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KRAUS(10) **Pub. No.: US 2017/0336094 A1**(43) **Pub. Date: Nov. 23, 2017**(54) **MODULATED DISTRIBUTION HUB OF FRESH AIR***F24F 12/00* (2006.01)*F24F 7/00* (2006.01)(71) Applicant: **AERECO**, Marne La Vallée Cedex 03 (FR)(52) **U.S. CL.**CPC *F24F 13/0236* (2013.01); *F24F 11/0015*(2013.01); *F24F 12/006* (2013.01); *F24F 7/06*(2013.01); *F24F 2011/0026* (2013.01); *F24F**2011/0042* (2013.01); *F24F 2007/001*

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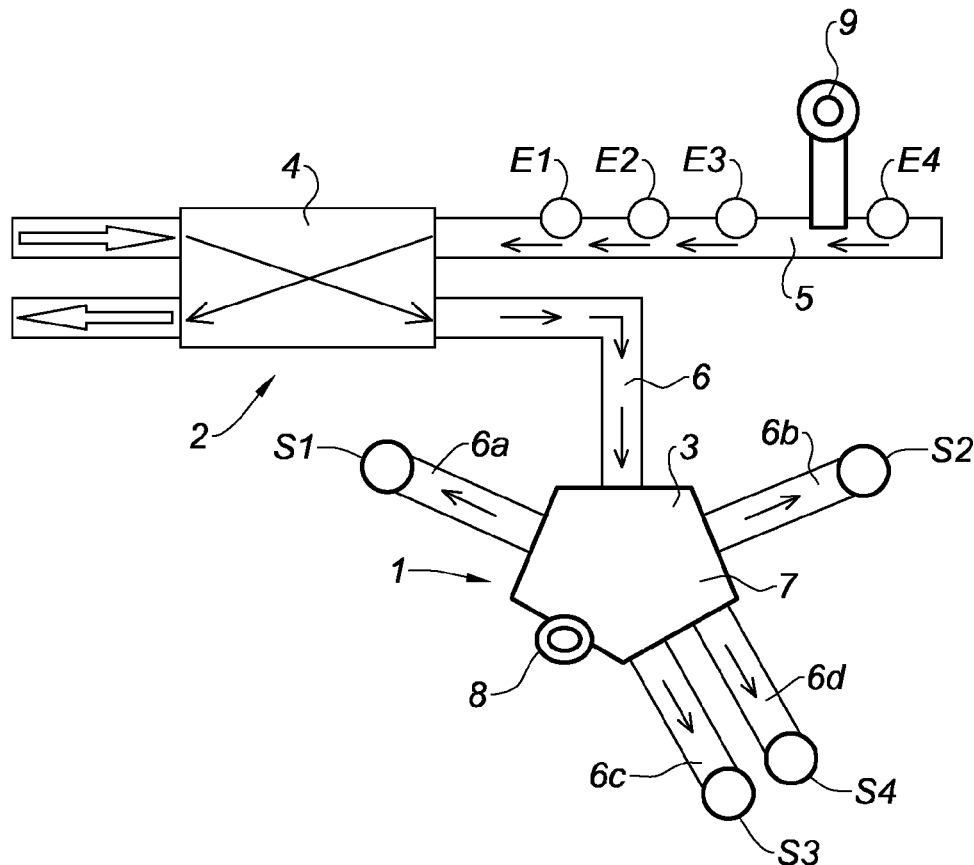
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The present invention concerns an equipment for a double-flow ventilation device, the ventilation device being modulated on the extraction, respectively the insufflation, of air, of an enclosure comprising two groups of at least one room, one is the first and the other is the second, the equipment being noteworthy in that it comprises at least one sensor for determining the insufflation needs of the first group, and a hub for managing an insufflation, respectively extraction, flow from the second group, comprising at least one pilotable means for managing the insufflation, respectively extraction, flow servo-controlled to the insufflation needs of the first group and at least one sensor of the pressure in the hub, the hub being integrated to the double-flow ventilation device so as to receive the insufflation, respectively extraction, flow.



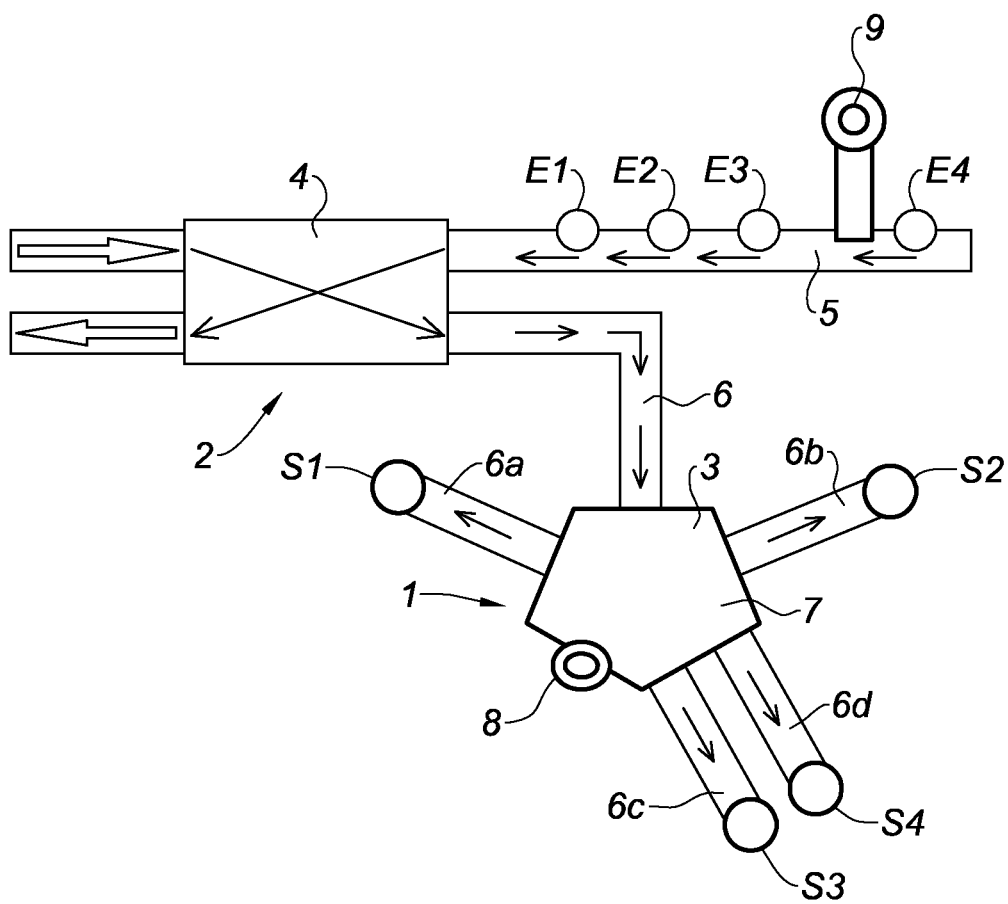


Fig. 1

MODULATED DISTRIBUTION HUB OF FRESH AIR

TECHNICAL FIELD

[0001] The present invention relates to an equipment for mechanical ventilation devices, in particular double-flow ventilation devices.

BACKGROUND

[0002] With the increasing tightness of the dwellings, the mechanical ventilation is more and more necessary to ensure sufficient hygienic air renewal flow rates.

[0003] In the context of energy efficiency of the beginning of the 21st century, the double-flow ventilation with a heat exchanger is an increasingly widespread technology.

[0004] The double-flow ventilation with a heat exchanger is known for individual dwellings since the seventies: a fan extracts the air in the service rooms (kitchen, bathroom and toilets), another induces the fresh air in the main rooms (living room, dining room, rooms).

[0005] The two flows meet in a particular element called heat exchanger, in which the (hotter) extracted air exchanges its calories with the (cooler) fresh air.

[0006] This disposition allows recovering a large portion of the energy necessary to heat the air and therefore considerably lowering the energy need of the dwelling.

[0007] In recent years, the double-flow ventilation is also associated with some air modulation forms, sensors placed in different rooms measure the ventilation need and particular devices allow adapting the ventilated amount of air to the actual needs of the dwelling.

[0008] These technologies allow reducing the electrical consumption of the fans and extending the service life of the filters.

[0009] There are commonly found double-flow ventilations whose extraction flow rate is modulated by sensors in the service rooms. The insufflation flow rate is therefore set on the extraction flow rate in order to preserve a balance of the two flows, this feature is important for the efficiency of the heat exchanger.

[0010] The drawback of this type of modulation is that the insufflation need may be not satisfied by the flow rate required for the extraction, and that the fixed distribution of the flow rates does not allow favoring the rooms with the largest insufflation need.

[0011] There are also found, less commonly, double-flow ventilations whose insufflation flow rate is modulated by sensors in the main rooms. It is therefore the extraction flow rate which is set on the insufflation flow rate.

[0012] Herein again, the previous defect is there but reversed, that is to say that the extraction needs may be not satisfied by the insufflation flow rates, and that the fixed distribution of the flow rates does not allow favoring the rooms with the largest extraction need.

[0013] Other double-flow ventilation devices also exist, which are more complex, and which modulate both the extraction and insufflation needs based on sensors placed in all rooms and connected to a centralized piloting. Different balancing strategies are then used according to methods proper to each manufacturer of double-flow ventilations.

BRIEF SUMMARY

[0014] The present invention aims to remedy in particular the aforementioned drawbacks.

[0015] Thus, the present invention concerns an equipment for a double-flow ventilation device, the ventilation device being modulated on the extraction, respectively the insufflation of air, of an enclosure comprising two groups of at least one room, one is the first and the other is the second, the equipment being noteworthy in that it comprises at least one sensor for determining the insufflation needs of the first group, and a hub for managing an insufflation, respectively extraction flow from the second group, comprising at least one pilotable means for managing the insufflation, respectively extraction, flow servo-controlled to the insufflation needs of the first group and at least one sensor of the pressure in the hub, the hub being integrated to the double-flow ventilation device so as to receive the insufflation, respectively extraction flow.

[0016] Throughout the entire application, the expression <<upstream >> is defined as referring to any point located before the considered point in the flow direction of any air flow and the expression <<downstream >> is defined as referring to any point located after the considered point in the flow direction of the air flow.

[0017] Throughout the entire application, the expression extraction flow should be understood as referring to any air flow upstream of the heat exchanger and the expression insufflation flow should be understood as referring to any air flow downstream of the heat exchanger.

[0018] Such an equipment allows completing the double-flow ventilation device so as to completely servo-control it, to manage extraction flows as well as to manage insufflation flows, in a simple, reliable, inexpensive, and practical manner to the extent that it can be installed on any double-flow ventilation device, even if such a double-flow ventilation device is already installed.

[0019] According to other optional technical features of the invention, considered separately or according to any possible combination:

[0020] the first group has several rooms, the equipment then comprises several determination sensors of insufflation needs each installed in a room of the first group;

[0021] when it is integrated downstream of the heat exchanger, the hub comprises several management valves each managing the insufflation flow for each room of the first group;

[0022] the second group has several rooms;

[0023] when it is integrated upstream of the heat exchanger, the hub comprises several management valves each managing the extraction flow for each room of the second group;

[0024] the equipment comprises at least one insufflation compensation valve which may be integrated to the double-flow ventilation device;

[0025] the equipment comprises at least one extraction compensation valve which may be integrated to the double-flow ventilation device.

[0026] The present invention also concerns a method for implementing an equipment according to the invention.

[0027] According to other optional technical features of the invention, considered separately or according to any possible combination, the method may have the following steps of:

- [0028] piloting by the hub the opening of each insufflation flow management valve according to information collected by the determination sensors of insufflation needs so as to best adapt the insufflation flow to the insufflation needs;
- [0029] piloting by the hub the opening of each insufflation flow management valve according to the pressure measured in the hub or in insufflation nozzles so as to best adapt the insufflation flow to the insufflation needs;
- [0030] piloting by the hub the extraction compensation valve so as to modify the extraction flow and to adapt it to the insufflation flow, for example if the insufflation needs are larger than the extraction needs;
- [0031] piloting by the hub the insufflation compensation valve so as to maintain a target pressure in the hub or in insufflation nozzles, for example if the extraction needs are larger than the insufflation needs;
- [0032] the target pressure in the hub or in the insufflation nozzles may be maintained constant depending on the insufflation flow rate;
- [0033] the target pressure in the hub or in the insufflation nozzles may vary progressively depending on the insufflation flow rate;
- [0034] the hub receives and treats complementary information coming from the double-flow ventilation device;
- [0035] the hub treats and transmits complementary information to the double-flow ventilation device.

BRIEF DESCRIPTION OF THE DRAWINGS

[0036] Other features, aims and advantages of the present invention will appear upon reading the following detailed description, according to the embodiments given as non-limiting examples and with reference to the unique appended drawing wherein:

[0037] FIG. 1 represents a diagram of a double-flow ventilation device equipped with an equipment according to an embodiment of the present invention.

DETAILED DESCRIPTION

[0038] With reference to FIG. 1, there is described an equipment 1 for a double-flow ventilation device 2.

[0039] The ventilation device 2 is modulated on the air extraction, that is to say that it comprises extraction mouths whose diameter for example is variable depending on the extraction needs defined by insufflation needs. The modulation of the air extraction is achieved by means of extraction valves of the ventilation device 2, or still by check-valves or control-valves.

[0040] The ventilation device 2 is a double-flow ventilation device 2 of an enclosure comprising two groups of four rooms each, one is the first and the other is the second. The enclosure may comprise other rooms not belonging to these two groups which would then therefore be concerned by the double-flow ventilation.

[0041] Each of the rooms of the second group receives an extraction mouth E1, E2, E3, E4 of the ventilation device 2 so as to from an extraction flow, the section of which is variable depending on the extraction needs.

[0042] Each of the rooms of the first group receives an insufflation mouth S1, S2, S3, S4 of the ventilation device 2

through which at least a portion of the insufflation flow is discharged, by means of an insufflation fan of the ventilation device 2.

[0043] The equipment 1 comprises four sensors for determining the insufflation needs of the first group. A sensor is disposed in each room of the first group. These sensors may in particular consist of sensors of the presence of carbon dioxide, humidity. It is understood that each room may comprise several sensors allowing a finer determination of the insufflation needs. The sensor type is selected according to the pursued effect, for example, when it is desired to servo-control an insufflation flow according to the humidity, a humidity sensor will be selected.

[0044] The equipment 1 also comprises a hub 3 for managing an insufflation flow integrated to the double-flow ventilation device 2 so as to receive the insufflation flow. More specifically, the hub 3 is integrated in the ventilation device 2 so as to be able to manage the distribution of the insufflation flow coming thereto from a heat exchanger 4 of the ventilation device 2 for each of the rooms of the first group.

[0045] The hub 3 comprises four pilotable valves for managing the insufflation flow servo-controlled to the insufflation needs of the first group determined by the determination sensors of insufflation needs.

[0046] The four valves allow opening or closing, completely or partially, in a discrete or continuous manner, the access of the insufflation flow to each of the rooms of the first group.

[0047] The hub 3 also comprises a sensor of the pressure in the hub 3.

[0048] The extraction flow is conveyed by a fan from the ventilation device 2 towards the exchanger 4.

[0049] In the general operation of the equipment 1 and of the ventilation device 2, hot air of the rooms of the second group enters via the variable-diameter extraction mouths thanks to the fan in an extraction nozzle 5 opening onto the heat exchanger 4, thus forming the hot extraction flow. The hot extraction flow circulates until the heat exchanger 4.

[0050] In parallel, cold fresh air coming from the outside of the enclosure is collected in order to be conveyed by an insufflation nozzle 6 until the heat exchanger 4, thus forming a cold insufflation flow.

[0051] Therefore a heat transfer takes place between the hot extraction flow and the cold insufflation flow within the heat exchanger 4, the insufflation flow therefore comes out reheated from the heat exchanger 4, thus forming a hot insufflation flow.

[0052] The hot insufflation flow therefore circulates in the insufflation nozzle 6 until a distribution node 7 from which a plurality of insufflation nozzle (6a, 6b, 6c, 6d) are issued downstream. Upstream of each of the insufflation nozzles (6a, 6b, 6c, 6d) are installed the management valves of the insufflation flow of the hub 3.

[0053] When they are open, these valves allow the passage of the insufflation flow which then surges into the nozzles (6a, 6b, 6c, 6d) opening onto the rooms of the first group.

[0054] The insufflation flow is therefore discharged in the rooms of the first group.

[0055] In an operating mode of the ventilation device 2, the pressure at the inlet of the ventilation device 2, that is to say at the extraction nozzle 5, is maintained constant whereas extraction valves, or any other device for example check-valves or control-valves, allow modulating the extrac-

tion flow. When an extraction valve opens to adapt to the need of a room of the first group, the pressure in the extraction nozzle 5 drops and the ventilation device 2 therefore accelerates the extraction fan to adjust the pressure of the extraction nozzle 5 on the desired target pressure. Simultaneously with this adjustment, the ventilation device 2 therefore also accelerates the insufflation fan so as to reestablish the balance between the extraction flow and the insufflation flow. The flow rate accordingly increased is distributed proportionally to the non-variable opening of the insufflation valves of the ventilation device 2. The hub 3 thus allows mastering, by settings of the management valves of the insufflation flow of the hub 3 according to the insufflation needs of the first group, the insufflation pressure, that is to say the pressure in the different insufflation nozzles 6, 6a, 6b, 6c and 6d.

[0056] In the example represented in FIG. 1, the hub 3 comprises an insufflation compensation valve 8 integrated to the double-flow ventilation device 2, as well as an extraction compensation valve 9, which is in turn integrated to the double-flow ventilation device 2.

[0057] The extraction compensation valve 9 allows, if appropriate, reestablishing the balance between the extraction flow and the insufflation flow based on the insufflation needs. In the absence of the extraction compensation valve 9, the section of the extraction mouths E1, E2, E3, E4 may be modulated in order to reestablish this balance.

[0058] The insufflation compensation valve 8 allows, if appropriate, maintaining a target pressure in the insufflation nozzles 6, 6a, 6b, 6c and 6d, regardless of the extraction flow generated in the extraction nozzle 5.

[0059] In general, one single compensation valve 8 or 9 is active at once. Nonetheless, it is possible that both compensation valves 8 and 9 are active simultaneously in exceptional cases, for example in the case of over-ventilation, that is to say when the intensity of the insufflation flow is very high.

[0060] The insufflation needs in the rooms of the first group are read by the determination sensors of insufflation needs installed in the rooms of the first group.

[0061] The extraction needs are servo-controlled to the pressures in the nozzles 5, 6, 6a, 6b, 6c and 6d.

[0062] A particular operating mode of the equipment 1 jointly with the ventilation device 2 would consist in that the equipment 1 does not intervene in the modulation of the extraction flow but only size the extraction flow according to the insufflation needs, the extraction compensation valve 9 would therefore be no longer necessary to the operation of the assembly formed by the equipment 1 and by the ventilation device 2. They are the extraction needs which will pilot the ventilation device 2 on which the equipment 1 is inserted. The insufflation flow, identical to the extraction flow, is distributed in each room depending on the need, the possible remainder passes through the insufflation compensation valve 8 which may be placed anywhere.

[0063] Another particular operating mode of the equipment 1 jointly with the ventilation device 2 would consist in that the equipment 1 does not comprise any insufflation compensation valve 8. In this instance, the function of the hub 3 would therefore be only to best distribute the insufflation flow by acting on the settings of the management valves of insufflation flow of the hub 3, whether the insufflation flow is sufficient or not so as to address the insufflation needs. They are the largest extraction or insufflation

needs which will pilot the ventilation device 2 on which the equipment 1 is inserted. The insufflation flow is distributed in each room of the first group according to the actual insufflation needs, they may be larger than the actual insufflation needs since the insufflation pressure is not limited. Besides, the insufflation compensation valve 8 may possibly be replaced, at least partially, by a particular management of the insufflation flow management valves of the hub 3. In this instance, the setting of the insufflation flow management valves of the hub 3 depends not only on the insufflation needs in the rooms of the first group, but also on the extraction needs if these are larger than the insufflation needs. The management valves of insufflation flow of the hub 3 are therefore open wider than if their setting would have depended only on the insufflation needs.

[0064] Another particular operating mode of the equipment 1 jointly with the ventilation device 2 would consist in that the equipment 1 does not comprise any insufflation 8 and extraction 9 compensation valves. In this instance, they are the extraction needs which will pilot the ventilation device 2 on which the equipment 1 is inserted. The insufflation flow, identical to the extraction flow, is distributed in each room depending on the need, the insufflation pressure is neither guaranteed nor limited. A management of the management valves of insufflation flow of the hub 3 considering the pressure may partially act as an insufflation compensation valve 8 and limit the pressure.

[0065] When there is a complete piloting of the ventilation device 2 on which the equipment 1 is inserted, that is to say when the extraction 9 and insufflation 8 compensation valves have been activated, the largest extraction or insufflation needs will actually pilot the ventilation device 2 on which the equipment 1 is inserted. The insufflation flow is distributed in each room of the first group according to the actual insufflation needs, the possible remainder passes through the insufflation 8 or extraction 9 compensation valve depending on the situation; these compensation valves may be placed anywhere. The insufflation pressure is mastered.

[0066] In the following, operating modes of the equipment 1 jointly with the ventilation device 2 are described in more detail.

[0067] In each of the operating modes which will be described, we chose to start from a situation in which the extraction Q_E and insufflation Q_S flows are balanced and the target pressure in the extraction nozzle 5 is P_E and the target pressure in the insufflation nozzle 6 is P_S .

[0068] In the first detailed operating modes, the extraction 9 and insufflation 8 compensation valves are closed, or do not exist, that is to say that their respective openings VdC_E and VdC_S are zero.

[0069] When the extraction needs increase, therefore the extraction valves of the ventilation device 2 widen their opening, which induces a decrease of the pressure P_E . The extraction fan therefore reacts to reestablish the target pressure P_E , therefore this results in an intensification of the extraction flow Q_E . The insufflation fan of the ventilation device 2 therefore reacts to balance the insufflation flow Q_S . This results in a rise of the pressure P_S . The pressure sensor in the hub 3 will detect this rise of the pressure P_S and will act on the insufflation compensation valve 8 to open it, that is to say that VdC_S increases. This results in a decrease of the pressure P_S . The pressure sensor in the hub 3 will detect this decrease of the pressure P_S and will act if necessary on the insufflation compensation valve 8 until reaching the target

pressure P_S . Depending on the magnitude of the variation and on the retained reaction algorithms, in particular for piloting of the insufflation compensation valve **8**, more or less sophisticated, with or without a pre-calculation of the result, with or without a hysteresis on the pressure, there may be a few oscillations of this type before the system is balanced. Finally, both extraction and insufflation flows are balanced again with new values corresponding to the new needs, P_E and P_S are at the nominal values.

[0070] When the extraction needs decrease, therefore the extraction valves of the ventilation device **2** reduce their opening, which induces a rise of the pressure P_E . The extraction fan therefore reacts to reestablish the target pressure P_E , therefore this results in a reduction of the extraction flow Q_E . The insufflation fan of the ventilation device **2** therefore reacts to balance the insufflation flow Q_S . This results in a decrease of the pressure P_S . The pressure sensor in the hub **3** will detect this decrease of the pressure P_S and will act on the extraction compensation valve **9** to open it, that is to say that VdC_E increases. This results in a decrease of the pressure P_E . The extraction fan of the ventilation device **2** then reacts to reestablish the pressure P_E . This results in an increase of the extraction flow Q_E . The insufflation fan therefore reacts to balance the insufflation flow Q_S . This results in a rise of the pressure P_E . The pressure sensor in the hub **3** will detect this rise of the pressure P_E and will act if necessary on the extraction compensation valve **9** until reaching the target pressure P_S . Depending on the magnitude of the variation and on the retained reaction algorithms, in particular for piloting of the extraction compensation valve **9**, more or less sophisticated, with or without a pre-calculation of the result, with or without a hysteresis on the pressure, there may be a few oscillations of this type before the system is balanced. Finally, both extraction and insufflation flows are balanced again with new values corresponding to the ancient needs, since the insufflation needs have not changed while the extraction needs decreased and considering that the insufflation is at control. P_E and P_S are at the nominal values.

[0071] When the insufflation demand increases, therefore the insufflation valves of the equipment **1** widen their opening, which induces a decrease of the pressure P_S . The pressure sensor in the hub **3** will detect this pressure P_S decrease and will act on the extraction compensation valve **9** to open it, that is to say that VdC_E increases. This results in a decrease of the pressure P_E . The extraction fan then reacts to reestablish the pressure P_E . This results in an increase of the extraction flow Q_E . The insufflation fan therefore reacts to balance the insufflation flow Q_S . This results in a rise of P_S . Herein again, there may be a few oscillations before reaching a new balance. Finally, the two flows are balanced again with new values corresponding to the new needs, P_E and P_S are at the target values.

[0072] When the insufflation demand decreases, this induces a rise of the pressure P_S . The pressure sensor in the hub **3** will detect this rise of the pressure P_S and will act on the insufflation compensation valve **8** to open it, that is to say that VdC_S increases. This results in a decrease of the pressure P_S . Finally, the two flows are balanced again with the same initial values corresponding to the ancient needs, P_E and P_S are at the target values.

[0073] In the second detailed operating mode, the insufflation compensation valve **8** is closed, or does not exist, that

is to say that its opening VdC_S is zero, and the extraction compensation valve **9** is open, that is to say that its opening VdC_E is not zero.

[0074] When the extraction needs increase, therefore the extraction valves of the ventilation device **2** widen their opening, which induces a decrease of the pressure P_E . The extraction fan then reacts to reestablish the target pressure P_E , therefore this results in an intensification of the extraction flow Q_E . The insufflation fan of the ventilation device **2** therefore reacts to balance the insufflation flow Q_S . This results in a rise of the pressure P_S . The pressure sensor in the hub **3** will detect this rise of the pressure P_S and will act on the extraction compensation valve **9** to close it. This results in a rise of P_E . The extraction fan therefore reacts to reestablish the pressure P_E . This results in a decrease of the extraction flow Q_E . The insufflation fan therefore reacts to balance the insufflation flow Q_S . This results in a decrease of the pressure P_S . Depending on the result and on the retained reaction algorithms, in particular for piloting of the compensation valve, more or less sophisticated, with or without a pre-calculation of the result, with or without a hysteresis on the pressure, there may be a few oscillations of this type before the system is balanced. It is also possible that the closure of the extraction compensation valve **9** does not suffice to balance the pressures, the hub **3** will then act on the insufflation compensation valve to open it, this results in a decrease of the pressure P_S . The pressure sensor in the hub **3** will detect this pressure decrease and will act or not on the insufflation compensation valve until reaching the nominal pressure P_S . Depending on the magnitude of the variation and on the retained reaction algorithms (piloting of the compensation valve more or less sophisticated, with or without a pre-calculation of the result, with or without a hysteresis on the pressure, . . .), there may be a few oscillations of this type before the system is balanced. Finally, the two flows are balanced again with new values corresponding to the new larger need, if the extraction compensation valve **9** opened, or equal to their original value if the extraction compensation valve **9** has remained closed, depending on the initial unbalance and on the magnitude of the variation. P_E and P_S are at the target values.

[0075] When the extraction needs decrease, therefore the extraction valves of the ventilation device **2** reduce their opening, which induces a rise of the pressure P_E . The extraction fan therefore reacts to reestablish the pressure P_E , this results in a reduction of the extraction flow Q_E . The insufflation fan of the ventilation device **2** therefore reacts to balance the insufflation flow Q_S . This results in a decrease of the pressure P_S . The pressure sensor in the hub **3** will detect this decrease of the pressure P_S and will act on the extraction compensation valve **9** which is open, to open it further. This results in a rise of Q_E . The insufflation fan of the ventilation device **2** therefore reacts to balance Q_E and Q_S . This results in a decrease of the pressure P_S . Depending on the result and on the retained reaction algorithms, in particular for piloting of the compensation valve, more or less sophisticated, with or without a pre-calculation of the result, with or without a hysteresis on the pressure, there may be a few oscillations of this type before the system is balanced. Finally, both extraction and insufflation flows are balanced again with values corresponding to the ancient needs, since the insufflation needs have not changed while the extraction needs decreased and considering that the insufflation is at control. P_E and P_S are at the nominal values.

[0076] When the insufflation demand increases, this induces a decrease of the pressure P_S . The pressure sensor in the hub 3 will detect this decrease of the pressure P_S and will act on the extraction compensation valve 9 to open it wider, that is to say that VdC_E increases. This results in a decrease of the pressure P_E . The extraction fan therefore reacts to reestablish the pressure P_E . This results in an increase of the extraction flow Q_E . The insufflation fan therefore reacts to balance the insufflation flow Q_S . This results in a rise of P_S . Herein again, there may be a few oscillations before reaching a new balance. Finally, the two flows are balanced again with new values corresponding to the new needs, P_E and P_S are at the target values.

[0077] When the insufflation demand decreases, this induces a rise of the pressure P_S . The pressure sensor in the hub 3 will detect this rise of the pressure P_S and will act on the extraction compensation valve 9 to close it. The extraction fan therefore reacts to reestablish the pressure P_E . This results in a decrease of the extraction flow Q_E . The insufflation fan therefore reacts to balance the insufflation flow Q_S . This results in a decrease of the pressure P_S . Depending on the result and on the retained reaction algorithms (piloting of the compensation valve more or less sophisticated, with or without a pre-calculation of the result, . . .), there may be a few oscillations of this type before the system is balanced. It is also possible that the closure of the extraction compensation valve 9 does not suffice to balance the pressures, the hub 3 will therefore act on the insufflation compensation valve to open it, this results in a decrease of the pressure P_S . The pressure sensor in the hub 3 will detect this pressure decrease and will act or not on the insufflation compensation valve until reaching the target pressure P_S . Depending on the magnitude of the variation and on the retained reaction algorithms (piloting of the compensation valve more or less sophisticated, with or without a pre-calculation of the result, with or without a hysteresis on the pressure, . . .), there may be a few oscillations of this type before the system is balanced. Finally, the two flows are balanced again with new values corresponding to the new need. P_E and P_S are at the target values.

[0078] In the third detailed operating mode, the insufflation compensation valve 8 is open, that is to say that its opening VdC_S is not zero, and the extraction compensation valve 9 is closed, or does not exist, that is to say that its opening VdC_E is zero.

[0079] When the extraction needs increase, therefore the extraction valves of the ventilation device 2 widen their opening, which induces a decrease of the pressure P_E . The extraction fan therefore reacts to reestablish the pressure P_E , therefore this results in an intensification of the extraction flow Q_E . The insufflation fan of the ventilation device 2 therefore reacts to balance the insufflation flow Q_S . This results in a rise of the pressure P_S . The pressure sensor in the hub 3 will detect this rise of the pressure P_S and will act on the insufflation compensation valve to open it wider. This results in a decrease of P_S . Depending on the result and on the retained reaction algorithms, in particular for piloting of the compensation valve, more or less sophisticated, with or without a pre-calculation of the result, with or without a hysteresis on the pressure, there may be a few oscillations of this type before the system is balanced. Finally, the two flows are balanced again with new values corresponding to

the new need. P_E and P_S are at the target values. When the extraction needs decrease, this induces a rise of the pressure P_E .

[0080] The extraction fan therefore reacts to reestablish the target pressure P_E , therefore this results in a reduction of the extraction flow Q_E . The insufflation fan of the ventilation device 2 therefore reacts to balance the insufflation flow Q_S . This results in a decrease of the pressure P_S . The pressure sensor in the hub 3 will detect this decrease of the pressure P_S and will act on the insufflation compensation valve 9 which is open, to close it. This results in a rise of P_S . Depending on the result and on the retained reaction algorithms, in particular for piloting of the compensation valve, more or less sophisticated, with or without a pre-calculation of the result, with or without a hysteresis on the pressure, there may be a few oscillations of this type before the system is balanced. It is also possible that the closure of the insufflation compensation valve 8 does not suffice to balance the pressures, the hub 3 will then act on the extraction compensation valve 9 to open it. This results in a decrease of the pressure P_E . The extraction fan therefore reacts to reestablish the pressure P_E . This results in a rise of the extraction flow Q_E . The insufflation fan therefore reacts to balance the insufflation flow Q_S . This results in a rise of the pressure P_S . The pressure sensor in the hub 3 will detect this pressure rise and will act or not on the extraction compensation valve until reaching the target pressure P_S . Depending on the magnitude of the variation and on the retained reaction algorithms (piloting of the compensation valve more or less sophisticated, with or without a pre-calculation of the result, with or without a hysteresis on the pressure, . . .), there may be a few oscillations of this type before the system is balanced. Finally, the two flows are balanced again with new values corresponding to the new need. P_E and P_S are at the target values.

[0081] When the insufflation needs increase, this results in a decrease of the pressure P_S . The pressure sensor in the hub 3 will detect this decrease of pressure P_S and will act on the insufflation compensation valve 9 which is open, to close it. This results in a rise of P_S . Depending on the result and on the retained reaction algorithms, in particular for the piloting of the compensation valve, more or less sophisticated, with or without a pre-calculation of the result, with or without a hysteresis on the pressure, there may be a few oscillations of this type before the system is balanced. It is also possible that the closure of the insufflation compensation valve 8 does not suffice to balance the pressures, the hub 3 will then act on the extraction compensation valve 9 to open it. This results in a decrease of the pressure P_E . The extraction fan therefore reacts to reestablish the target pressure P_E . This results in a rise of the extraction flow Q_E . The insufflation fan therefore reacts to balance the insufflation flow Q_S . This results in a rise of the pressure P_S . The pressure sensor in the hub 3 will detect this pressure rise and will act or not on the extraction compensation valve until reaching the target pressure P_S . Depending on the magnitude of the variation and on the retained reaction algorithms (piloting of the compensation valve more or less sophisticated, with or without a pre-calculation of the result, with or without a hysteresis on the pressure, . . .), there may be a few oscillations of this type before the system is balanced. Finally, the two flows are balanced again with new values corresponding to the new larger need, if the extraction compensation valve 9 has been opened, or equal to their

original value if the extraction compensation valve 9 has remained closed, depending on the initial unbalance and on the magnitude of the variation. P_E and P_S are at the target values.

[0082] When the insufflation demand decreases, this induces a rise of the pressure P_S . The pressure sensor in the hub 3 will detect this rise of pressure P_S and will act on the insufflation compensation valve 8 to open it wider. This results in a decrease of P_S . Depending on the result and on the retained reaction algorithms, in particular for the piloting of the compensation valve, more or less sophisticated, with or without a pre-calculation of the result, with or without a hysteresis on the pressure, there may be a few oscillations of this type before the system is balanced. Finally, both extraction and insufflation flows are balanced again with values corresponding to the ancient needs, the extraction needs have not changed. P_E and P_S are at the nominal values.

[0083] The passages into over-ventilation remain possible, the increase of the extraction flow by increase of the pressure P_E will result in an increase of P_S and a reaction of the system for reducing the openings but the compensation of the fan will act beyond the reaction possibilities of the hub 3; a direct (wired or other) connection may also simplify this operating mode while avoiding acoustic drawbacks (a too high rise of P_S).

[0084] Information may also transit from the equipment 1 to the initial double-flow ventilation device 2 piloting device, for example on the operation of the insufflation flow management valves of the equipment 1, the insufflation flows for each room or the air quality levels by room but these connections (in one way or another) are not necessary for the operation of the invention.

[0085] In the same manner, information may also pass from the ventilation device 2 to the equipment 1.

[0086] It goes without saying that the invention is not limited to the embodiments described hereinabove as examples but it comprises all technical equivalents and variants of the described means and steps as well as the possible combinations thereof.

1. An equipment for a double-flow ventilation device, the ventilation device being modulated on the extraction, respectively the insufflation, of air, of an enclosure comprising two groups of at least one room, one is the first and the other is the second, the equipment being comprising at least one sensor for determining the insufflation needs of the first group, and a hub for managing an insufflation, respectively extraction, flow from the second group, comprising at least one pilotable means for managing the insufflation, respectively extraction, flow servo-controlled to the insufflation needs of the first group and at least one sensor of the pressure

in the hub, the hub being integrated to the double-flow ventilation device so as to receive the insufflation, respectively extraction, flow.

2. The equipment according to claim 1, wherein the first group has several rooms, the equipment therefore comprises several sensors for determining insufflation needs each installed in a room of the first group.

3. The equipment according to claim 1, wherein the second group has several rooms.

4. The equipment according to claim 1, wherein it comprises at least one insufflation compensation valve.

5. The equipment according to claim 1, wherein it comprises at least one extraction compensation valve.

6. The equipment according to claim 1, wherein when it is integrated downstream of the heat exchanger, the hub comprises several management valves each managing the insufflation flow for each room of the first group.

7. The equipment according to claim 1, wherein when it is integrated upstream of the heat exchanger, the hub comprises several management valves each managing the extraction flow for each room of the second group.

8. A method for implementing an equipment according to claim 1.

9. The method according to claim 8, wherein when the hub is integrated downstream of the heat exchanger, the method comprises a step of piloting by the hub the opening of each insufflation management valve of the insufflation flow according to information collected by the determination sensors of insufflation needs so as to best adapt the insufflation flow to the insufflation needs.

10. The method according to claim 9, wherein it comprises a step of piloting by the hub the opening of each insufflation flow management valve according to the pressure measured in the hub or in insufflation nozzles so as to best adapt the insufflation flow to the insufflation needs.

11. The method according to claims 8, wherein it comprises a step of piloting by the hub the extraction compensation valve so as to modify the extraction flow and to adapt it to the insufflation flow.

12. The method according to any one of claim 8, wherein it comprises a step of piloting by the hub the insufflation compensation valve so as to maintain a target pressure in the hub or in insufflation nozzles.

13. The method according to any one of claim 8, wherein it comprises a step of receiving and treating by the hub complementary information coming from the double-flow ventilation device.

14. The method according to claim 8, wherein it comprises a step of treating and transmitting by the hub complementary information to the double-flow ventilation device.

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