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(54) **Controlled Mechanical Ventilation Installation**

(57) The present invention relates to a controlled mechanical ventilation installation, comprising a CMV unit (1) for controlled mechanical ventilation, provided with an air outlet nozzle (2) and several air inlet nozzles (4) intended for being connected to ducts communicating

with respective rooms to be ventilated, wherein in relation to each air inlet nozzle (4) there is arranged an individual suction element (6) for extracting air from the corresponding rooms to be ventilated.

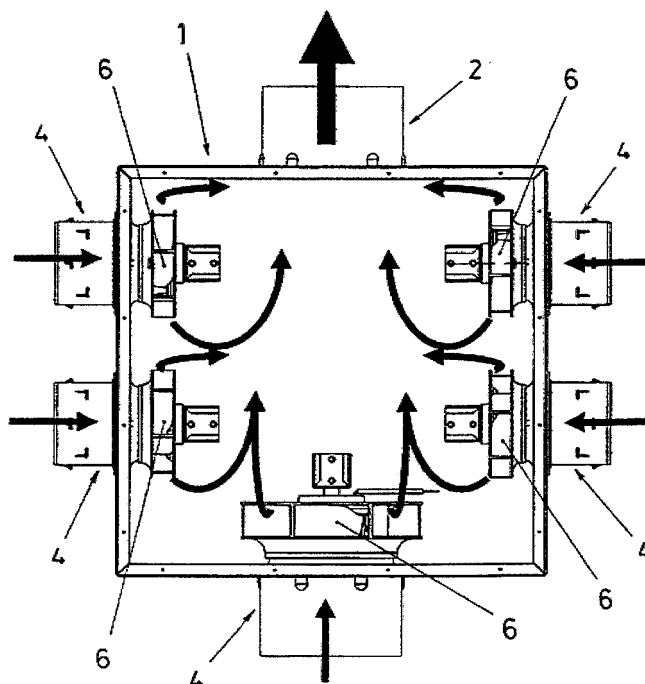


**Fig.4**

## Description

### Field of the Art

**[0001]** The present invention relates to systems for regenerating air inside rooms, proposing to that end a controlled mechanical ventilation system that allows simple installation, and it allows using its air driving elements in an optimal operating manner, optimizing power consumption and the service life of said elements.

### State of the Art

**[0002]** The air of single-family dwellings or premises where several people live together may be stuffy due to the grouping of people, to unpleasant odors caused by agents, such as tobacco, to humidity conditions in bathrooms, to odors and vapors derived from cooking food, etc.

**[0003]** Therefore, air renewal in rooms is essential to enable maintaining suitable healthy inner ambient conditions. To that end hygienic ventilation must be performed by means of extracting stuffy air from rooms and introducing clean air from the outside.

**[0004]** To that end, it is known to use devices known as "Controlled Mechanical Ventilation (CMV) Units", which are essentially formed by a box, the inside of which houses a fan, said box having several inlets to which ducts from rooms the air of which is to be renewed, such as bathrooms, the kitchen, etc., such that the air is extracted from such rooms to be conducted to the outside of the building by means of the CMV unit.

**[0005]** An important aspect to be taken into account in those applications is the consumption of the CMV unit, because ventilation systems have to be running constantly 24 hours a day, which makes continuous power consumption necessary to power the CMV unit.

**[0006]** Conventional CMV units are defined by their characteristic curve in which the y-axis corresponds to pressure values and the x-axis corresponds to flow rate values, such that said conventional CMV units have ventilation operating characteristics in which the available pressure increases when the flow rate decreases.

**[0007]** Said CMV units are conventionally provided with choke hatches or mouths in the connecting ducts or in the suction mouths, with respect to the different rooms to be ventilated, to regulate the passage of air through each duct according to the ventilation needs in the corresponding rooms. For example, if the room was a bathroom, the corresponding duct of the ventilation system opens as far as it can when the shower is turned on to allow passage of the maximum flow possible and to thus extract steam caused by the shower. In those conditions, when the passage of air is blocked to any extent in the different ducts connected to the CMV unit, the fan of the CMV unit continues working at a pressure higher than that desired because the head loss caused by choking the passage through the hatches or mouths, which en-

tails excessive and wasteful consumption, as well as producing noise caused by the air passing through the choke.

### Object of the Invention

**[0008]** According to the present invention there is proposed a controlled mechanical ventilation system, which allows automatic regulation of the air renewal of different rooms with optimized power consumption of the operation.

**[0009]** This system object of the invention consists of a controlled mechanical ventilation CMV unit in the form of a container box, which has an outlet nozzle for being connected to an air removal duct and several inlet nozzles for being connected to different air extraction ducts for extracting air from rooms to be ventilated, there being arranged in relation to each of said inlet nozzles an air suction element having a power level that is in accordance with the conditions necessary for extracting air only through the corresponding duct.

**[0010]** Therefore, each of the suction elements of the CMV unit can be activated independently depending on the needs for extracting air through the corresponding ducts, activation of the different suction elements being able to be controlled by means of automatic control depending on parameters, such as humidity, the presence of smoke, of people, etc., to activate each suction element only when it is necessary to suction air through the corresponding duct.

**[0011]** Therefore, with the activation of each suction element air is suctioned out of the room to which the corresponding duct is connected, and is taken to the CMV unit from where the air suctioned in through the inlets flows outside through the outlet nozzle.

**[0012]** The suction elements are thus integrated inside the CMV unit itself, without having to arrange closing choke hatches or mouths for closing off the ducts connected with the rooms to be ventilated, so it is unnecessary to install wiring to the electrical components located at different points, the system also being very economical and simple to install because in addition to reducing installation costs, the cost of the closing choke hatches or mouths is also reduced.

**[0013]** On the other hand, the suction elements of the system provide the necessary flow rate to each duct by means of changing the speed of said suction elements, such that each suction element works at a higher speed when air has to be extracted through the corresponding inlet nozzle, and those suction elements could also be low-power elements in accordance with the needs for individual suction that each of them must perform in relation to the corresponding duct, which allows optimal conditions for the operation of the CMV unit, with very low power consumption.

**[0014]** CMV units are continuously operating apparatus, so closure hatches or mouths for the ducts are not needed, although the installation of non-return valves can

optionally be contemplated.

[0015] Therefore, the controlled mechanical ventilation system object of the invention has certainly advantageous features, acquiring its own identity and preferred nature with respect to embodiments of systems of this type that are known today.

#### Description of the Drawings

#### [0016]

Figure 1 shows a diagram of a controlled mechanical ventilation system according to a conventional embodiment with closure regulating hatches in each of the air suction ducts and a single suction element in the CMV unit.

Figure 2 shows a diagram of a controlled mechanical ventilation system similar to the previous one but with closure regulating mouths in relation to air suction ducts instead of hatches.

Figure 3 shows a diagram of the controlled mechanical ventilation system according to the invention.

Figure 4 shows a section of the CMV unit of the system of the invention according to one embodiment, including air flow indications.

Figure 5 shows a perspective view of a CMV unit according to the invention, the top cover having been removed.

Figure 6 shows an exploded view of the CMV unit shown in the preceding figure.

#### Detailed Description of the Invention

[0017] The present invention relates to a controlled mechanical ventilation system, comprising a CMV unit (1) for controlled mechanical ventilation which has an air outlet nozzle (2) for being connected to an air removal duct (3) and several air inlet nozzles (4) for being connected to different ducts (5) communicating with rooms to be ventilated, there being arranged in relation to each of said air inlet nozzles (4) a respective suction element (6).

[0018] The CMV unit (1) consists of a box-like body through the walls of which the air outlet nozzle (2) and the air inlet nozzles (4) are formed, with couplings on the outside for connecting to the respective air circulation ducts (3 and 5).

[0019] The suction elements (6) are sized in correspondence with the dimension of the air inlet nozzles (4) of the CMV unit (1), and the power level thereof depends on flow rate of the air that must be suctioned through said air inlet nozzles (4) for the ventilation of application.

[0020] In turn, the ducts (5) which are connected to the air inlet nozzles (4) of the CMV unit (1) go from each of the rooms to be ventilated to said air inlet nozzles (4) of the CMV unit (1), whereas the removal duct (3) that is connected to the outlet nozzle (2) of the CMV unit (1) goes to the outside of the building of application of the

ventilation system.

[0021] Each of the suction elements (6) is arranged in an individual manner in relation to the respective inlet nozzle (4) of the CMV unit (1), the operation thereof being independent of the suction elements (6) arranged in relation to the other inlet nozzles (4) of the CMV unit (1), such that the speed of said suction elements (6) is controlled by means of automatic control which, depending on contamination parameters, such as humidity, presence of smoke, etc., determines the individual speed of each of those suction elements (6) according to the necessary ventilation of the room with which the duct (5) connected to the corresponding nozzle (4) communicates.

[0022] Therefore, by means of each of the suction elements (6), the air of the rooms of application of the ventilation is suctioned to the CMV unit (1) by means of the corresponding suction element (6), to be discharged through the outlet nozzle (2) and the removal duct (3), such that when they are not in use, said suction elements (6) form the closure of the respective air inlet nozzles (4) of the CMV unit (1), each suction element (6) being activated only when it is needed to operate.

[0023] The present invention therefore improves the functional conditions with respect to conventional ventilation systems, such as those shown in Figures 1 and 2, where the CMV unit (1) for controlled mechanical ventilation includes only one fan-suction element (7), whereby air from all the rooms to be ventilated is suctioned through the corresponding ducts (5) which are connected to the inlet nozzles (4) of the CMV unit (1), arranging in each of said ducts (5) a choke hatch (8) or a choke mouth (9) for regulating the closure of the passage of air through those ducts (5), depending on the needs of the ventilation of application.

#### **Claims**

1. A controlled mechanical ventilation system, comprising a CMV unit (1) for controlled mechanical ventilation having an air outlet nozzle (2) and several air inlet nozzles (4) which are connected to ducts (5) communicating with respective rooms to be ventilated, **characterized in that** in relation to each air flow of the rooms to be ventilated there is arranged an individual suction element (6) for extracting air through respective ducts (5), with respect to the corresponding rooms of application to be ventilated.
2. The controlled mechanical ventilation system according to claim 1, **characterized in that** the suction elements (6) that are arranged in relation to the different air inlet nozzles (4) of the CMV unit (1) regulate their speed independently by means of automatic control, depending on the need to extract air through the respective ducts (5) connecting with the rooms to be ventilated.

3. The controlled mechanical ventilation system according to claim 1, **characterized in that** when they are not in use, the suction elements (6) optionally form a closure of the passage of air with respect to the corresponding nozzles (4).

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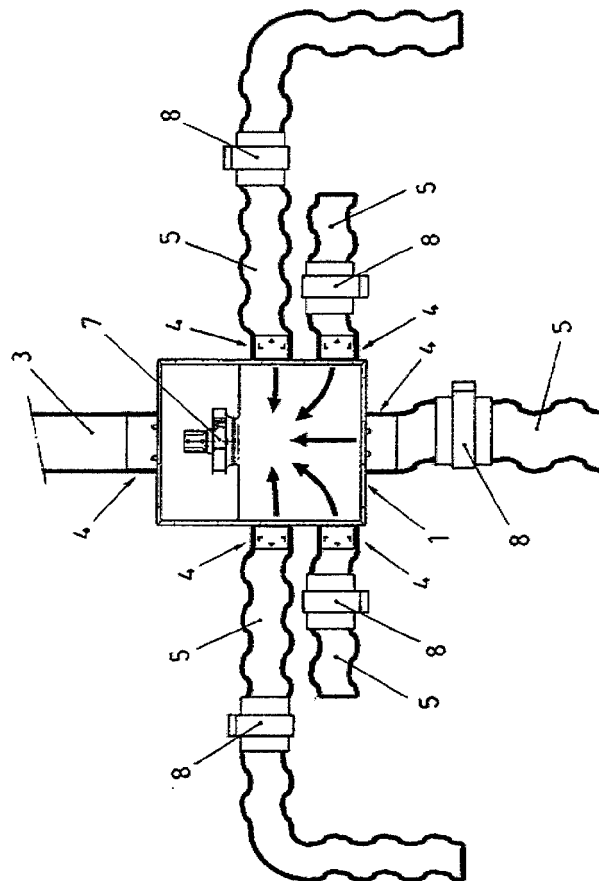


Fig.1

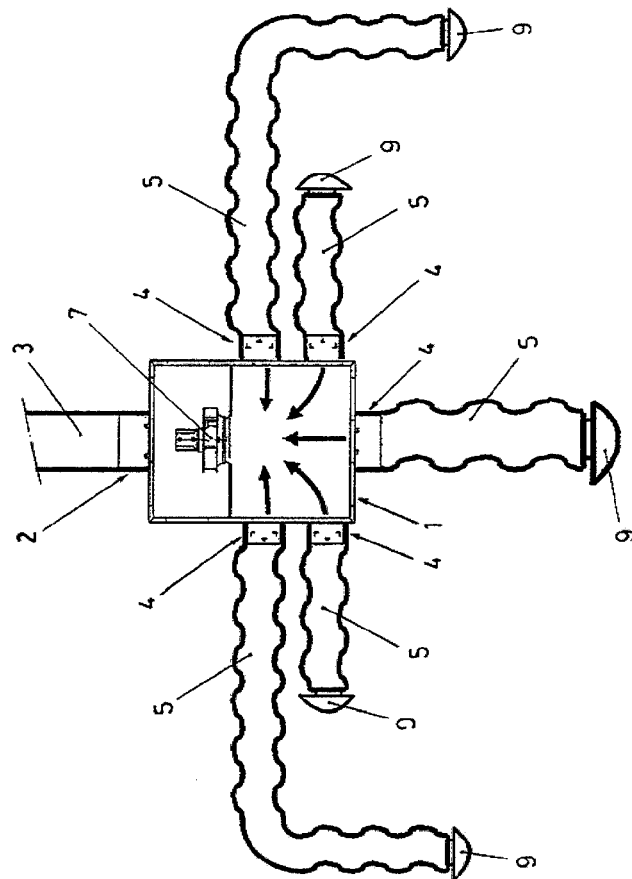


Fig.2

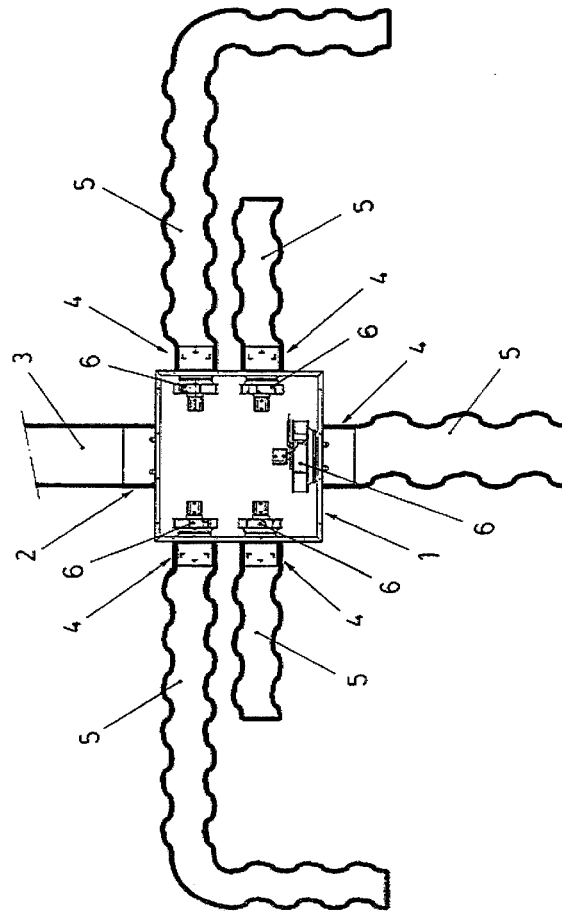


Fig.3

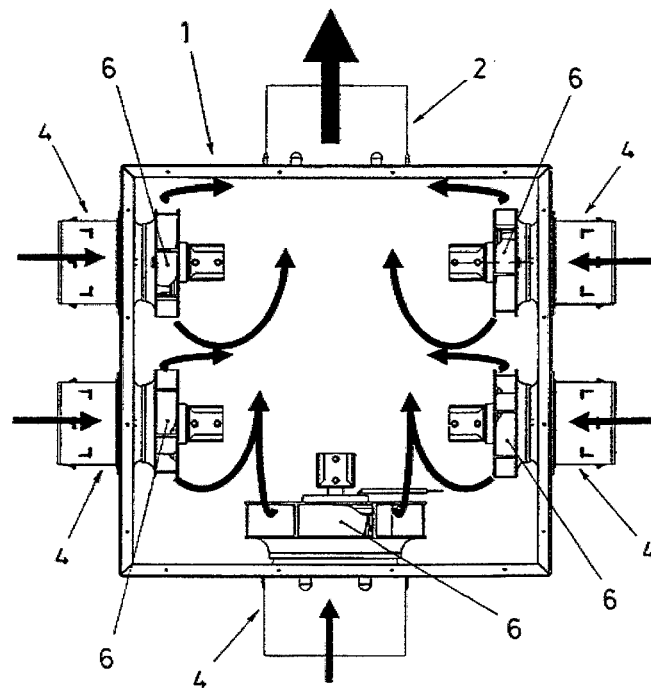


Fig.4

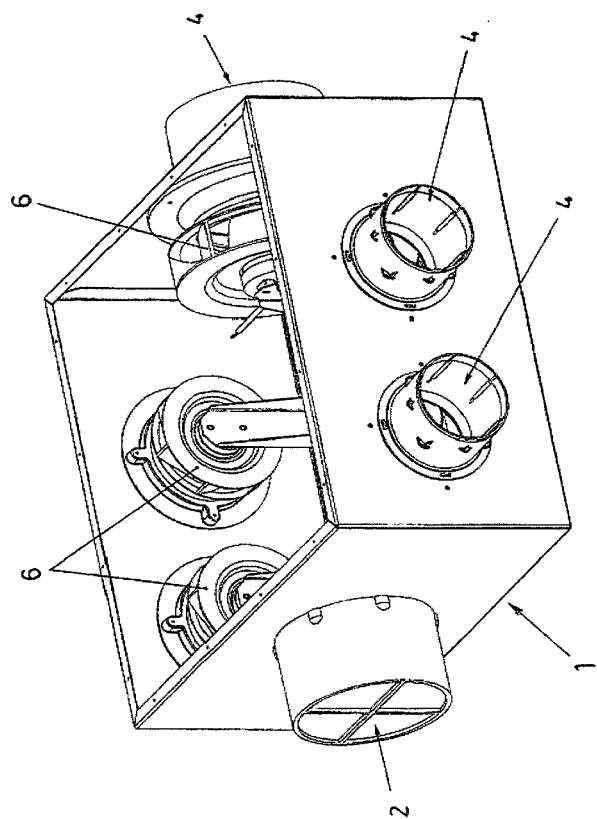


Fig.5

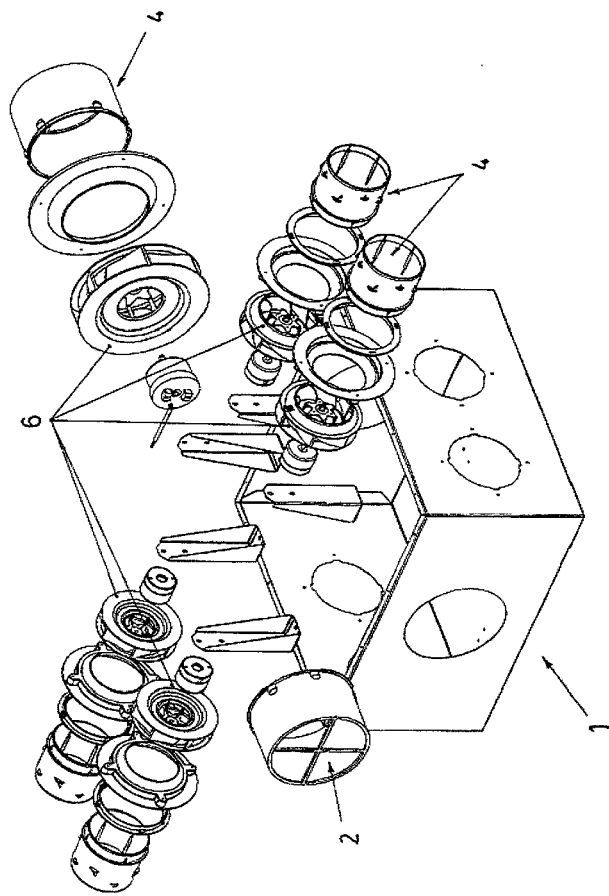


Fig.6