveably between a first open position O1 and a second open position O2 to regulate a width W of the first opening 10. By width is meant the size of the opening that a person that intends to walk through the entrance system 1 enters into or leaves through the first opening 10. The width W is according to an aspect the distance between one end of the first opening 10 and the first door leaf 40. The width W is according to an aspect the arc distance between one end of the first opening and the first door leaf 40. According to an aspect the radius of the arc is corresponding to the radius of the revolving door 30. The opening 10 is open in both the first and second open positions O1, O2 of the first door leaf 40. The first door leaf 40 does not close the opening when it is moved between the first open position O1 and the second open position O2, it only reduces or increases the width W of the first opening 10. The first door leaf 40 could be positioned in any positions between the first open position O1 and the second open position O2.

[0040] According to an aspect the door entrance system 1 further comprise a second door leaf 50. The second door leaf 50 is moveably between a first open position O1 and a second open position O2 to regulate a size W of the second opening 20. By width is meant the size of the opening that a person that intends to walk through the entrance system 1 enters into or leaves through the second opening 20. The width W is according to an aspect the distance between one end of the second opening and the second door leaf 50. The width W is according to an aspect the arc distance between one end of the second opening 20 and the second door leaf 50. According to an aspect the radius of the arc is corresponding to the radius of the revolving door 30. The opening 20 is open in both the first and second open positions O1, O2 of the second door leaf 50. The second door leaf 50 does not close the opening when it is moved between the first open position O1 and the second open position O2, it only reduces or increases the width W of the second opening 20. The second door leaf 50 could be positioned in any positions between the first open position O1 and the second open position O2.

[0041] The term first and second opening position O1, O2 is used in relation to the positions of the first door leaf 40 and the second door leaf 50. This is used to better describe the function of the first and second door leaf 40, 50 in a more clear way. The first and the second open position O1, O2 of the first door leaf 40 is not the same actual position as the first and second open position O1, O2 of the second door leaf 50, however, they are corresponding positions in the respective first and second opening 10, 20. The first and the second door leaf 40, 50 are according to an aspect moved in a synchronized way. Put in another way, the first and second door leaf 40, 50 are moved in the corresponding manner between their corresponding first and the second open position O1, O2.

[0042] According to an aspect the first door leaf 40 is connected to the first opening 10. According to an aspect the first door leaf 40 is positioned at the first opening 10. According to an aspect the second door leaf 50 is connected to the second opening 20. According to an aspect the second door leaf 50 is positioned at the second opening 20.

[0043] According to an aspect the door entrance system 1 comprise a control unit 60 and a first air sensor 11, as is disclosed in fig 2. The control unit 60 is connected to the first door leaf 40 and to the first air sensor 11. The first air sensor 11 is configured to measure parameters of the air A in the first area 2. The control unit 60 is configured to receive input from the first air sensor 11 corresponding to the obtained parameters of the air A in the first area 2. The control unit is configured to move the first door leaf 40 between the first and second open position O1, O2 to regulate the size W of the first opening 10 at least based on input from the first air sensor 11. According to an aspect the control unit 60 reduces the width of the first opening 10 if the temperature of the air in the first area 2 is below a pre-set value by moving the first door leaf 40 from the first open position O1, as is disclosed in figure 3a, 3c and 5, towards the second open position O2. According to an aspect the control unit 60 reduces the width W of the first opening 10 more if the temperature of the air A is below a further pre-set value until it has moved the first door leaf 40 to the second open position O2, as is disclosed in fig 3b, 3d and 4.

[0044] According to an aspect the control unit 60 re-

duces the width of the first opening 10 if the humidity of the air in the first area 2 is above a pre-set value by moving the first door leaf 40 from the first open position O1, as is disclosed in figure 3a, 3c and 5, towards the second open position O2. According to an aspect the control unit 60 reduces the width W of the first opening 10 more if the humidity of the air A is above a further pre-set value until it has moved the first door leaf 40 to the second open position O2, as is disclosed in fig 3b, 3d and 4. The control unit 60 according to an aspect reduces the width W of the first opening 10 more if it rains more in the first area 2.

[0045] According to an aspect the control unit 60 reduces the width of the first opening 10 if the wind speed of the air in the first area 2 is above a pre-set value by moving the first door leaf 40 from the first open position O1, as is disclosed in figure 3a, 3c and 5, towards the second open position O2. According to an aspect the control unit 60 reduces the width W of the first opening 10 more if the wind speed of the air A is above a further pre-set value until it has moved the first door leaf 40 to the second open position O2, as is disclosed in fig 3b, 3d and 4. The control unit 60 according to an aspect reduces the width W of the first opening 10 more if it rains more in the first area 2.

[0046] According to an aspect the control unit 60 increases the width W of the first opening 10 if the parameters of the air A in the first area 2 goes back in the opposite direction, i.e. if the temperature increases, the air becomes more dry, if it stops to rain or if the wind speed is reduced.

[0047] The control unit is according to an aspect configured to move the first door leaf 40 between the first and second open position 01, 02 to regulate the size W of the first opening 10 also based on the number of persons that is entering and leaving the entrance door system 1. If a large number of persons is moving through the entrance system 1, it could in some cases not be efficient to reduce the width of the first opening 10.

[0048] According to an aspect the door entrance system 1 comprise a second air sensor 12. The second air sensor 12 is connected to the control unit 60. The second air sensor 12 is configured to measure parameters of the air A in the second area 3. According to an aspect the control unit is configured to move the first door leaf 40 between the first and second open position O1, O2 to regulate the size W of the first opening 10 at least based on input from the first air sensor 11 and the second air sensor 12. According to an aspect the control unit is configured to move the first door leaf 40 between the first and second open position O1, O2 to regulate the size W of the first opening 10 at least based on input from the second air sensor 12.

[0049] According to an aspect the control unit 60 reduces the width of the first opening 10 if a difference of the temperature of the air in the first area 2, obtained by the first sensor, in relation to the temperature of the air in the second area 3, obtained by the second sensor 12, is larger than a pre-set value, by moving the first door leaf 40 from the first open position O1, as is disclosed in figure 3a, 3c and 5, towards the second open position O2. According to an aspect the control unit 60 reduces the width W of the first opening 10 more if the difference in temperature of the air A in the first and second area 2, 3 is larger than a further pre-set value. This could be continued until the control unit 60 has moved the first door leaf 40 to the second open position O2, as is disclosed in fig 3b, 3d and 4.

[0050] According to an aspect the control unit 60 reduces the width of the first opening 10 if the humidity of the air in the first area 2 is above a pre-set value in comparison to the humidity of the air in the second area 3 by moving the first door leaf 40 from the first open position O1, as is disclosed in figure 3a, 3c and 5, towards the second open position O2. According to an aspect the control unit 60 reduces the width W of the first opening 10 more if the difference in humidity of the air A in the first and second area 2, 3 are more than a further pre-set value until it has moved the first door leaf 40 to the second open position O2, as is disclosed in fig 3b, 3d and 4. The control unit 60 according to an aspect reduces the width W of the first opening 10 more if it rains more in the first area 2.

[0051] By regulating the width W of the first opening 10 based on parameters from both sides of the door entrance system, i.e. in the first and second area, the width W of the first opening 10 could be regulated to reduce the energy transfer from the first area 2 and the second area 3 in an efficient way. In some cases it could even be desirable to have a high energy transfer through the door entrance system 1, for instance if it is too hot on one side of the door entrance system 1 and it is colder on the other side of the door entrance system 1.

[0052] According to an aspect the control unit 60 increases the width W of the first opening 10 if the parameters of the air A in the first area 2 goes back in the opposite direction, i.e. if the temperature increases, the air becomes more dry, if it stops to rain or if the wind speed is reduced.

[0053] The control unit 60 is according to an aspect configured to move the first door leaf 40 between the first and second open position O1, O2 to regulate the size W of the first opening 10 also based on the number of persons that is entering and leaving the entrance door system 1. If a large number of persons is moving through the entrance system 1 it could in some cases not be efficient to reduce the width of the first opening 10.

[0054] According to an aspect the control unit 60 is configured to move the second door leaf 50 between the first and second open position 01, 02 to regulate the size W of the second opening 20 at least based on input from the first air sensor 11. According to an aspect the control unit 60 is configured to move the second door leaf 50 between the first and second open position O1, O2 to regulate the size W of the second opening 20 at least based on input from the first air sensor 11 and the second air sensor 12. According to an aspect the control unit 60 is

configured to move the second door leaf 50 between the first and second open position 01, 02 to regulate the size W of the second opening 20 at least based on input from the second air sensor 12.

[0055] According to an aspect the second door leaf 50 is move in a corresponding way as has been described in accordance with the first door leaf 40 above.

[0056] According to an aspect the control unit 60 is configured to move the first door leaf 40 and the second door leaf 50 between the first and second open positions O1, O2 in a synchronous way. According to an aspect the control unit 60 is configured to move the first door leaf 40 a distance between the first and second open position O1, O2 and the second door leaf 50 a different distance between the first and second open position O1, O2.

[0057] According to an aspect the first opening 10 is open between 100- 70% of its width W when the first door leaf 40 is positioned in the first open position O1. According to an aspect the first opening 10 is open between 90-30% of its width W when the first door leaf 10 is positioned in the second open position O2.

[0058] According to an aspect the second opening 20 is open between 100- 70% of its width W when the second door leaf 50 is positioned in the first open position O1. According to an aspect the second opening 20 is open between 90-30% of its width W when the second door leaf 20 is positioned in the second open position O2.

[0059] According to an aspect the first door leaf 40 is slideably moveably between the first open position O1 and the second open position O2. According to an aspect the first and second door leaf 40, 50 is slideably moveably between the first open position O1 and the second open position O2. According to an aspect the second door leaf 50 is slideably moveably between the first open position O1 and the second open position O2. According to an aspect the first door leaf 40 has an arc shape. According to an aspect the second door leaf 50 has an arc shape.

[0060] According to an aspect first air sensor 11 is configured to measure one or more parameters of the temperature, the humidity, the amount of pollution and the speed of the air A in the first area 2. According to an aspect the first sensor 11 is a temperature sensor, a humidity sensor, a pollution sensor, a particle sensor or a wind sensor or any combination thereof. According to an aspect the first sensor 11 is a wind direction sensor.

[0061] According to an aspect the first sensor 11 is a traffic intensity sensor. According to an aspect the traffic intensity sensor is configured to receive input from other sensors and make a priority of the received parameters. Put in another way the traffic intensity sensor obtains information from the other sensors and make a priority regarding which of the parameters that should be more important or prioritized as input in regard to others. As an example, the traffic intensity sensor is adapted to make a priority if the energy consumption should be higher prioritized than the amount of pollution. As an example, the traffic intensity sensor is adapted to make a priority if the energy consumption and or the amount of pollution should be higher prioritized than the capacity of the door entrance system 1.

[0062] According to an aspect the second air sensor 11 is configured to measure one or more parameters of the temperature, the humidity, the amount of pollution and the speed of the air A in the second area 3. According to an aspect the first sensor 11 is a temperature sensor, a humidity sensor, a pollution sensor, a particle sensor or a wind sensor or any combination thereof. According to an aspect the first sensor 11 is a wind direction sensor. According to an aspect the second sensor 12 is a traffic intensity senson. According to an aspect the traffic intensity sensor is configured to receive input from other sensors and make a priority of the received parameters. Put in another way the traffic intensity sensor obtains information from the other sensors and make a priority regarding which of the parameters that should be more imoportant as input in regard to others. As an example the traffic intensity sensor is adapted to make a priority if the energy consumption should be higher prioritized than the amount of pollution

[0063] The first air sensor 11 is according to an aspect mounted on/connected to/at the door wing 31 of the revolving door 30 or the first door leaf 40 of the door entrance system 1. The first air sensor 11 is according to an aspect mounted on/connected to/at a frame of the door entrance system 1. The first air sensor 11 is according to an aspect mounted at a distance from the first opening 10 and comprises a wireless connection. According to an aspect the first air sensor 11 comprises a wireless connection. According to an aspect the first air sensor 11 is further comprised in a ventilation system or air conditioning system of the building 100.

[0064] The second air sensor 12 is according to an aspect mounted on/connected to a door wing 31 of the revolving door 30 or the second door leaf 50 of the door entrance system 1. The second air sensor 12 is according to an aspect mounted on/connected to a frame of the door entrance system 1. The first air sensor 11 is according to an aspect mounted at a distance from the second opening 20 and comprises a wireless connection. According to an aspect the second air sensor 12 comprises a wireless connection. According to an aspect the second air sensor 12 is further comprised in a ventilation system or air conditioning system of the building 100.

[0065] According to an aspect the control unit 60 is connected to the revolving door 30 and configured to regulate the rotation of the at least two wings 31 at least based on input from the first air sensor 11. According to an aspect the control unit 60 is connected to the revolving door 30 and configured to regulate the rotation of the at least two wings 31 at least based on input from the first and second air sensor 11, 12. According to an aspect the control unit 60 is connected to the revolving door 30 and configured to regulate the rotation of the at least two wings 31 at least based on input from the second air sensor 12.

[0066] According to an aspect the revolving door 30

comprise four of more wings 31 and the control unit 60 is configured to rotate the wings 31 of the revolving door 30. In in full turns. In fig 3a-3d a full rotation of the wings 31 of the revolving door 30 is disclosed. In fig 3a the door entrance system 1 is in a starting position. When a person is approaching the door entrance system 1, sensors of the door entrance system 1 identifies the person and start rotating the wings 31 of the revolving door 20. If one person should pass through the door entrance system 1, the wings 31 of the four winged revolving door 30 needs to rotate at least 270° for the person to be able to pass. The person enters into the area between two wings 31 that is directed towards the first opening 10, see checked triangle D infigure 3a. When the wings 31 of revolving door 30 has turned 90°, a quarter of a full turn, the person is in the checked triangle D as disclosed in fig 3b. The person is now inside the revolving door 30.

[0067] The wings 31 is further rotated and the checked triangle D is now, see figure 3c, is now directed towards the second area 3 and the person can start leaving the door entrance system 1 and walk into the second area 3. To be secure of that the person is able to leave the door entrance system the wings 31 is turned to 270°, as is disclosed in fig 3d where the checked triangle D is facing the wall of the door entrance system 1. The door entrance systems 1 are often focused on saving energy and one way to save energy is to reduce the time that the revolving door 30 rotates the wings 21. However, by rotating the four winged revolving door 30 in full turns, i.e. even 360° rotations, the checked triangle D will return to its starting position, as disclosed in fig 3a. By returning to the starting position the air between the wings 31 of the revolving door 30 is exposed to the same conditions as it was exposed to before it stated to rotate. As an example, cold air in contact will the first area 2 will return to the first area 2 when the revolving door 30 stops rotating the wings 31 and not with the second area 3 or the intermediate positions as disclosed in fig 3b, 3d. When the revolving door 30 is stopped the air in between the wings 31 that is directed towards the first and the second area 2, 3 will mix with the air in first and the second area 2, 3.

[0068] According to an aspect the door entrance system 1 comprise a first arc shaped wall 70 at a side of the first and second opening 10, 20 and a second arc shaped wall 80 at an other side of the first and second opening 10, 20, as is disclosed in fig 3-6. The first arc shaped wall 70 comprise an inner end 71 and an outer end 72. The second arc shaped wall 80 comprise an inner end 81 and an outer end 82. The inner end 71, 81 of the first and second arc shaped wall 70, 80 define the second opening 20. The outer end 72, 82 of the first and second arc shaped wall 70, 80 define the first opening 10. Put in another way, the first opening 10 is positioned between the outer ends 72, 82 of the first and second arc shaped wall 70, 80 and the second opening 20 is positioned between the inner ends 71, 81 of the first and second arc shaped wall 70, 80.

[0069] According to an aspect the first and/or second arc shaped wall 70, 80 is at least partly hollow, as is disclosed in fig 4-6. The first and second door leaf 40, 50 is configured to at least partly be positioned in a hollow part 73, 83 of the first and/or second arc shaped wall 70, 80. By positioning the first and second door leaf 40, 50 within the hollow first and second arc shaped wall 70, 80, the first and second door leaf 40, 50 is moveable between the first and second open position 01, 02 with a low air leakage between the first and second door leafs 40, 50 and the first and second arc shaped walls 70, 80. It also reduces the risk of that the revolving door 30 will make contact with the first and second door leafs 40, 50 when it its rotated and get stuck.

[0070] According to an aspect the first and/or second door leaf 40, 50 is moveably to a third closed position C, as disclosed in fig 6, to close the first and/or second opening 10, 20. This enables the first and second door leafs 40, 50 to assist in the locking of the door entrance system 1, for example when a building is closed for the night.

[0071] According to an aspect the control unit 60 is connected to a data server 103 and/or a cloud service 104 via a wireless connection 105, as disclosed in fig 2. According to an aspect the control unit 60 is connected to the wireless connection 105. According to an aspect the control unit 60 is configured to receive parameters such as pollution levels and/or weather parameters such as temperature, wind and humidity in the air A the first area 2 from the data server 103 or the cloud service and to regulate width W of the first and/or second opening 10, 20 by moving the first and/or second door leaf 40, 50 based on the received pollution levels and or weather information. If the received parameters are high/low, the width of the first and or second opening 10, 20 is reduced by the control unit 60 to reduce the risk of that air from the first area 2 enters into the second area 3.

[0072] According to an aspect the control unit 60 is configured to receive parameters such as pollution levels and/or climate parameters such as temperature, wind and humidity in the air A of the second area 3 from the data server 103 or the cloud service and to regulate width W of the first and/or second opening 10, 20 by moving the first and/or second door leaf 40, 50 based on the received pollution levels and or weather information. According to an aspect the data server 103 or the cloud service is part of a building management system.

[0073] According to an aspect the wireless connection 105 comprise a radio communication interface. The radio communication interface 105 may be comprised as any number of tranceiving, receiving, and/or transmitting units or circuitry. It should further be appreciated that the radio communication interface may be in the form of any input/output communications port known in the art. The radio communication interface may comprise RF circuitry and baseband processing circuitry. The radio communication interface may support either wireless and/or wired communication. Examples of wireless communication may be Global System for Mobile Commu-

nication, GSM, Bluetooth, narrowband communication, Internet of Things, IoT, specific communication.

[0074] According to an aspect the radio communication interface is configured to send data associated with the door entrance system 1 to one or more remote entity. According to an aspect the data is pollution levels in one or more of the different areas 2, 3.

[0075] According to an aspect, the one or more remote entity is a server, a database, a further door entrance system 1 and/or the cloud service.

[0076] According to an aspect the door entrance system 1 further comprises a wireless connection interface suitable for sending electronic signals. Examples of wireless connections are BluetoothTM, WiFi, Infrared or any kind of near field communication technology.

[0077] According to an aspect the control unit 60 comprise a central processor unit (CPU) and a memory (not disclosed).

[0078] According to an aspect, the first and/or second air sensor 11, 12 comprises a wireless connection unit suitable for sending electronic signals. The connection is a wireless connection. Examples of wireless connections are BluetoothTM, WiFi, Infrared or any kind of near field communication technology. According to an aspect the first and/or the second air sensor 11, 12 is wirelessly connected.

[0079] Hereafter a method for regulating the door entrance system 1 will be described with reference to fig 7. The method comprise the steps of measuring S100, in the first air sensor 11, parameters of the air A in the first area 2. The measured parameters is according to an aspect the temperature of the air, the humidity of the air, the speed of the air and/or the amount of pollution in the air. Thereafter the step of comparing S101, in the control unit 60, the parameters of the air A in the first area 2 with pre-set values of the parameters in the control unit 60. The comparing will identify if the temperature in the first area 2 is cold or hot or if the air is humid etc. Thereafter the step of regulating S102 the width W of the first opening 10 and/or second opening 20 if the parameters of the air A in the first area 2 is below or above the pre-set values of the parameters. By comparing the measured parameters with pre-set values the width W of the opening could be regulated. According to an aspect the width W is reduced to decrease the heat transfer from the first area 2 to the second area 3. If the heat transfer is low, the air in the building is not heated that much and energy could be saved by not having to run an air-conditioning unit that much in the building.

[0080] According to the invention the method comprise the step of measuring, in the second air sensor 12, parameters of the air A in the second area 3, comparing, in the control unit 60, parameters of the air A in the first area 2 with parameters of the air A in the second area 3, and regulating the width W of the first opening 10 and/or second opening 20 if the parameters of the air A in the first area 2 is below or above the pre-set values of the parameters.

[0081] The person skilled in the art realizes that the present invention by no means is limited to the preferred embodiments described above. On the contrary, many modifications and variations are possible within the scope of the appended claims. For example, a sliding door set may comprise of more than two sliding door leafs, arranged in the same way as discussed above.

[0082] The description of the aspects of the disclosure provided herein has been presented for purposes of illustration. The description is not intended to be exhaustive or to limit aspects of the disclosure to the precise form disclosed, and modifications and variations are possible in light of the above teachings or may be acquired from practice of various alternatives to the provided aspects of the disclosure. The examples discussed herein were chosen and described in order to explain the principles and the nature of various aspects of the disclosure and its practical application to enable one skilled in the art to utilize the aspects of the disclosure in various manners and with various modifications as are suited to the particular use contemplated. The features of the aspects of the disclosure described herein may be combined in all possible combinations of methods, apparatus, modules, systems, and computer program products. It should be appreciated that the aspects of the disclosure presented herein may be practiced in any combination with each other.

[0083] It should be noted that the word "comprising" does not necessarily exclude the presence of other elements or steps than those listed. It should further be noted that any reference signs do not limit the scope of the claims.

Claims

1. A door entrance system (1) for regulating the access between a first area (2) and a second area (3), comprising

- a first opening (10) configured to be connected to the first area (2),
- a second opening (20) configured to be connected to the second area (3) and
- a revolving door (30) comprising two or more wings (31),

wherein

- the revolving door (30) is positioned between the first and second opening (10, 20) and configured to rotate the two or more wings (31) to control access between the first and second area (2, 3) through the first and second opening (10, 20), and
- the door entrance system (1) further comprise a first door leaf (40) moveably between a first open position (O1) and a second open position (O2) to

regulate a size (W) of the first opening (10),

the door entrance system further comprising a control unit (60) connected to the first door leaf (40) and to a first air sensor (11) configured to measure parameters of the air (A) in the first area (2), **characterized in that** the control unit (60) is configured to move the first door leaf (40) between the first and second open position (O1, O2) to regulate the size (W) of the first opening (10) at least based on input from the first air sensor (11), wherein the control unit (60) is connected to a second air sensor (12) configured to measure parameters of the air (A) in the second area (3) and is configured to move the first door leaf (40) between the first and second open position (O1, O2) to regulate the size (W) of the first opening (10) at least based on input from the first air sensor (11) and/or the second air sensor (12).

2. The door entrance system (1) according to claim 1, further comprising a second door leaf (50) moveably between a first open position (O1) and a second open position (O2) to regulate a size (W) of the second opening (20).

3. The door entrance system (1) according to any of claims 1 to 2, wherein the control unit (60) is configured to move the second door leaf (50) between the first and second open position (O1, O2) to regulate the size (W) of the the second opening (3) at least based on input from the first air sensor (11) and/or the second air sensor (12).

4. The door entrance system (1) according to any of the preceding claims, wherein the first and/or second door leaf (40, 50) is slideably moveably between the first open position (O1) and the second open position (O2).

5. The door entrance system (1) according to any of the preceding claims, wherein the first air sensor (11) is configured to measure one or more parameters of the temperature, the humidity, the wind direction, the amount of pollution and the speed of the air (A) in the first area (2).

6. The door entrance system (1) according to any of the preceding claims, wherein the second air sensor (12) is configured to measure one or more parameters of the temperature, the humidity, the wind direction, the amount of pollution and the speed of the air (A) in the second area (3).

7. The door entrance system (1) according to any of the preceding claims, wherein the control unit (60) is connected to the revolving door (30) and configured to regulate the rotation of the at least two wings (31) at least based on input from the first and/or second air sensor (11, 12).

8. The door entrance system (1) according to any of the preceding claims, wherein the revolving door (30) comprise four of more wings (31) and the control unit (60) is configured to rotate the wings (31) of the revolving door (30) in full turns.

9. The door entrance system (1) according to any of the preceding claims, further comprising a first arc shaped wall (70) at a side of the first and second opening (10, 20) and a second arc shaped wall (80) at an other side of the first and second opening (10, 20).

10. The door entrance system (1) according to any of claim 9, wherein an inner end (71, 81) of the first and second arc shaped wall (70, 80) define the first opening (10) and an outer end (72, 82) of the first and second arc shaped wall (70, 80) define the second opening (20).

11. The door entrance system (1) according to any of claims 9 or 10, wherein the first and second arc shaped wall (70, 80) is at least partly hollow and the first and second door leaf (40, 50) is configured to at least partly be positioned in a hollow part (73, 83) of the first and/or second arc shaped wall (70, 80).

12. The door entrance system (1) according to any of claims 2 to 11, wherein the first and/or second door leaf (40, 50) is moveably to a third closed position (C) to close the first and/or second opening (10, 20).

13. The door entrance system (1) according to any of the preceding claims, wherein the first opening (10) is open between 100- 70% of its size/width (W) when the first door leaf (40) is positioned in the first open position (O1) and the first opening (10) is open between 90-30% of its size/width (W) when the first door leaf (10) is positioned in the second open position (O2).

14. The door entrance system (1) according to any of claims 2 to 15, wherein the second opening (20) is open between 100- 70% of its size/width (W) when the second door leaf (50) is positioned in the first open position (O1) and the second opening (20) is open between 90-30% of its size/width (W) when the second door leaf (50) is positioned in the second open position (O2).

15. A method for regulating a door entrance system (1) according to any of claims 1-14 comprising the steps:

- measuring (S100), in the first air sensor (11), parameters of the air (A) in the first area (2),
- comparing (S101), in the control unit (60), the

parameters of the air (A) in the first area (2) with pre-set values of the parameters in the control unit (60),

• regulating (S102) the size/width (W) of the first opening (10) and/or second opening (20) if the parameters of the air (A) in the first area (2) is below or above the pre-set values of the parameters,

• measuring (S103), in the second air sensor (12), parameters of the air (A) in the second area (3),

• comparing (S104), in the control unit (60), parameters of the air (A) in the first area (2) with parameters of the air (A) in the second area (3), and

• regulating (S105) the size (W) of the first opening (10) and/or second opening (20) if the parameters of the air (A) in the first area (2) is below or above the pre-set values of the parameters.

Patentansprüche

1. Türeingangssystem (1) zum Regulieren des Zugangs zwischen einem ersten Bereich (2) und einem zweiten Bereich (3), umfassend

- eine erste Öffnung (10), die dazu konfiguriert ist, mit dem ersten Bereich (2) verbunden zu sein,
- eine zweite Öffnung (20), die dazu konfiguriert ist, mit dem zweiten Bereich (3) verbunden zu sein, und
- eine Drehtür (30), die zwei oder mehr Flügel (31) umfasst,

wobei

- die Drehtür (30) zwischen der ersten und zweiten Öffnung (10, 20) positioniert und dazu konfiguriert ist, die zwei oder mehr Flügel (31) zu drehen, um Zugang zwischen dem ersten und zweiten Bereich (2, 3) durch die erste und zweite Öffnung (10, 20) zu steuern, und
- das Türeingangssystem (1) ferner ein erstes Türblatt (40) umfasst, das zwischen einer ersten offenen Position (01) und einer zweiten offenen Position (O2) bewegbar ist, um eine Größe (W) der ersten Öffnung (10) zu regulieren,

wobei das Türeingangssystem ferner eine Steuereinheit (60) umfasst, die mit dem ersten Türblatt (40) und mit einem ersten Luftsensor (11) verbunden ist, der dazu konfiguriert ist, Parameter der Luft (A) in dem ersten Bereich (2) zu messen, **dadurch gekennzeichnet, dass** die Steuereinheit (60) dazu konfiguriert ist, das erste Türblatt (40) zwischen der ersten und zweiten offenen Position (O1, O2) zu bewegen, um die Größe (W) der ersten Öffnung (10) mindestens auf Grundlage von Eingaben von dem ersten Luftsensor (11) zu regulieren, wobei die Steuereinheit (60) mit einem zweiten Luftsensor (12) verbunden ist, der dazu konfiguriert ist, Parameter der Luft (A) in dem zweiten Bereich (3) zu messen, und dazu konfiguriert ist, das erste Türblatt (40) zwischen der ersten und zweiten offenen Position (O1, O2) zu bewegen, um die Größe (W) der ersten Öffnung (10) mindestens auf Grundlage von Eingaben von dem ersten Luftsensor (11) und/oder dem zweiten Luftsensor (12) zu regulieren.

2. Türeingangssystem (1) nach Anspruch 1, ferner umfassend ein zweites Türblatt (50), das zwischen einer ersten offenen Position (01) und einer zweiten offenen Position (O2) bewegbar ist, um eine Größe (W) der zweiten Öffnung (20) zu regulieren.

3. Türeingangssystem (1) nach einem der Ansprüche 1 bis 2, wobei die Steuereinheit (60) dazu konfiguriert ist, das zweite Türblatt (50) zwischen der ersten und zweiten offenen Position (O1, O2) zu bewegen, um die Größe (W) der zweiten Öffnung (3) mindestens auf Grundlage von Eingaben von dem ersten Luftsensor (11) und/oder dem zweiten Luftsensor (12) zu regulieren.

4. Türeingangssystem (1) nach einem der vorhergehenden Ansprüche, wobei das erste und/oder zweite Türblatt (40, 50) verschiebbar zwischen der ersten offenen Position (01) und der zweiten offenen Position (O2) bewegbar sind.

5. Türeingangssystem (1) nach einem der vorhergehenden Ansprüche, wobei der erste Luftsensor (11) dazu konfiguriert ist, einen oder mehrere Parameter der Temperatur, der Feuchtigkeit, der Windrichtung, der Menge an Verschmutzung und der Geschwindigkeit der Luft (A) in dem ersten Bereich (2) zu messen.

6. Türeingangssystem (1) nach einem der vorhergehenden Ansprüche, wobei der zweite Luftsensor (12) dazu konfiguriert ist, einen oder mehrere Parameter der Temperatur, der Feuchtigkeit, der Windrichtung, der Menge an Verschmutzung und der Geschwindigkeit der Luft (A) in dem zweiten Bereich (3) zu messen.

7. Türeingangssystem (1) nach einem der vorhergehenden Ansprüche, wobei die Steuereinheit (60) mit der Drehtür (30) verbunden und dazu konfiguriert ist, die Drehung der mindestens zwei Flügel (31) mindestens auf Grundlage von Eingaben von dem ersten und/oder zweiten Luftsensor (11, 12) zu regulieren.

8. Türeingangssystem (1) nach einem der vorhergehenden Ansprüche, wobei die Drehtür (30) vier oder mehr Flügel (31) umfasst und die Steuereinheit (60) dazu konfiguriert ist, die Flügel (31) der Drehtür (30) in vollen Umdrehungen zu drehen.

9. Türeingangssystem (1) nach einem der vorhergehenden Ansprüche, ferner umfassend eine erste bogenförmige Wand (70) an einer Seite der ersten und zweiten Öffnung (10, 20) und eine zweite bogenförmige Wand (80) an einer anderen Seite der ersten und zweiten Öffnung (10, 20).

10. Türeingangssystem (1) nach einem von Anspruch 9, wobei ein inneres Ende (71, 81) der ersten und zweiten bogenförmigen Wand (70, 80) die erste Öffnung (10) definieren und ein äußeres Ende (72, 82) der ersten und zweiten bogenförmigen Wand (70, 80) die zweite Öffnung (20) definieren.

11. Türeingangssystem (1) nach einem der Ansprüche 9 oder 10, wobei die erste und zweite bogenförmige Wand (70, 80) mindestens teilweise hohl sind und das erste und zweite Türblatt (40, 50) dazu konfiguriert sind, mindestens teilweise in einem hohlen Teil (73, 83) der ersten und/oder zweiten bogenförmigen Wand (70, 80) positioniert zu sein.

12. Türeingangssystem (1) nach einem der Ansprüche 2 bis 11, wobei das erste und/oder zweite Türblatt (40, 50) in eine dritte geschlossene Position (C) bewegbar sind, um die erste und/oder zweite Öffnung (10, 20) zu schließen.

13. Türeingangssystem (1) nach einem der vorhergehenden Ansprüche, wobei die erste Öffnung (10) zwischen 100-70 % ihrer Größe/Breite (W) offen ist, wenn das erste Türblatt (40) in der ersten offenen Position (01) positioniert ist, und die erste Öffnung (10) zwischen 90-30 % ihrer Größe/Breite (W) offen ist, wenn das erste Türblatt (10) in der zweiten offenen Position (O2) positioniert ist.

14. Türeingangssystem (1) nach einem der Ansprüche 2 bis 15, wobei die zweite Öffnung (20) zwischen 100-70 % ihrer Größe/Breite (W) offen ist, wenn das zweite Türblatt (50) in der ersten offenen Position (01) positioniert ist, und die zweite Öffnung (20) zwischen 90-30 % ihrer Größe/Breite (W) offen ist, wenn das zweite Türblatt (50) in der zweiten offenen Position (O2) positioniert ist.

15. Verfahren zum Regulieren eines Türeingangssystems (1) nach einem der Ansprüche 1-14, umfassend die Schritte:

• Messen (S100), in dem ersten Luftsensor (11), von Parametern der Luft (A) in dem ersten Bereich (2),
• Vergleichen (S101), in der Steuereinheit (60), der Parameter der Luft (A) in dem ersten Bereich (2) mit voreingestellten Werten der Parameter in der Steuereinheit (60),
• Regulieren (S102) der Größe/Breite (W) der ersten Öffnung (10) und/oder zweiten Öffnung (20), falls die Parameter der Luft (A) in dem ersten Bereich (2) unter oder über den voreingestellten Werten der Parameter liegen,
• Messen (S103), in dem zweiten Luftsensor (12), von Parametern der Luft (A) in dem zweiten Bereich (3),
• Vergleichen (S104), in der Steuereinheit (60), von Parametern der Luft (A) in dem ersten Bereich (2) mit Parametern der Luft (A) in dem zweiten Bereich (3) und
• Regulieren (S105) der Größe (W) der ersten Öffnung (10) und/oder zweiten Öffnung (20), falls die Parameter der Luft (A) in dem ersten Bereich (2) unter oder über den voreingestellten Werten der Parameter liegen.

Revendications

1. Système d'entrée à porte (1) pour réguler l'accès entre une première zone (2) et une seconde zone (3), comprenant

- une première ouverture (10) configurée pour être reliée à la première zone (2),
- une seconde ouverture (20) configurée pour être reliée à la seconde zone (3) et
- une porte tournante (30) comprenant deux ou plusieurs vantaux (31),

dans lequel

- la porte tournante (30) est positionnée entre la première et la seconde ouverture (10, 20) et configurée pour faire tourner les deux ou plusieurs vantaux (31) pour contrôler l'accès entre la première et la seconde zone (2, 3) à travers la première et la seconde ouverture (10, 20), et
- le système d'entrée à porte (1) comprend en outre un premier battant de porte (40) mobile entre une première position ouverte (O1) et une seconde position ouverte (O2) pour réguler une taille (W) de la première ouverture (10),

le système d'entrée à porte comprenant en outre une unité de commande (60) connectée au premier battant de porte (40) et à un premier capteur d'air (11) configuré pour mesurer des paramètres de l'air (A) dans la première zone (2), **caractérisé en ce que**
l'unité de commande (60) est
configurée pour déplacer le premier battant de

porte (40) entre la première et la seconde position ouverte (O1, O2) pour réguler la taille (W) de la première ouverture (10) au moins sur la base d'une entrée provenant du premier capteur d'air (11), l'unité de commande (60) étant connectée à un second capteur d'air (12) configuré pour mesurer des paramètres de l'air (A) dans la seconde zone (3) et étant configurée pour déplacer le premier battant de porte (40) entre la première et la seconde position ouverte (O1, O2) pour réguler la taille (W) de la première ouverture (10) au moins sur la base d'une entrée provenant du premier capteur d'air (11) et/ou du second capteur d'air (12).

2. Système d'entrée à porte (1) selon la revendication 1, comprenant en outre un second battant de porte (50) mobile entre une première position ouverte (O1) et une seconde position ouverte (O2) pour réguler une taille (W) de la seconde ouverture (20).

3. Système d'entrée à porte (1) selon l'une quelconque des revendications 1 à 2, dans lequel l'unité de commande (60) est configurée pour déplacer le second battant de porte (50) entre la première et la seconde position ouverte (O1, O2) pour réguler la taille (W) de la seconde ouverture (3) au moins sur la base de l'entrée provenant du premier capteur d'air (11) et/ou du second capteur d'air (12).

4. Système d'entrée à porte (1) selon l'une quelconque des revendications précédentes, dans lequel le premier et/ou le second battant de porte (40, 50) est mobile de manière coulissante entre la première position ouverte (O1) et la seconde position ouverte (O2).

5. Système d'entrée à porte (1) selon l'une quelconque des revendications précédentes, dans lequel le premier capteur d'air (11) est configuré pour mesurer un ou plusieurs paramètres parmi la température, l'humidité, la direction du vent, la quantité de pollution et la vitesse de l'air (A) dans la première zone (2).

6. Système d'entrée à porte (1) selon l'une quelconque des revendications précédentes, dans lequel le second capteur d'air (12) est configuré pour mesurer un ou plusieurs paramètres parmi la température, l'humidité, la direction du vent, la quantité de pollution et la vitesse de l'air (A) dans la seconde zone (3).

7. Système d'entrée à porte (1) selon l'une quelconque des revendications précédentes, dans lequel l'unité de commande (60) est connectée à la porte tournante (30) et configurée pour réguler la rotation des au moins deux vantaux (31) au moins sur la base de l'entrée provenant du premier et/ou du second capteur d'air (11, 12).

8. Système d'entrée à porte (1) selon l'une quelconque des revendications précédentes, dans lequel la porte tournante (30) comprend quatre ou plusieurs vantaux (31) et l'unité de commande (60) est configurée pour faire tourner les vantaux (31) de la porte tournante (30) en tours complets.

9. Système d'entrée à porte (1) selon l'une quelconque des revendications précédentes, comprenant en outre une première paroi en forme d'arc (70) sur un côté de la première et de la seconde ouverture (10, 20) et une seconde paroi en forme d'arc (80) sur un autre côté de la première et de la seconde ouverture (10, 20).

10. Système d'entrée à porte (1) selon l'une quelconque des revendications 9, dans lequel une extrémité intérieure (71, 81) de la première et de la seconde paroi en forme d'arc (70, 80) définit la première ouverture (10) et une extrémité extérieure (72, 82) de la première et de la seconde paroi en forme d'arc (70, 80) définit la seconde ouverture (20).

11. Système d'entrée à porte (1) selon l'une quelconque des revendications 9 ou 10, dans lequel la première et la seconde paroi en forme d'arc (70, 80) sont au moins partiellement creuses et le premier et le second battant de porte (40, 50) sont configurés pour être au moins partiellement positionnés dans une partie creuse (73, 83) de la première et/ou de la seconde paroi en forme d'arc (70, 80).

12. Système d'entrée à porte (1) selon l'une quelconque des revendications 2 à 11, dans lequel le premier et/ou le second battant de porte (40, 50) est mobile vers une troisième position fermée (C) pour fermer la première et/ou la seconde ouverture (10, 20).

13. Système d'entrée à porte (1) selon l'une quelconque des revendications précédentes, dans lequel la première ouverture (10) est ouverte entre 100 et 70 % de sa taille/largeur (W) lorsque le premier battant de porte (40) est positionné dans la première position ouverte (O1) et la première ouverture (10) est ouverte entre 90 et 30 % de sa taille/largeur (W) lorsque le premier battant de porte (10) est positionné dans la seconde position ouverte (O2).

14. Système d'entrée à porte (1) selon l'une quelconque des revendications 2 à 15, dans lequel la seconde ouverture (20) est ouverte entre 100 et 70 % de sa taille/largeur (W) lorsque le second battant de porte (50) est positionné dans la première position ouverte (O01) et la seconde ouverture (20) est ouverte entre 90 et 30 % de sa taille/largeur (W) lorsque le second battant de porte (50) est positionné dans la seconde position ouverte (02).

15. Procédé de régulation d'un système d'entrée à porte (1) selon l'une quelconque des revendications 1 à 14, comprenant les étapes consistant à :

• mesurer (S100), dans le premier capteur d'air (11), des paramètres de l'air (A) dans la première zone (2),
• comparer (S101), dans l'unité de commande (60), les paramètres de l'air (A) dans la première zone (2) avec des valeurs prédéfinies des paramètres dans l'unité de commande (60),
• réguler (S102) la taille/largeur (W) de la première ouverture (10) et/ou de la seconde ouverture (20) si les paramètres de l'air (A) dans la première zone (2) sont inférieurs ou supérieurs aux valeurs prédéfinies des paramètres,
• mesurer (S103), dans le second capteur d'air (12), des paramètres de l'air (A) dans la seconde zone (3),
• comparer (S104), dans l'unité de commande (60), des paramètres de l'air (A) dans la première zone (2) avec des paramètres de l'air (A) dans la seconde zone (3), et
• réguler (S105) la taille (W) de la première ouverture (10) et/ou de la seconde ouverture (20) si les paramètres de l'air (A) dans la première zone (2) sont inférieurs ou supérieurs aux valeurs prédéfinies des paramètres.

Fig. 1

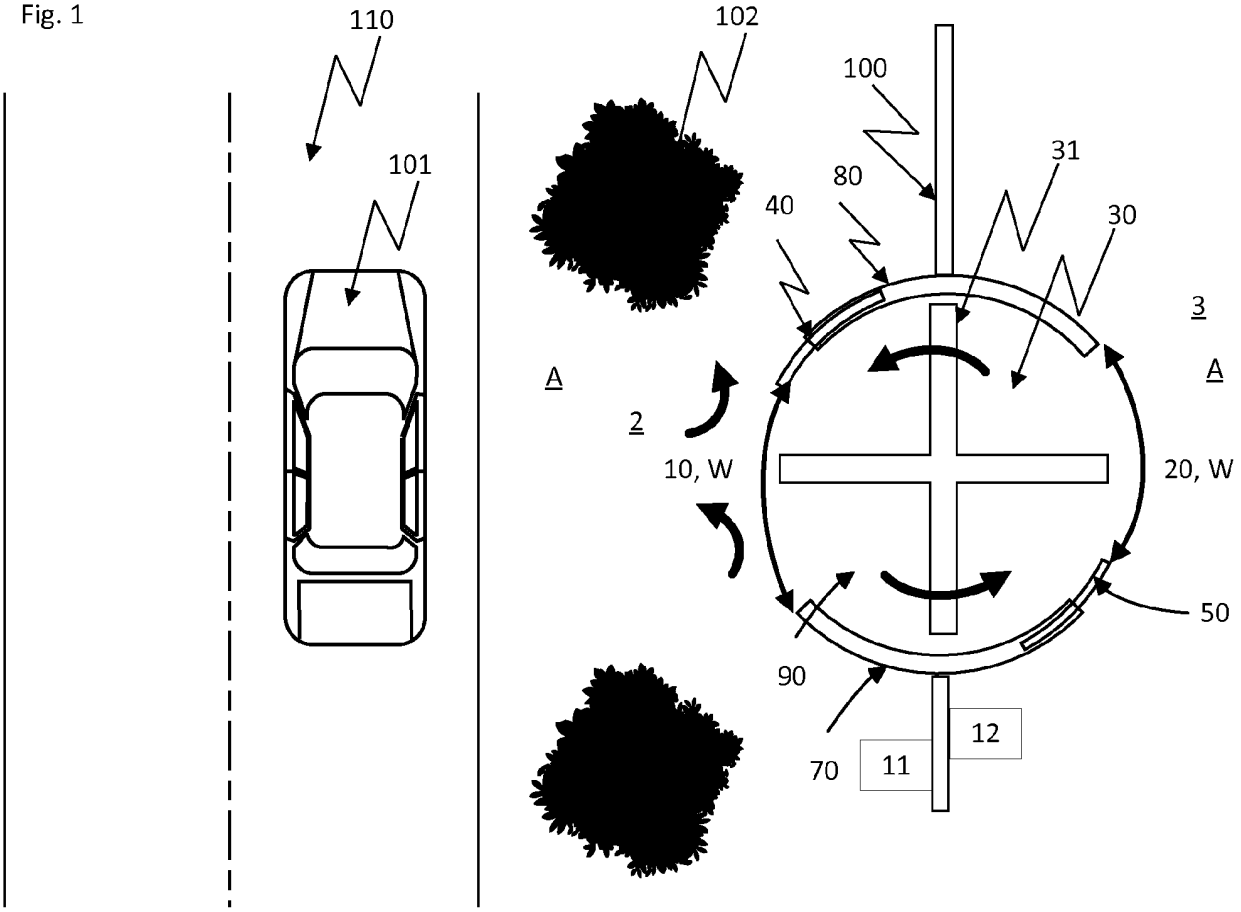

110
102
101
100
31
80
40
30
3
A
A
2
10, W
20, W
50
90
70
11
12

Fig. 2

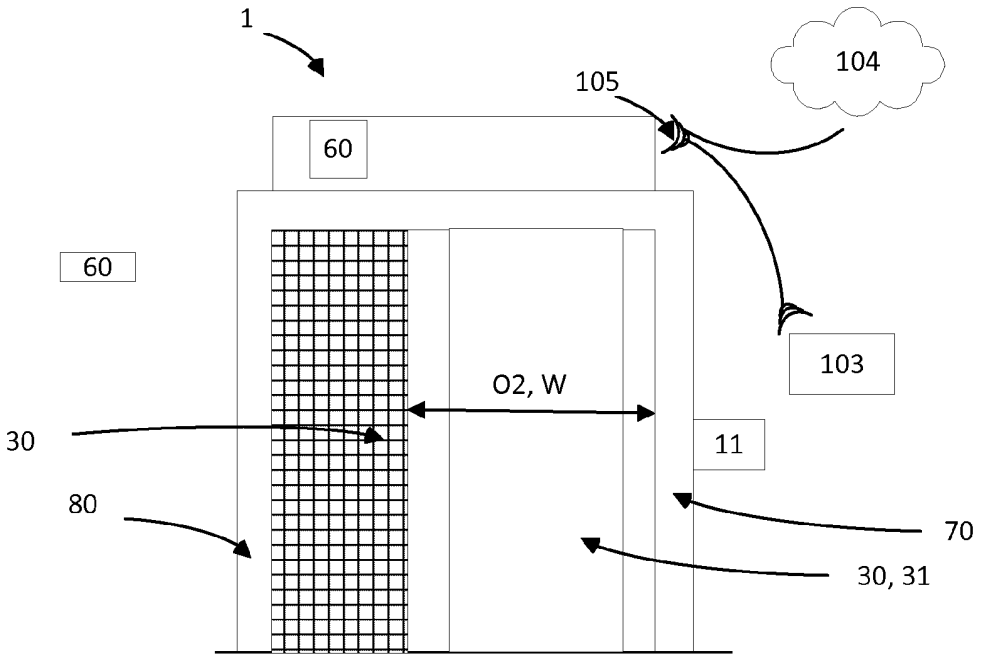

1
104
105
60
60
103
O2, W
30
11
80
70
30, 31

Fig. 3a

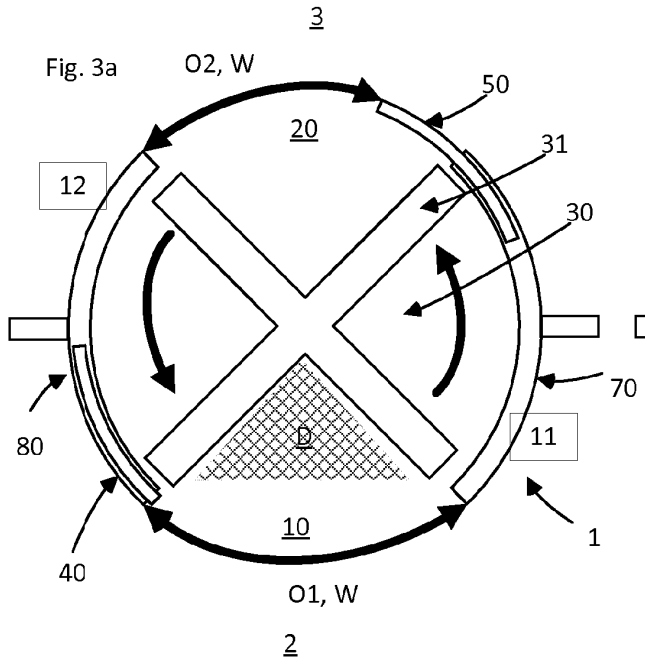


Fig. 3b

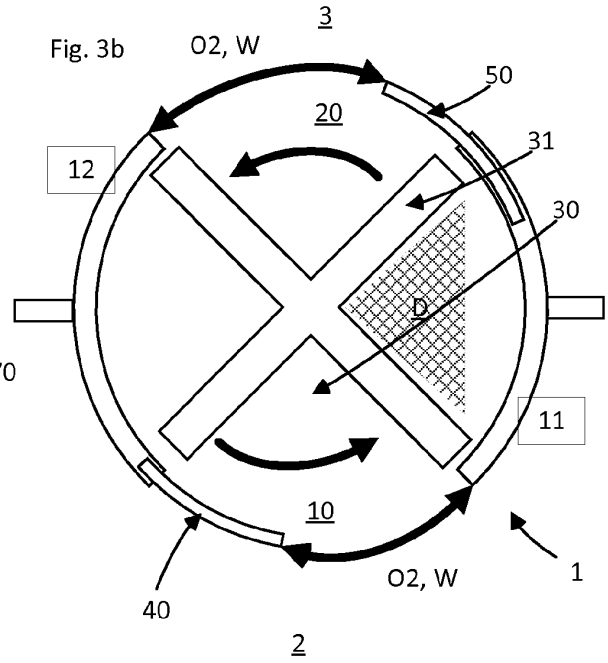


Fig. 3c

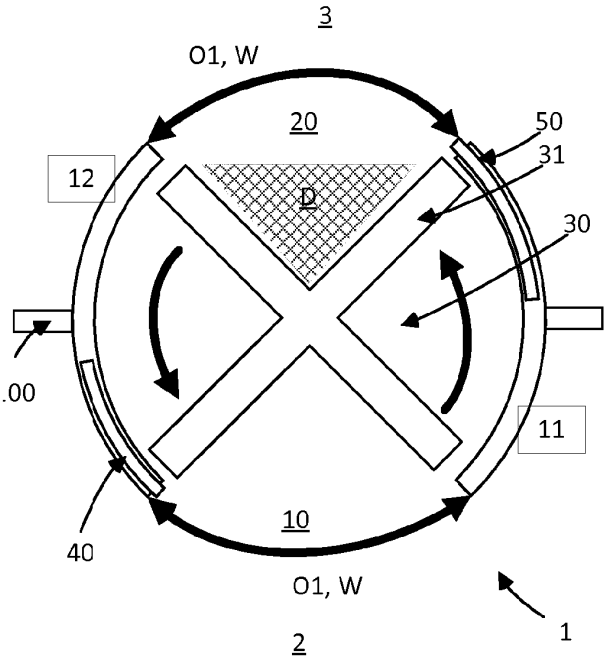


Fig. 3d

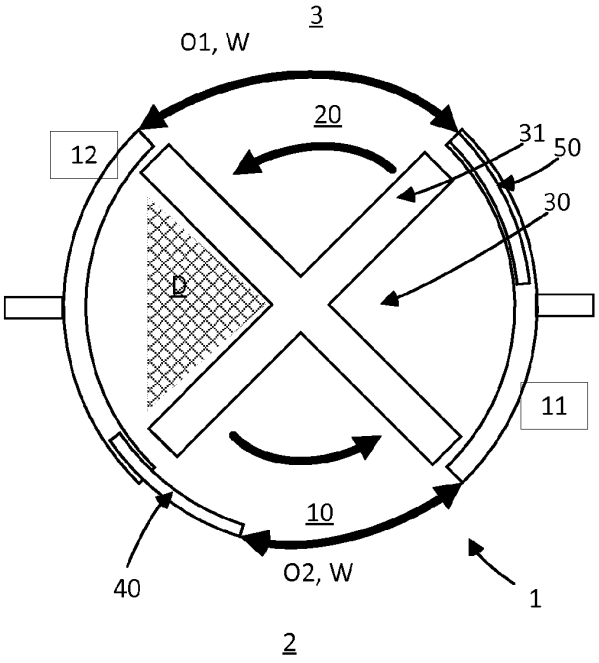


Fig. 4

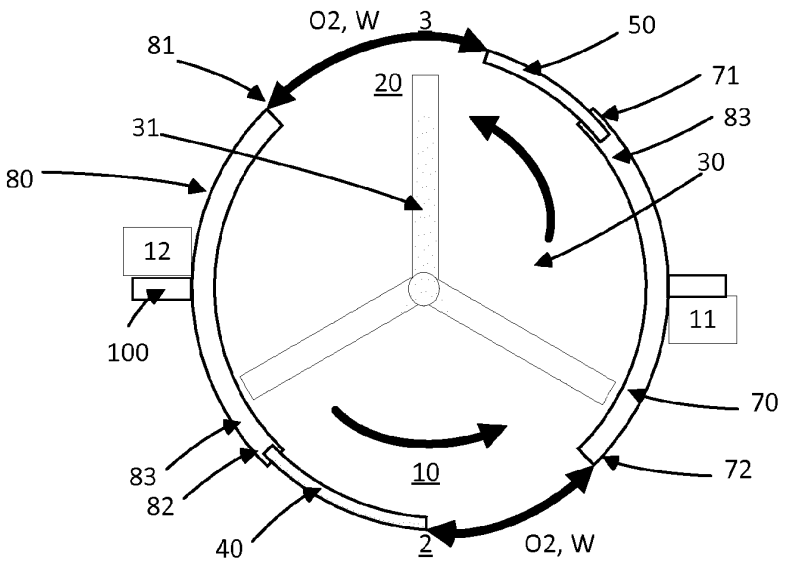


Fig. 5

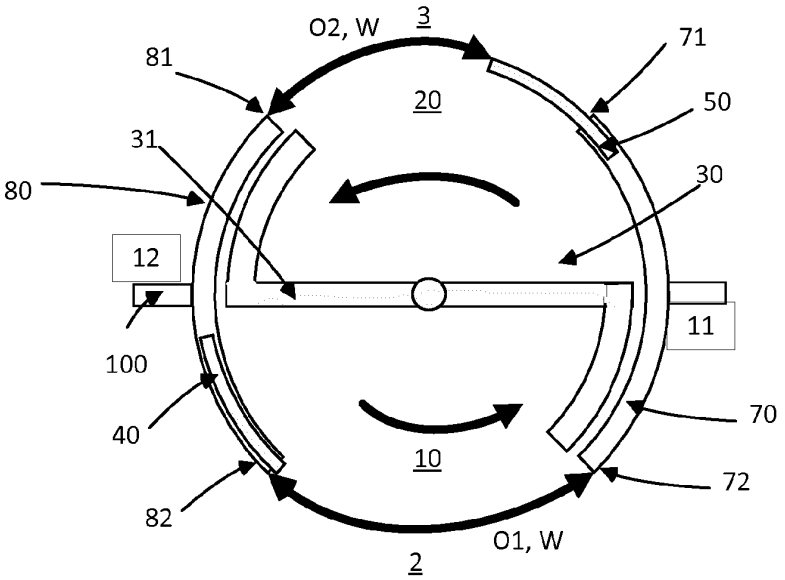


Fig. 6

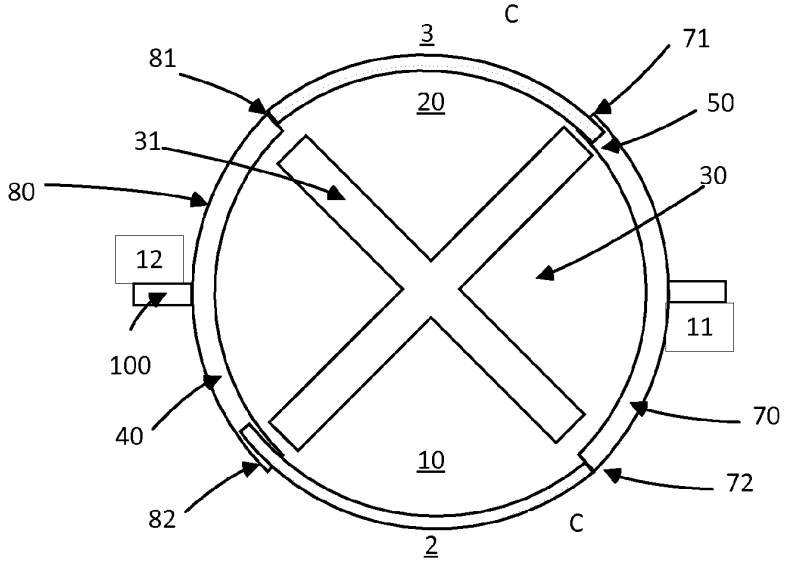
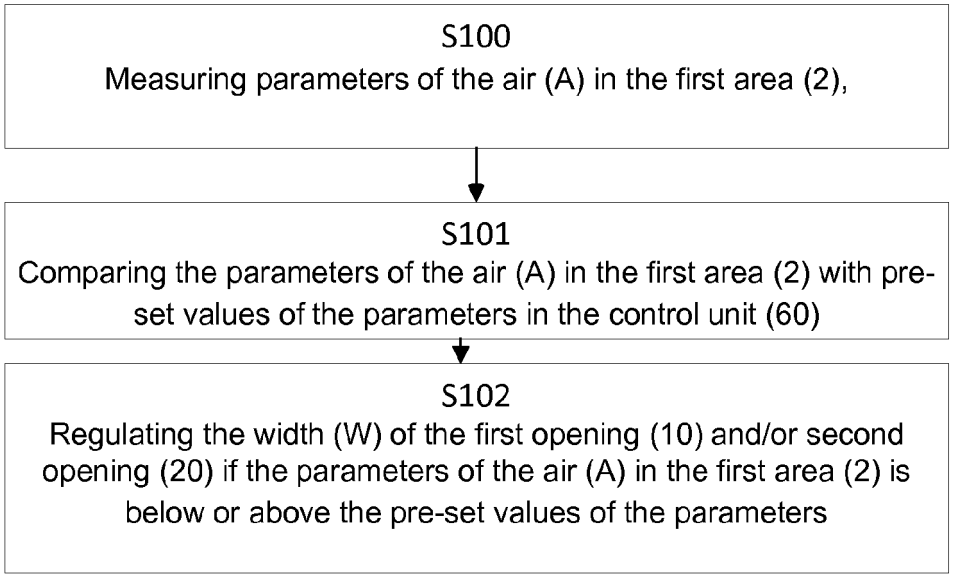


Fig. 7


S100
Measuring parameters of the air (A) in the first area (2),
S101
Comparing the parameters of the air (A) in the first area (2) with pre-set values of the parameters in the control unit (60)
S102
Regulating the width (W) of the first opening (10) and/or second opening (20) if the parameters of the air (A) in the first area (2) is below or above the pre-set values of the parameters

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 6084367 A1 **[0003]**