



(11)

EP 2 457 050 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:

02.09.2015 Bulletin 2015/36

(21) Application number: **10739864.6**

(22) Date of filing: **26.07.2010**

(51) Int Cl.:

F26B 21/00 ^(2006.01)

(86) International application number:

PCT/EP2010/004566

(87) International publication number:

WO 2011/009640 (27.01.2011 Gazette 2011/04)

(54) **AIR MOVER DEVICE**

Luftfördergerät

Dispositif de ventilation

(84) Designated Contracting States:

**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO
PL PT RO SE SI SK SM TR**

(30) Priority: **24.07.2009 EP 09009641**

(43) Date of publication of application:

30.05.2012 Bulletin 2012/22

(73) Proprietor: **DBK David + Baader GmbH**

Nordring 26

76761 Rülzheim (DE)

(72) Inventors:

• **JAYNE, Jonathan**

RCT (GB)

• **HOPKIN, Ian, David**

Vale of Glamorgan CF71 7HE (GB)

(74) Representative: **Winter, Brandl, Fürniss, Hübner,**

Röss, Kaiser, Polte - Partnerschaft mbB

Patent- und Rechtsanwaltskanzlei

Bavariaring 10

80336 München (DE)

(56) References cited:

EP-A1- 0 405 110

EP-A1- 1 288 091

EP-A1- 1 588 873

EP-A2- 1 788 330

WO-A1-91/12476

DE-A1- 3 321 673

DE-A1- 10 143 540

DE-A1- 19 937 193

DE-U- 1 902 483

GB-A- 2 462 066

US-A- 2 810 060

US-A- 5 097 672

US-A- 5 180 333

US-A1- 2004 022 631

US-A1- 2005 285 748

US-A1- 2006 217 934

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

Description

[0001] The invention relates to an air mover device and a method of controlling such air mover device.

[0002] Publication US 2004/0022631 A1 discloses an air mover according to the preamble of claim 1.

[0003] In publication U.S. 2005/0257394 A1 an air mover device for drying damp rooms is disclosed. Said device comprises a housing having an air inlet and an air outlet. A rotor which generates airflow between the air inlet and the air outlet is arranged in the housing. Upstream of the air outlet a turbine driven by a motor is disposed, the airflow generated by the rotor absorbing waste heat from the motor. Thus, hot air flows through the air outlet into the room to be dried. Moreover, air is pumped through a passage via the turbine. The passage is connected to a base plate spaced apart from a floor of the room, whereby air provided between the floor and the base plate is sucked toward the passage. A convective flow occurs between the floor and the base plate to remove the humidity prevailing in the floor.

[0004] This solution has the drawback that such air mover device has an extremely complex structure and requires a large amount of energy to drive the rotor and the turbine.

[0005] Compared to that, it is the object underlying the invention to provide an air mover device and a method of controlling such air mover device for inexpensive and energy-saving drying of damp areas in rooms, such as walls, ceiling or floors.

[0006] This object is achieved by an air mover device in accordance with the features of claim 1 and by a method of controlling such air mover device according to the features of the claims 15 and 16.

[0007] In accordance with the invention, an air mover device includes - for drying a surface, especially a damp wall or wall portion - at least one air mover for generating airflow. The airflow is controllable by an adjusting unit which has such configuration that the airflow is automatically controllable essentially into any direction of the room.

[0008] This solution has the advantage that high dynamics of the ambient air are developed by varying the airflow into any directions of the room, whereby dehumidifying of the walls or wall portions is accelerated by reason of high convection. Energy is saved by the more rapid drying process of the walls or wall portions.

[0009] The adjusting unit is controlled by an Electronic Control Unit (ECU), thus allowing control, for instance, of different motion patterns of the airflow.

[0010] At least one sensor is provided which serves especially for detecting humidity and/or a temperature of a wall, a wall portion or other surfaces. The airflow is controlled in response to a measuring signal of the at least one sensor transmitted to the ECU.

[0011] In this way, during a motion pattern, the airflow can be directed primarily to a damp area of the wall measured by the sensor and the wall can be dehumidified sub-

stantially in this area by convection. If the temperature and/or humidity value of the wall then falls below a pre-determined value, the air mover can be switched off, for instance, in order to save energy.

[0012] Preferably a plurality of sensors is provided for measuring the humidity of one or more walls or wall portions, whereby it is possible, for example, to always direct the airflow to the dampest wall portion or the dampest wall.

[0013] The measuring signal can be transmitted extremely flexibly through wireless connection from the sensor to the ECU. This is carried out, for instance, electromagnetically, optically or acoustically. Also, a wire connection could be used between the sensor and the ECU and in this way, compared to the wireless connection, a transmitter and a receiver could be saved.

[0014] A position of the at least one sensor can preferably be transmitted to the ECU via a GPS signal received by the sensor or is manually entered into the ECU via a control panel.

[0015] In a further embodiment of the invention, the air mover includes a rotor driven by an electric motor which is movable by the adjusting unit for varying the flow direction of the airflow.

[0016] In order to pivot the rotor into all directions of the room, preferably a first swivel axis extending approximately transversely to a drive axis of the rotor and a second swivel axis extending approximately transversely to the first swivel axis are provided.

[0017] It is preferred that the rotor is pivoted by conventional and inexpensive geared motors assigned to the swivel axes.

[0018] The swivel axes may be operatively connected to a respective rotary encoder to determine the current flow direction of the airflow. Said rotary encoders then report the respective swivel angle to the ECU.

[0019] At least one further air mover may be provided to generate a further airflow, the latter then being aligned with respect to the first airflow so as to form turbulence in the room.

[0020] In order to permit an extremely flexible drying of a wall or a wall portion the flow direction and/or the flow rate and/or the temperature of the airflow is controllable. The flow rate is then varied, for instance, by the rotational speed of the rotor and the temperature can be adjusted, for example, by a heater operatively connected to the airflow.

[0021] In a first preferred method of controlling an air mover device the airflow is directed approximately in the direction of the sensor reporting the highest reading of humidity. In this way, drying of a wall or a wall portion is possible within a short drying period, as the convection due to the airflow is most efficient in the area of the highest humidity, which entails saving of energy.

[0022] In a further preferred method the airflow is alternately directed approximately toward each sensor, the period of flow during which the airflow is directed approximately to one of the sensors depending on the measured

humidity of said sensor or all sensors. The advantage is that walls or wall portions exhibiting high humidity can be aired during a longer flow period than walls or wall portions exhibiting less humidity which, in turn, results in a short drying period and, consequently, in saving of energy.

[0023] In a further especially simple method the airflow is varied in a pattern predetermined by the ECU.

[0024] Other advantageous further developments of the invention are the subject matter of further subclaims.

[0025] Hereinafter a preferred embodiment of the invention is illustrated by way of schematic drawing. The drawings show:

Fig. 1 a perspective view of an air mover device including pertinent sensors;

Fig. 2 a flow diagram of a method of controlling such a air mover device;

Fig. 3 a perspective view of an air mover device according to a second embodiment;

Fig. 4 a perspective view of an air mover device according to a third embodiment and

Fig. 5 a perspective view of an air mover device according to a fourth embodiment.

[0026] In the figure 1 an air mover device 1 comprising two sensors 2 according to a first embodiment is shown in a perspective view. The sensors 2 are fixed to a surface 4 shown in sections, which are, for instance, damp areas in rooms, such as walls, wall portions, ceiling or floors. The at least one air mover device 1 preferably serves for the drying of damp walls or wall portions of a room or other surfaces during construction, for instance in order to eliminate damage of a building by water.

[0027] The air mover device 1 comprises an air mover 6 having a rotor unit 7 which is pivoted through a fixing bracket 8. The fixing bracket 8 in turn is rotatably mounted to a base 10.

[0028] The rotor unit 7 has a hollow cylindrical rotor housing 12 encompassing a rotor 14 or rather fan, wherein a housing axis and a rotor axis extend substantially coaxially with respect to each other. The rotor 14 includes plural blades 16 fixed to a rotor head 18. The rotor 14 is driven, for instance, by an electric drive motor not shown in the figure.

[0029] An airflow extending approximately axially with respect to the rotor axis of the rotor 14 is generated by rotation of the rotor 14. The air is conveyed from the rotor 14 via an inlet 20 of the rotor housing 12 to an outlet 22. The hollow cylindrical rotor housing 12 has a bearing on the flow direction of the airflow downstream of the outlet 22.

[0030] The rotor housing 12 is pivoted about a first swivel axis 24 between the approximately U-shaped fix-

ing bracket 8. The swivel axis 24 extends approximately perpendicularly to the housing axis or rotor axis. At least one or two electric geared motors 26 disposed at end portions of the fixing bracket 8 support and swivel the rotor housing 12.

[0031] The fixing bracket 8 is supported at the base 10 via a further geared motor 28 and by the geared motor 28 is rotatable about a second swivel axis 30. The latter is arranged approximately perpendicularly to the floor area and to the first swivel axis 24. Through the geared motors 26, 28 the rotor unit 7 is rotatable about the swivel axis 24 and about the swivel axis 30 of the fixing bracket 8 in all directions of the room so that the airflow can be aligned in any direction.

[0032] The airflow generated by the rotor 14 serves for drying the damp surfaces 4. For this purpose, the airflow is directed to a surface 4 to be dried. In this way, a convective flow is generated at the surface and thus the surface 4 is dehumidified.

[0033] In order to accelerate the drying process of the damp surface 4, several sensors 2 are provided, two of said sensors 2 being exemplified in the figure. The sensors 2 include a rod-shaped sensor portion 34 inserted in a recess 32 of the surface 4 respectively. Said sensor portion 34 is used for measuring the relative humidity and/or temperature in the surface 4 in the area of the recess 32. Thus the arrangement of the sensor portion 34 in the recess 32 is needed for creating a microenvironment to measure the temperature and relative humidity in particular in a brick of the wall. The sensor 2 moreover has a sensor unit 36 projecting away from the surface 4 and including a transmitter through which the reading - i.e. the humidity and/or temperature of the wall portion - is transmitted as measuring signal 38. The measuring signal 38 is received and processed by an Electronic Control Unit (ECU) 40 disposed in the base 10 of the air mover 6. The ECU 40 can also be a separate device positioned in an additional housing.

[0034] For determining the position of the rotor unit 7 and, thus, for determining the flow direction of the airflow rotary encoders 42 are provided. The latter detect the swivel angle and the swivel direction of the rotor unit 7 with respect to the two swivel axes 24, 30. They are arranged, for instance, in the area of the geared motors 26, 28. The swivel angle and the swivel direction are transmitted to the ECU 40 in the form of an electric signal.

[0035] The directions of the rotor unit 7 and/or the airflow to the respective sensors 2 are stored in the ECU 40. For this purpose, the rotor unit 7 is alternately aligned toward each sensor 2 prior to the start of a drying process and the respective position of the rotor unit 7 - detected by the rotary encoders 42 - is stored along with a sensor identification of a respective sensor 2 in a memory connected to the ECU 40. The data are stored by the fact that, after a respective alignment of the rotor unit 7 toward one of the sensors 2, a user confirms them through a control panel 44 connected to the ECU 40 and the corresponding swivel angles of the rotor unit 7 and the sen-

sensor identification of the sensors 2 are then stored in the memory.

[0036] It is also possible that the position of the sensors 2 is determined by a Global Positioning System (GPS). To this effect, each sensor 2 transmits its GPS position to the ECU 40 which then can swivel the rotor unit 7 in the direction of each sensor 2.

[0037] At predetermined time intervals or non-stop the ECU 40 receives the measuring signal from each sensor 2 and processes the same. Accordingly, the sensor 2 measuring the highest humidity is determined, for instance. Then the ECU 40 controls the rotor unit 7 via the geared motors 26, 28 so that the airflow passes in the direction of the sensor 2 having the highest measuring value for humidity.

[0038] It is supposable that the ECU 40 delivers a signal to the outside, for instance to a hand-held phone, with several information, for instance the actual condition of the drying process ("moisture in %" or "end of operation, room dry"). The delivering of the signal can be made by a GSM (Global System for Mobile Communication) module which is connected with the ECU 40.

[0039] Different methods of controlling the air mover device 1 are possible for rapid and thus energy-saving drying of the damp walls 4, which will be explained hereinafter.

[0040] Figure 2 shows a flow diagram of a method of controlling the air mover device 1. In this method in a first process step 46 the ECU 40 calculates the highest reading of humidity and in a second process step 48 the airflow generated by the air mover 6 is directed by the ECU 40 approximately in the direction of the sensor 2 reporting the highest reading of humidity. The higher the humidity in the wall portion, the more humidity is removed by convection. These steps 46, 48 are repeated shown by the arrow 50 in figure 2. Thus, if the reading of humidity of the sensor 2 falls below the reading of humidity of another sensor 2 which is spaced apart therefrom, the ECU 40 directs the airflow to the other sensor 2. Thus, the airflow always points to the direction in which the highest humidity of the surface 4 is measured and thus the largest quantity of humidity can be removed, whereby rapid and thus energy-saving drying of the surface 4 is permitted.

[0041] In another method the air mover 6 alternately directs the airflow approximately in the direction of each sensor 2. In this case, the period of flow during which the airflow passes in the direction of a sensor 2 depends on the humidity measured by said sensor 2 in proportion to the readings of humidity of the other sensors 2. For instance, the higher the humidity measured by a sensor 2, the longer is also the flow period during which the respective wall portion is aired by the airflow. The flow period is calculated by the ECU 40.

[0042] It is also possible to program the air mover device 1 via the control panel 44 independently of the sensors 2. In this way, the user can determine a particular motion pattern of the airflow.

[0043] Furthermore, also several air mover devices 1,

for example two, can be employed. They can be arranged in a room in such way that turbulence occurs.

[0044] The air mover 6 in figure 1 can also have an integrated heater controlling the airflow temperature (embodiments of the air mover device with a heater are described in the figures 3 to 5). Thus the sensors 2 can relay information about the airflow temperature to the ECU 40 which can decide whether the addition of thermal energy from the integrated heater is required. If the airflow is heated by the integrated heater the fan speed of the air mover 6 can change the air-off temperature of the airflow. The higher the fan speed the lower the temperature of the heated airflow. Alternatively it could be controlled the heater on/off time, for example by a constant airflow or fan speed.

[0045] In the figure 3 the air mover device 52 according to a second embodiment is shown in a perspective view. The air mover 53 has an elongate housing 54 having the form of a canon and is pivot-mounted on a u-shaped fixing bracket 56 essentially at his balance point. The fixing bracket 56 has according to the first embodiment at least one electric geared motor 57 disposed at end portions of the fixing bracket 56 support and swivel the housing 54 essentially around its cross axis.

[0046] The fixing bracket 56 is supported at a base 58 via a further geared motor 60 and by the geared motor 60 is rotatable about a second swivel axis. The base 58 has three legs 62, 64, 66 arranged such that the base 60 provides a safe stand.

[0047] The essentially cylindrically housing 54 has at each face side a nozzle 68, 70. The nozzle 68 (right side of the housing 54 in figure 3) is an air inlet nozzle 68 and the nozzle 70 is an air outlet nozzle 70 accelerating the air flow streaming out. Within the housing 54 is a fan. The air mover device 52 inlets air through the nozzle 68 and blows air out through the nozzle 70.

[0048] Figure 4 shows the air mover 71 of an air mover device according to a third embodiment. The housing 72 of the air mover 71 equates essentially the housing 54 according to figure 3 but also has an ECU 76 and an electric heater 74 illustrated in a cutaway view of the housing 72. The electric heater 74 compared to a gas heater has the advantage that there is no unshielded flame (which can be dangerous). Also the air heated by a gas heater is more humidified compared to an electric heater.

[0049] The heater 74 is arranged upstream of the rotor 78 and has plural heat-elements 80. These are supported at the housing 54 and arranged essentially transverse to the flow direction of the air. A temperature of the air flow 82 streaming out of the nozzle 70 is adjustable by the heat output of the heater 74 independent of an air flow rate. The heater 70 is controlled by the ECU 76. For example if the airflow is zero or nearly zero the heater 74 is stopped by the ECU 76 preventing damage. The positioning of the hot airflow 82 is carried out according to the air mover device in figure 1 by the geared motor 57, 60 of the fixing bracket 56 in figure 3.

[0050] In figure 5 a fourth embodiment of the air mover device 84 is shown. In difference to the previous embodiments the air mover device 84 has a stationary unit 86 according to the unit shown in figure 4 and a pivotable air mover 87 having the shape of a diffuser 88 connecting with the stationary unit 86 by a flexible hose 90.

[0051] The unit 86 has a fan and a heater (see figure 4) controlled by an ECU 91. A base frame 92 bears the unit 86 essentially in a horizontal position. On an air outlet nozzle 94 a first end section 96 of the hose 90 is attached. The other end section 98 is attached to an inlet 100 of the pivotable diffuser 88. A housing of the nozzle 88 has three parts: the essentially cylindrical inlet 100, a truncated cone shaped middle section 102 and an also essentially cylindrical outlet 104 having a greater diameter than the inlet 100.

[0052] A mounting 106 of the air mover 87 corresponds to the mounting of the air mover 53 in figure 3.

[0053] In action of the air mover device 84 air streams through a inlet nozzle 108 into the unit 86 due to the fan within the unit 86. Inside the unit 86 the air is heated by the heater and streams to the outlet nozzle 94 into the hose 90. From this the hot air gets into the diffuser 88 and streams out afterwards.

[0054] The unit 86 is also useable in a combination with a room dryer as described in the document GB 2462066 A. Thereby the unit 86 is arranged upstream of a dryer unit so that air is heated by the unit 86 before it is dried by the dryer unit.

[0055] The air mover devices in the figures 1 to 5 can be plugged at an electric ring main. If there are more than one air mover device plugged it is important not to overload the ring main. To avoid this it is possible that the air mover devices communicate with each other with usual means. The ECUs of the air mover devices determine which one of the air mover devices should be energised at a given time. For example it is always the air mover device activated having to dry the wettest walls.

[0056] The invention discloses an air mover device for drying damp walls or wall portions by at least one air mover. Said air mover generates airflow which is controllable by an adjusting unit. The adjusting unit is designed so that the airflow can be automatically controlled toward any direction in the room.

List of reference numbers:

[0057]

- 1 air mover device
- 2 sensor
- 4 surface
- 6 air mover
- 7 rotor unit
- 8 fixing bracket
- 10 base
- 12 rotor housing
- 14 rotor

- 16 blade
- 18 rotor head
- 20 inlet
- 22 outlet
- 5 24 swivel axis
- 26 geared motor
- 28 geared motor
- 30 swivel axis
- 32 recess
- 10 34 sensor portion
- 36 sensor unit
- 38 measuring signal
- 40 ECU
- 42 rotary encoder
- 15 44 control panel
- 46 process step
- 48 process step
- 50 arrow
- 52 air mover device
- 20 53 air mover
- 54 housing
- 56 fixing bracket
- 57 geared motor
- 58 base
- 25 60 geared motor
- 62 leg
- 64 leg
- 66 leg
- 68 nozzle
- 30 70 nozzle
- 71 air mover
- 72 housing
- 74 heater
- 76 ECU
- 35 78 fan
- 80 heat-element
- 82 air flow
- 84 air mover device
- 86 unit
- 40 87 air mover
- 88 diffuser
- 90 hose
- 91 ECU
- 92 base frame
- 45 94 outlet nozzle
- 96 end section
- 98 end section
- 100 inlet
- 102 middle section
- 50 104 outlet
- 106 mounting
- 108 inlet nozzle

55 Claims

1. An air mover device for drying at least one surface (4) comprising at least one air mover (6; 53; 71; 87)

- by which an airflow controllable by an adjusting unit (26, 28; 57, 60) is generateable, wherein the airflow is controllable automatically by the adjusting unit (26, 28; 57, 60) essentially to any direction in space, **characterized in that** the adjusting unit (26, 28; 57, 60) is controlled by an Electronic Control Unit (ECU) (40; 76), wherein at least one sensor (2) for detecting humidity and/or temperature of the at least one surface (4) is provided and wherein the air mover device is adapted to control the airflow in response to a measuring signal (38) of the at least one sensor (2) transmitted to the ECU (40; 76).
2. An air mover device according to claim 1, wherein a plurality of sensors (2) is provided at the at least one surface (4).
 3. An air mover device according to claim 1 or 2, wherein the measuring signal (38) is transmitted from the at least one sensor (2) to the ECU (40; 76) electrically, electronically, optically or acoustically with or without wire connection.
 4. An air mover device according to any one of the claims 1 to 3, wherein a position of the at least one sensor (2) is detectable automatically by the ECU (40; 76), especially via a GPS signal, or stored by a control panel (44) connected to the ECU (40; 76).
 5. An air mover device according to any one of the preceding claims, wherein the air mover (6; 53; 71; 87) includes a rotor (14; 78) adapted to be pivoted by the adjusting unit (26, 28; 57, 60) for varying the direction of the airflow in the room.
 6. An air mover device according to claim 5, wherein the rotor (14; 78) is adapted to be pivoted about a first swivel axis (24) extending approximately transversely to a drive axis and about a second swivel axis (30) extending approximately transversely to the first swivel axis (24).
 7. An air mover device according to claim 6, wherein the rotor (14) is pivoted about the swivel axes (24, 30) via geared motors (26, 28; 57, 60).
 8. An air mover device according to claim 6 or 7, wherein a respective rotary encoder (42) is operatively connected to a swivel axis (24, 30) to measure a pivoting angle, the respective pivoting angle being reported to the ECU (40).
 9. An air mover device according to any one of the preceding claims, comprising two air movers (6; 53; 71; 87), wherein the two airflows thereof are aligned such that turbulence is formed especially in a room defined by the surfaces (4).
 10. An air mover device according to any one of the preceding claims, wherein the direction of flow and/or the flow rate and/or the temperature of the airflow are controllable.
 11. An air mover device according to any one of the preceding claims, whereby a heater (74) is provided for adjusting the temperature of the airflow.
 12. An air mover device according to claim 11, whereby the air mover (53; 71) has the heater (74).
 13. An air mover device according to any one of the preceding claims, whereby the air mover (87), especially formed as a diffusor (88), is connected to a unit (86), especially by a hose (90), whereby the unit (86) has the rotor and/ or the heater.
 14. An air mover device according to any one of the preceding claims, whereby this is applicable as a fan heater, for drying surfaces and/ or in combination with a room dryer.
 15. A method of controlling an air mover device according to anyone of the claims 2 to 14, wherein the airflow is directed approximately toward the sensor (2) reporting the highest reading of humidity and/or of temperature.
 16. A method of controlling an air mover device according to any one of the claims 2 to 14, wherein the airflow is alternately directed approximately toward each sensor (2), the period of flow during which the airflow points approximately to the direction of one of the sensors (2) being dependent on the humidity and/or temperature measured by said sensor (2) or by all sensors (2).

Patentansprüche

1. Luftbewegungs Vorrichtung zum Trocknen von mindestens einer Oberfläche (4) mit mindestens einer Luftbewegungseinrichtung (6; 53; 71; 87), durch die ein von einer Stelleinheit (26, 28; 57, 60) steuerbarer Luftstrom erzeugt werden kann, wobei der Luftstrom automatisch von der Stelleinheit (26, 28; 57, 60) im Wesentlichen in jede Richtung im Raum steuerbar ist, **dadurch gekennzeichnet, dass** die Stelleinheit (26, 28; 57, 60) von einem elektronischen Steuergerät (ECU) (40; 76) gesteuert wird, wobei mindestens ein Sensor (2) zur Erfassung von Feuchtigkeit und/oder Temperatur der mindestens einen Fläche (4) vorgesehen ist und wobei die Luftbewegungs Vorrichtung in der Lage ist, den Luftstrom in Abhängigkeit eines Messsignals (38) des mindestens einen Sensors (2) zu steuern, das an das Steuergerät (40; 76) übertragen wird.

2. Luftbewegungsvorrichtung gemäß Anspruch 1, wobei mehrere Sensoren (2) an der mindestens einen Oberfläche (4) vorgesehen sind.
3. Luftbewegungsvorrichtung gemäß Anspruch 1 oder 2, wobei das Messsignal (38) von dem mindestens einen Sensor (2) elektrisch, elektronisch, optisch oder akustisch drahtverbunden oder drahtlos an das Steuergerät (40; 76) übertragen wird.
4. Luftbewegungsvorrichtung gemäß einem der Ansprüche 1 bis 3, wobei eine Position des mindestens einen Sensors (2) automatisch von dem Steuergerät (40; 76) insbesondere über ein GPS-Signal erfassbar ist oder von einer mit dem Steuergerät (40; 76) verbundenen Schalttafel (44) gespeichert wird.
5. Luftbewegungsvorrichtung gemäß einem der vorhergehenden Ansprüche, wobei die Luftbewegungseinrichtung (6; 53; 71; 87) einen Rotor (14; 78) aufweist, der von der Stelleinheit (26, 28; 57, 60) zur Änderung der Richtung des Luftstromes im Raum verschwenkt werden kann.
6. Luftbewegungsvorrichtung gemäß Anspruch 5, wobei der Rotor (14; 78) um eine erste Schwenkachse (24), die sich in etwa quer zu einer Antriebsachse erstreckt, und um eine zweite Schwenkachse (30) verschwenkt werden kann, die sich in etwa quer zur ersten Schwenkachse (24) erstreckt.
7. Luftbewegungsvorrichtung gemäß Anspruch 6, wobei der Rotor (14) über Getriebemotoren (26, 28; 57, 60) um die Schwenkachsen (24, 30) verschwenkt wird.
8. Luftbewegungsvorrichtung gemäß Anspruch 6 oder 7, wobei ein entsprechender Drehwertgeber (42) mit einer Schwenkachse (24, 30) in Wirkverbindung steht, um einen Schwenkwinkel zu messen, wobei der jeweilige Schwenkwinkel an das Steuergerät (40) gemeldet wird.
9. Luftbewegungsvorrichtung gemäß einem der vorhergehenden Ansprüche, mit zwei Luftbewegungseinrichtungen (6; 53; 71; 87), wobei deren zwei Luftströme derart ausgerichtet sind, dass insbesondere in einem von den Oberflächen (4) festgelegten Raum eine Verwirbelung gebildet wird.
10. Luftbewegungsvorrichtung gemäß einem der vorhergehenden Ansprüche, wobei die Strömungsrichtung und/oder die Strömungsgeschwindigkeit und/oder die Temperatur des Luftstromes steuerbar ist/sind.
11. Luftbewegungsvorrichtung gemäß einem der vorhergehenden Ansprüche, wobei eine Heizeinrich-

tung (74) zur Einstellung der Temperatur des Luftstromes vorgesehen ist.

12. Luftbewegungsvorrichtung gemäß Anspruch 11, wobei die Luftbewegungseinrichtung (53; 71) die Heizeinrichtung (74) aufweist.
13. Luftbewegungsvorrichtung gemäß einem der vorhergehenden Ansprüche, wobei die insbesondere als Diffusor (88) ausgebildete Luftbewegungseinrichtung (87) insbesondere durch einen Schlauch (90) mit einer Einheit (86) verbunden ist, wobei die Einheit (86) den Rotor und/oder die Heizeinrichtung aufweist.
14. Luftbewegungsvorrichtung gemäß einem der vorhergehenden Ansprüche, wobei diese als Heizlüfter zum Trocknen von Oberflächen und/oder in Verbindung mit einem Raumtrockner eingesetzt werden kann.
15. Verfahren zum Steuern einer Luftbewegungsvorrichtung gemäß einem der Ansprüche 2 bis 14, wobei der Luftstrom ungefähr in Richtung des Sensors (2) gelenkt wird, der den höchsten Feuchtigkeits- und/oder Temperaturmesswert meldet.
16. Verfahren zum Steuern einer Luftbewegungsvorrichtung gemäß einem der Ansprüche 2 bis 14, wobei der Luftstrom abwechselnd ungefähr in Richtung eines jeden Sensors (2) gelenkt wird, wobei die Strömungsdauer, während der der Luftstrom ungefähr in die Richtung eines der Sensoren (2) weist, von der Feuchtigkeit und/oder Temperatur abhängig ist, die von diesem Sensor (2) oder von allen Sensoren (2) gemessen wird.

Revendications

1. Dispositif de ventilation pour sécher au moins une surface (4) comprenant au moins un ventilateur (6 ; 53 ; 71 ; 87) par lequel une circulation d'air commandable par une unité de réglage (26, 28 ; 57, 60) peut être générée, dans lequel la circulation d'air est commandable automatiquement par l'unité de réglage (26, 28 ; 57, 60) essentiellement dans toute direction de l'espace, **caractérisé en ce que** l'unité de réglage (26, 28 ; 57, 60) est commandée par une unité de commande électronique (UCE) (40 ; 76), dans lequel au moins un capteur (2) permettant de détecter l'humidité et/ou la température d'au moins une surface (4) est ménagé et dans lequel le dispositif de ventilation est adapté pour commander la circulation d'air en réponse à un signal de mesure (38) de l'au moins un capteur (2) transmis à l'UCE (40 ; 76).

2. Dispositif de ventilation selon la revendication 1, dans lequel une pluralité de capteurs (2) est ménagée au niveau de l'au moins une surface (4).
3. Dispositif de ventilation selon la revendication 1 ou 2, dans lequel le signal de mesure (38) est transmis de l'au moins un capteur (2) à l'UCE (40 ; 76) électriquement, électroniquement, optiquement ou acoustiquement avec ou sans connexion filaire.
4. Dispositif de ventilation selon l'une quelconque des revendications 1 à 3, dans lequel une position de l'au moins un capteur (2) est détectable automatiquement par l'UCE (40 ; 76), spécialement via un signal GPS, ou stockée par un panneau de commande (44) connecté à l'UCE (40 ; 76).
5. Dispositif de ventilation selon l'une quelconque des revendications précédentes, dans lequel le ventilateur (6 ; 53 ; 71 ; 87) inclut un rotor (14 ; 78) adapté pour être pivoté par l'unité de réglage (26, 28 ; 57, 60) permettant de faire varier la direction de la circulation d'air dans la pièce.
6. Dispositif de ventilation selon la revendication 5, dans lequel le rotor (14 ; 78) est adapté pour être pivoté autour d'un premier axe de pivotement (24) s'étendant approximativement transversalement à un axe d'entraînement et autour d'un second axe de pivotement (30) s'étendant approximativement transversalement au premier axe de pivotement (24).
7. Dispositif de ventilation selon la revendication 6, dans lequel le rotor (14) est pivoté autour des axes de pivotement (24, 30) via des moteurs à train d'engrenages (26, 28 ; 57, 60).
8. Dispositif de ventilation selon la revendication 6 ou 7, dans lequel un encodeur rotatif (42) respectif est opérationnellement connecté à un axe de pivotement (24, 30) pour mesurer un angle de pivotement, l'angle de pivotement respectif étant rapporté à l'UCE (40).
9. Dispositif de ventilation selon l'une quelconque des revendications précédentes, comprenant deux ventilateurs (6 ; 53 ; 71 ; 87), dans lequel leurs deux circulations d'air sont alignées de telle sorte qu'une turbulence est formée en particulier dans une pièce définie par les surfaces (4).
10. Dispositif de ventilation selon l'une quelconque des revendications précédentes, dans lequel la direction de circulation et/ou le débit et/ou la température de la circulation d'air sont commandables.
11. Dispositif de ventilation selon l'une quelconque des revendications précédentes, selon lequel un chauffage (74) est ménagé pour régler la température de la circulation d'air.
12. Dispositif de ventilation selon la revendication 11, selon lequel le ventilateur (53 ; 71) comporte le chauffage (74).
13. Dispositif de ventilation selon l'une quelconque des revendications précédentes, selon lequel le ventilateur (87), en particulier formé comme un diffuseur (88), est connecté à une unité (86), en particulier par un tuyau (90), moyennant quoi l'unité (86) comporte le rotor et/ou le chauffage.
14. Dispositif de ventilation selon l'une quelconque des revendications précédentes, selon lequel il s'agit d'un dispositif applicable en tant que radiateur soufflant, pour sécher des surfaces et/ou en combinaison avec un sécheur de pièce.
15. Procédé de commande d'un dispositif de ventilation selon l'une quelconque des revendications 2 à 14, dans lequel la circulation d'air est dirigée approximativement vers le capteur (2) rapportant la plus haute lecture d'humidité et/ou de température.
16. Procédé de commande d'un dispositif de ventilation selon l'une quelconque des revendications 2 à 14, dans lequel la circulation d'air est en alternance dirigée approximativement vers chaque capteur (2), la période de circulation pendant laquelle la circulation d'air est dirigée approximativement vers l'un des capteurs (2) étant dépendante de l'humidité et/ou de la température mesurée par ledit capteur (2) ou par tous les capteurs (2).

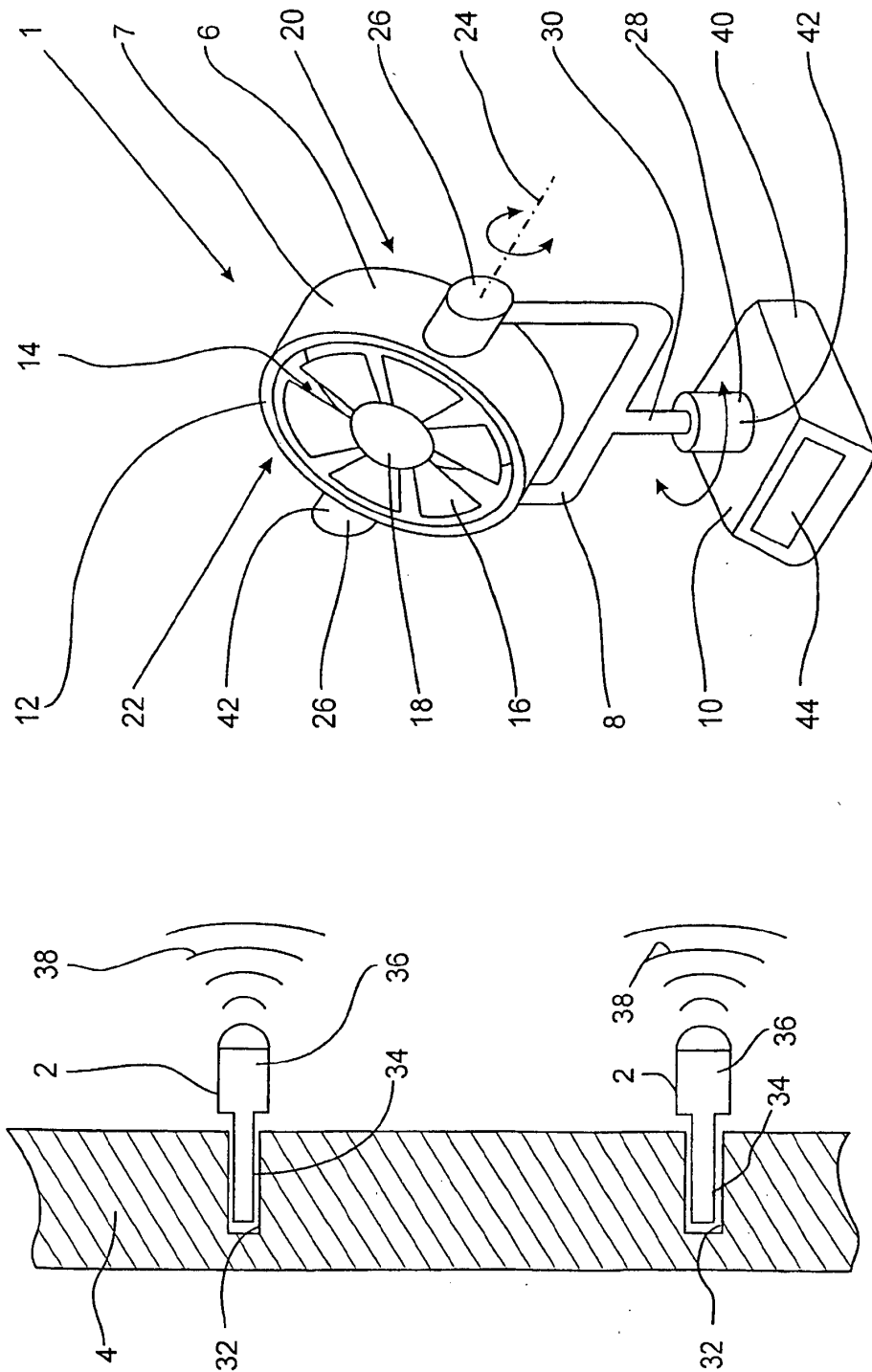


fig. 1

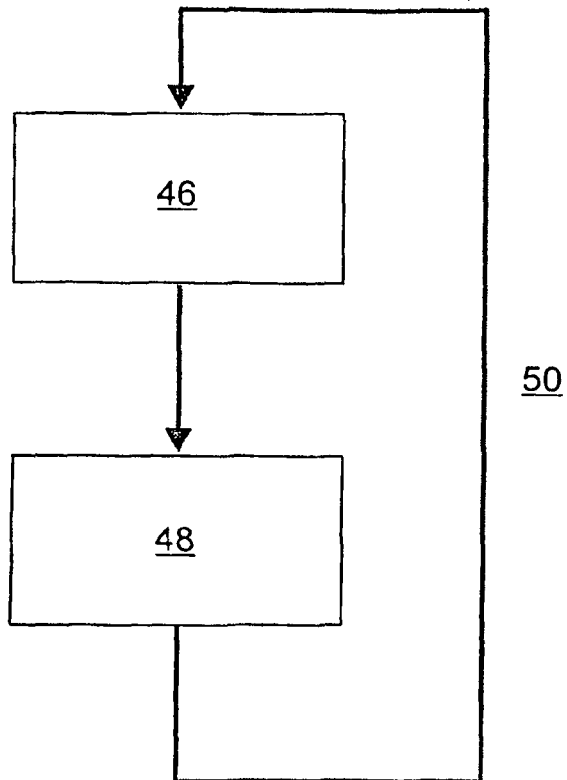


fig. 2

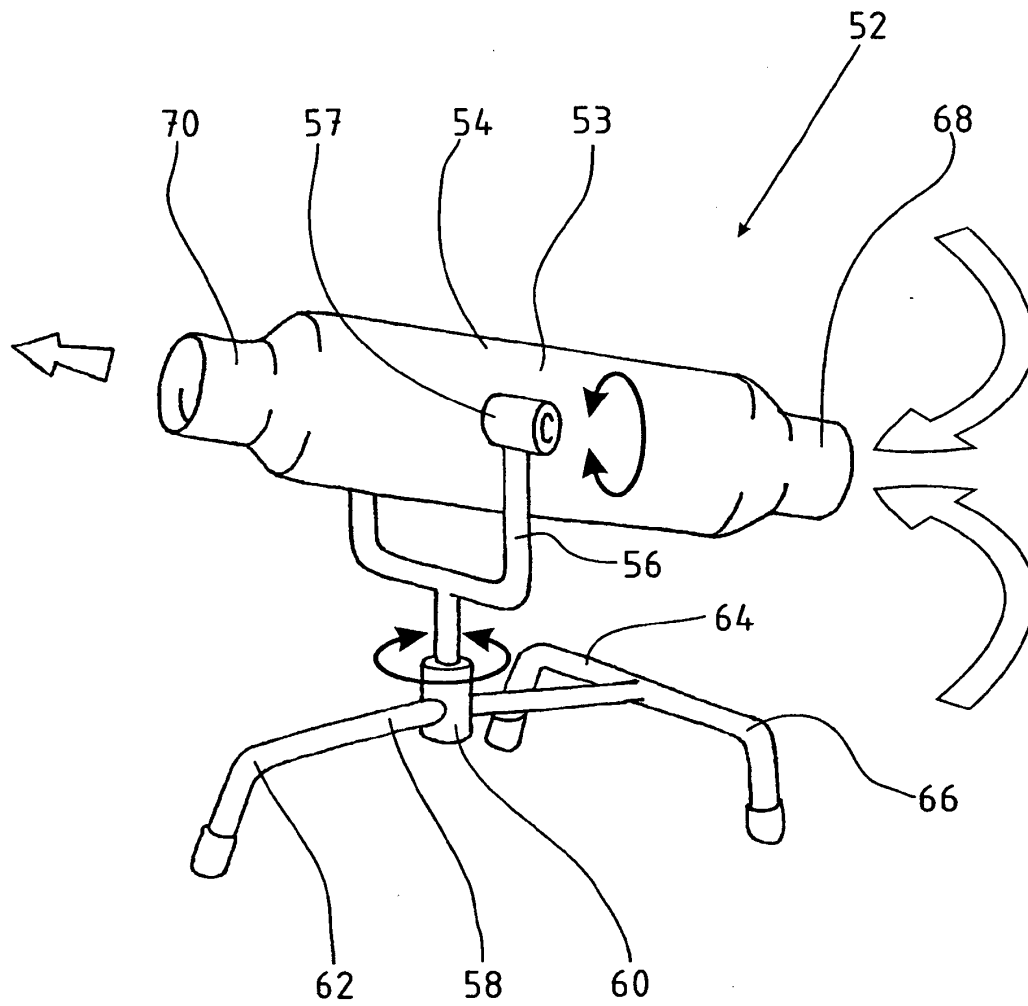


Fig.3

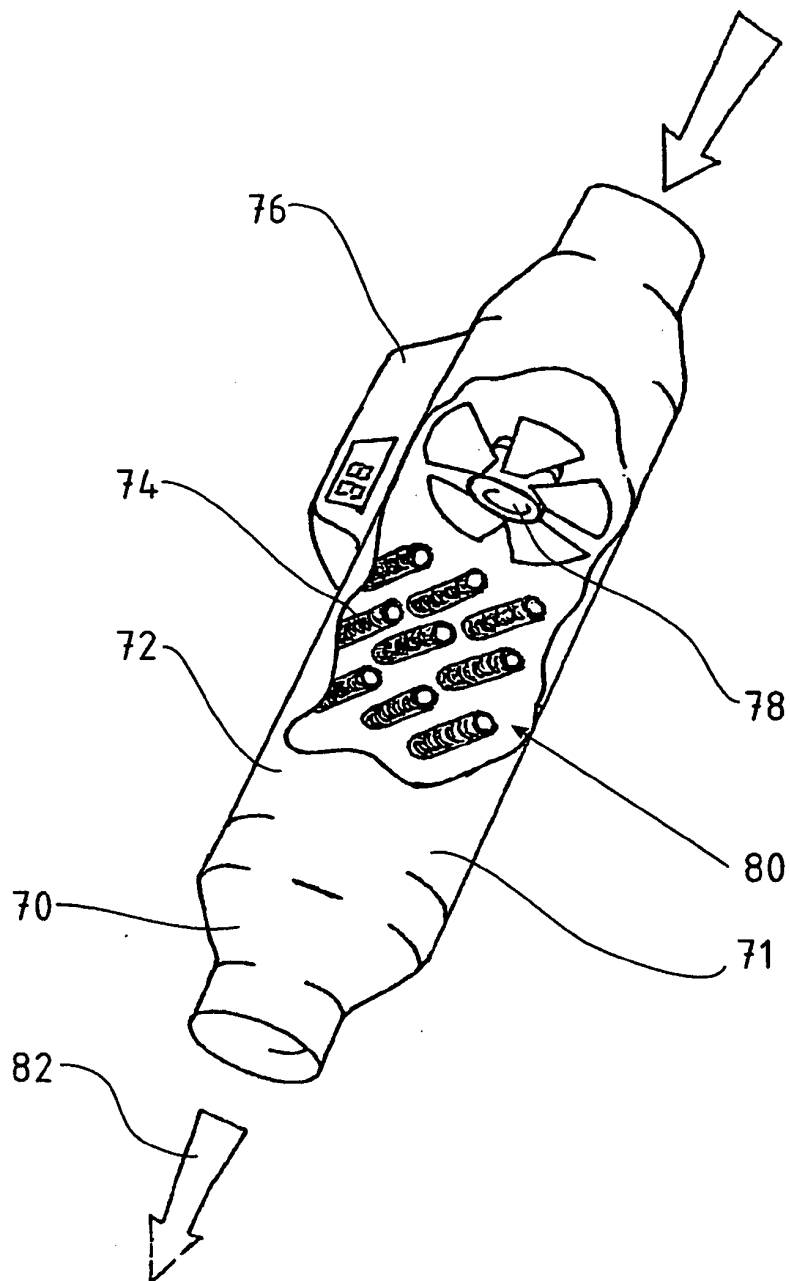


Fig.4

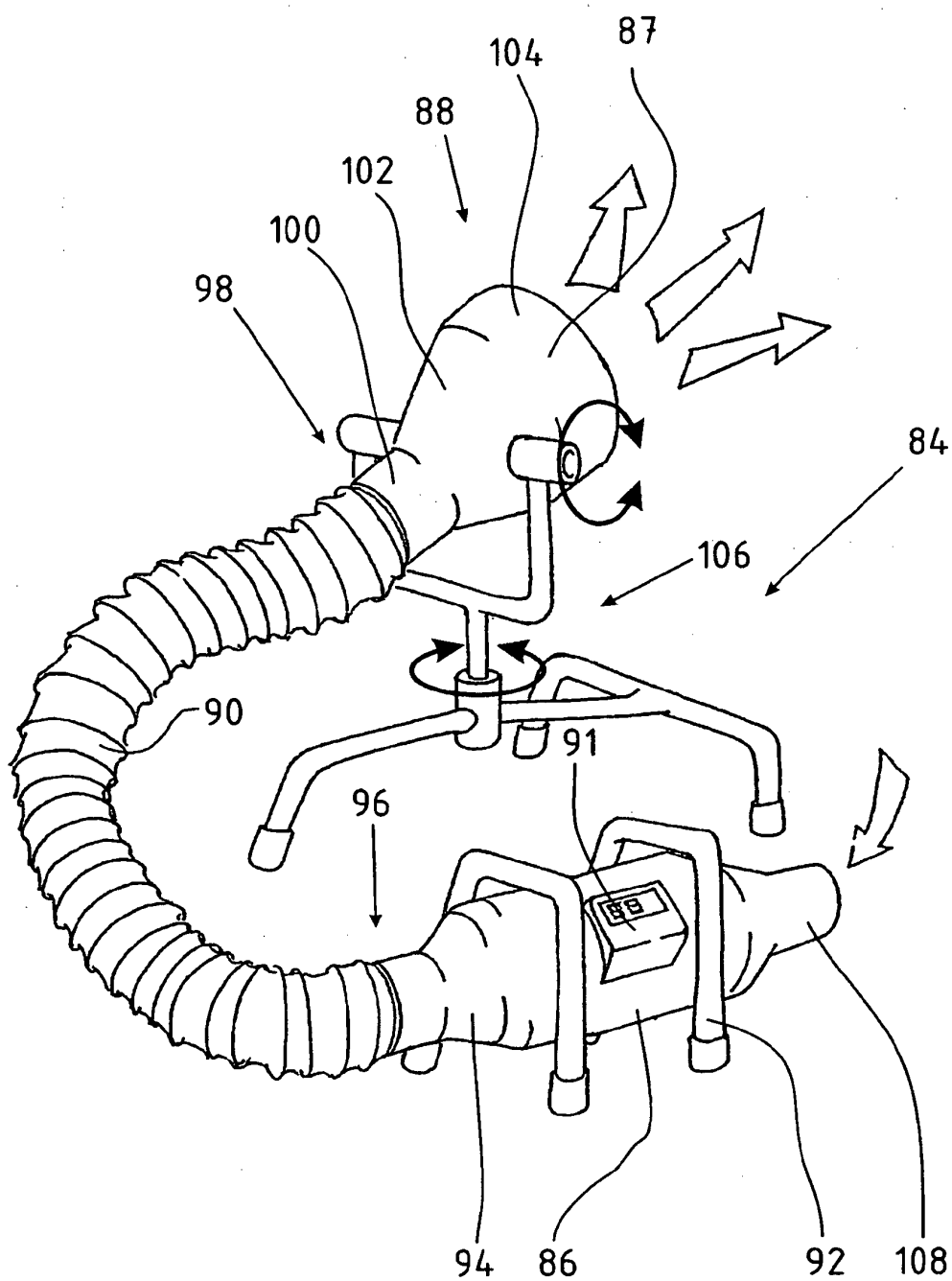


Fig.5

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- US 20040022631 A1 [0002]
- US 20050257394 A1 [0003]
- GB 2462066 A [0054]