

A method and means to create an individually controlled climate at a separate workstation in a room having a primary climate equipment.

The present invention relates to a method and means to create an individually controlled climate at a separate work station in a room having a primary climate equipment by using one of several possible connection points at a connection network in a roof or in a ceiling and covering an essential part of the surface of the room.

The human being needs fresh air and a regulated temperature to feel comfortable. This is also the case in a working station in an office where bad air and a too high or a too low temperature will decrease the working capacity. The comfortable temperature is highly individual as well as the sensitivity to draught and odours. To control the climate in a workroom or in an open-plan office from just one basic setting is not enough in most cases as some persons will be in close to venting air outlets and/or radiators and will suffer from this, while other persons will be further away and will have a poor air ventilation and/or a too low temperature to work efficient during a whole working day. Technique according prior art involves use of huge static and hard to control systems integrated in the building and working with an air exchange in the order of 40 - 60 m³/hour/person.

Thus an economic adaption of the whole indoor climate or of the microclimate for each workstation can be difficult to obtain. Ventilating, comfort cooling and heating should be possible to obtain in an individual way with regard to not just the inflow of tempered fresh air but where evacuation of used air or air affected by smoke, flatulens and/or transpiration, welding smoke, etc will be efficiently removed close to the working station, i.e. close to the person being the cause of the inconveniences.

Thus the main object of the present invention is to obtain an individually (of each person controlled) climate adaption of just any workstation by integrating the secondary climate equipment into a furniture module.

Yet another object of the invention is to obtain an individual workstation having its own heat pump module for comfort cooling or heating.

The above mentioned objects are obtained by a method and an equipment having the characterising clauses mentioned in the claims.

By a releasable connection to the primary climate equipment of the building in a secondary separate climate controlling equipment in connection to the workstation in one of several possible connection points at the conduit network in the ceiling or in the floor covering an essential part of the surface of the room, a very big freedom in choice and possible composition of several work stations is possible, each with its own micro climate obtained by the user adjusting means or influencing means for controlling flow and temperature of the incoming and/or outflowing air to and from the workstation, respectively.

By activating the secondary climate equipment in connection to the workstation to a co-operation with the primary climate equipment in the building just when the workstation is used, the initial expenses for the climate system can be kept low in the event a full climate adaption capacity for all the possible workstations is not needed. In the case the separate workstations have small heat pump modules these can very well be used for a basic climate adaption of the room during non-working hour. Many advantages are achieved if the secondary climate equipment forms part of a furniture module in connection to the workstation, which module is arranged for a releasable connection to and co-operation with the primary climate equipment of the building by the use of an arrangement

with columns containing channels, conduits and/or wiring for the utilities to be used at the workstation.

One possibility is to use special connection means for different utilities, which means being just connectable to the correct positions at the conduit network.

One advantage with the invention is to use the cooling and ventilation possibilities at the separate workstation also for the workchair. As the appearing airflow is small the appropriate conduit network for this purpose can be made flexible and not bulky by the use of a hose containing channels for both inflowing and outflowing air.

A channel network for ventilation may consist of crossed channels for inflowing and/or outflowing air joined in a check pattern together with conduits for heating/cooling, electricity, data, etc. Hereby the airflow at an outlet point of the check patterns system to be fed from at least two directions. The piercing of the air inlet channels and the closing of the same in connection to a rearrangement of the room module including movement of the workstations can be done in many different ways. E.g. a kind of push lids can be used, or the apertures can be made with a special perforating saw equipment and can be resealed with special sealing means being snapped in place. Lids in the roof and/or in the ceiling will give admittance to the channel system.

At bigger room modules with a large ventilation need it is possible to arrange channels for incoming air both in the ceiling and in the floor. This can be done, as the height will become as low as 10 cm for each channel system.

When it comes to the primary climate adaption equipment integrated in the building this can be completely free from the channel system being arranged in the floor and maybe in the ceiling. Thus the primary climate adaption equipment will give a basic climate in the building and for the separate room modules, e.g. an initial heating and an initial

ventilation, while the individual climate adaption for each workstation with a personally chosen temperature level and degree of ventilation will be taken care of by the secondary climate equipment, where the evacuation of air preferably takes place.

The invention will be described below in connection to an embodiment shown in the attached drawings, where

Fig. 1 is a diagrammatic perspective view of an office room where a conduit chequered pattern network has been put into the ceiling and where a connection of a couple of workstations have been shown,

Fig. 2 is a side view of a ventilation evacuation part in connection to a workstation,

Fig. 3 is a side view of a ventilation evacuation part in connection to a workstation under its desk,

Fig. 4 is a diagrammatic perspective view of a workstation completed with a column arrangement to connect to a conduit network in the ceiling, and where

Fig. 5 is a diagrammatic side view of a workstation equipped with an air heat pump module.

Thus fig. 1 is a perspective view of a large office room where a conduit network 1 for the evacuating air is shown. Two workstations 3 are shown connected to the conduit network 1 by connection means 2. The incoming air is here shown coming in peripherally at two short ends

of the room, but also this conduit network can be more branched off if regarded suitable for certain applications.

In fig. 2 a side view of an evacuation part 4 above a workstation 3 and being connected to the conduit network 1 by connection means 2 and by channel means 5. The shown evacuation means is arranged to use the inflowing air to perform an ejecting action, i.e. eject the existing indoor air with said inflowing air.

In fig. 3 a variant of the outlet part 4 for inflowing air is shown positioned beneath a working desk at the workstation and where the ejected air has the possibility to pass a heat element prior to escape.

In fig. 4 a diagrammatic perspective view of a workstation 3 completed with a column arrangement 7 for connection to a conduit network 1 in the ceiling is shown. Here is also shown how evacuating means 4, 8 for fresh air, etc. has been arranged for a co-operation to individually control the microclimate. A conduit 8a has also been shown connected to the chair. Otherwise connections 6 for a telephone 9 and for a computer 10 (internet) are shown.

In fig. 5 a diagrammatic side view of a workstation 3 equipped with an air heat pump module A having a capacity to draw in indoor air to heat, cool and/or dehumidify said air before it is ejected to contribute to the creation of a comfortable micro climate. In connection to the heat pump module A possibility for a ion emission procedure can be arranged to increase the self cleaning ability of the indoor air in such a way that electrically charged particles in the room will more easily be united to form heavier particles falling out from the indoor air and become more easily taken care of.

The invention is not restricted to what is mentioned above, but modifications can be done within the scope of the following claims.

1. A method to create an individually controlled climate at a separate work station (3) in a room having a primary climate installation, characterised in establishing and conducting venting air in a cross pattern over an essential part of the ceiling or of the floor using a conduit network (1), releasably connecting said separate work station (3) to one of several possible connection points at said conduit network (1), and using a part flow of said venting air from said conduit network for establishing an individual climate at said separate work station.
2. A method according to claim 1, characterised in that inflowing and/or outflowing air at each connection point occurs through connection means (2) connected to said cross pattern conduit network (1).
3. A method according to claim 1, characterised in that said linking of a part of the venting air occurs when the work station is used.
4. A device to create an individually controlled climate at a separate work station (3) in a room having a primary climate installation, and to perform the method according to claim 1, characterised in that said device include a cross pattern conduit network (1) covering an essential part of the ceiling or of the floor, a secondary, individual climate controlling unit at a furniture module for said separate work station (3), releasably connected to said primary room climate installation at one of several possible connection points at said cross pattern conduit network (1).
- 5 A device according to claims 4, characterised in that the conduit network (1) has prearranged connection points being accessible from the outside, each having a specially adapted shape and being prepared to receive correspondingly shaped and adapted connection means (2), e.g. in the shape of coupling boxes, each of which is designed for connection to a certain necessity.
6. A device according to any of the claims 4 to 5, characterised in that an office chair is connected to said secondary, individual climate controlling unit.
7. A device according to any of the claims 4 to 6, wherein the secondary, individual climate controlling unit includes a pressure chamber injecting ventilating air and an ejector for a simultaneous suck-in and circulation of indoor air through a heat exchanger for a possible cooling or heating of indoor air, characterised in a textile permeable envelope of a suitable size, through which the circulating air passes before being distributed out in the room.

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8. A device according to claim 7, characterised in that the textile permeable envelope is covered by an adjustable screening to control the injected airflow by said equipment.

9. A device according to claim 5 and/or 7, characterised in that said equipment for injecting air to the work station (3) for creating said individual climate at the separate work station include a heat pump (A) by which evaporating and condensing element, respectively, cooled and heated air can be fed to the separate work station (3).

10. A device according to any or more of the claims 5 to 9, characterised in that connections for electricity, computer and/or telephone (6, 9, 10) form part of the conduit network for a simple attachment to said separate work station (3).