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(54) **A METHOD AND AN APPARATUS FOR INCREASING THE YIELD OF AN AIR DRYING PROCESS**

**VERFAHREN UND VORRICHTUNG ZUR VERBESSERUNG DER WIRKSAMKEIT EINES
LUFTTROCKNUNGSVERFAHRENS**

**PROCEDE ET DISPOSITIF SERVANT A AMELIORER L'EFFICACITE D'UN PROCESSUS DE
SECHAGE PAR AIR**

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Description

TECHNICAL FIELD

[0001] The present invention relates to a method of increasing the yield of an air drying process.

[0002] The invention also relates to an air drying apparatus which includes a drying rotor.

[0003] The method and the apparatus are primarily intended for drying so-called layered constructions or other building constructions with which an extra high air pressure is required in order for the air to pass through water-damaged insulation, i.e. when the pressure of the air delivered by a conventional dehumidifier is insufficient for this purpose.

DESCRIPTION OF THE BACKGROUND ART

[0004] SE-C2-500 223 (Swedish Patent Application 9301015-5) (Rento-venta) (corresponding to WO-A-94/23 142) describes a method and apparatus for drying water-damaged building structures, for instance insulated concrete floors or subfloors, wherein hot dry air is delivered at overpressure to the water-damaged area and the moisture-saturated air is allowed to pass to atmosphere, to an overlying room or space, or is collected and transported away or processed for re-use. This known method involves positioning insulation above the floor or subfloor so as to form a gap therebetween, whereafter hot pressurized air is delivered to the gap with the intention of removing moisture-containing air from the water-damaged area.

[0005] In the case of this method and other methods and apparatus that are applied in practice at present, the dehumidifier draws in wet or moist air that is to be dried and the dry air is passed through a hose to a high-pressure fan which pressurizes the air. The pressurized, dry air is then forced down through the wet insulation while taking up moisture, and is again drawn into the dehumidifier as it re-enters the room or space.

[0006] Dehumidifiers that can be used in methods of this kind are described in SE-C-8804281-7 and its American counterpart US-A-5,147,420 (Corroventa) and also in SE-C-9102488-5 (Corroventa Avfuktning) (corresponding to WO-A-93/04 764).

[0007] DE-A1-38 15 161 (Getro-Gebäudetrocknung) teaches apparatus for drying insulated layers in building structures, this apparatus using two high-pressure fans with mutually operatively connected shafts that are driven by one and the same electric motor in an insulated box. Air is drawn into the box directly from the floor structure with the aid of the one single high-pressure fan, pressurized and then delivered to a drying means located outside the box and there dried, whereafter the air is returned through a hose to the inlet of the other high-pressure fan and there again pressurized and then delivered to the water-damaged area. The publication also mentions the possibility of placing the drying means in-

side the insulated box, therewith implying the use of two housings or boxes, one within the other. Implementation of this suggestion would increase the complexity, size, weight and price of the apparatus or system and also jeopardize its function, among other things because it is not certain where the drying means should be placed in the housing or how the means can be caused to coact optimally with the two high-pressure fans that are driven by one and the same electric motor.

[0008] Optimal drying methods and equipment will preferably have the following characteristic features:

- a) Easy to handle.
- b) Easy to install.
- c) Have as few components as possible.
- d) Be as cheap as possible.
- e) Have a low sound level.
- f) Emit dry air with the lowest possible water content.
- g) Emit air with the lowest possible relative humidity.
- h) Emit air which is as warm as possible.
- i) Have the lowest possible energy consumption.
- j) Be easy to control, i.e. enable temperature and air volumes to be readily measured.

[0009] None of the drying methods and apparatus that are currently available fulfils all of these features. For instance, known apparatus, or systems, require a plurality of components, such as dehumidifier, high-pressure fans, hoses, tubing, piping, hose clips, etc., which make handling and installation of such apparatus or systems troublesome. The operator at the site of use will often forget to bring with him components that are necessary to the function of the apparatus. Furthermore, complete installations normally take-up a large amount of space and also take a long time to accomplish.

[0010] The large number of components involved also result in high total installation costs.

[0011] Another problem is that conventional dehumidifiers generate high sound levels, and the high-pressure fan very high sound levels. These high sound levels are very irritating to people present in or living in the vicinity of the damage. In certain cases, the sound level is not allowed to exceed a certain number of decibels, meaning that this type of product cannot be used at all.

[0012] Because the dry air exiting from the dehumidifier to the turbine wanders through uninsulated hoses, the air becomes cool and its relative humidity increases. Furthermore, most of the energy contained by the high-pressure fan is delivered to the surroundings and not to the dry air, which also contributes to a lower temperature and a higher relative humidity in comparison with what is possible and desirable. Cooling of the air in the hoses that occurs with the use of high-pressure fans in accordance with present-day techniques means that the energy of the fans will not be fully utilized in practice, therewith extending the drying time by a factor of three to four due to the colder and wetter air being unable to carry

away sufficient water from the water-damaged area.

[0013] The following factors are of the highest significance in enabling water damage to be dried quickly:

1) The volume of air that wanders through the moisture-damaged area. The greater the volume the quicker the area will be dried.

2) The relative humidity and the temperature of the dry air. The lower the relative humidity and the higher the temperature, the greater the amount of water that can be carried away by the air. A high temperature will also warm-up the moisture-damaged material, therewith increasing the water-vapour pressure in the pores and therewith water evaporation. The more water that is evaporated, the shorter the drying time.

In the case of present-day techniques where the dry air has a temperature of 30-35°C for instance, the water-vapour pressure in the pores is about 35 mm Hg. If the temperature increases to 60-80°C, the water-vapour pressure would be about 230 mm Hg, i.e. about seven times greater, resulting in a drying time which is one-seventh of the drying time that can be achieved with conventional techniques.

3) Established techniques do not utilize all of the energy available, among other things because the air is cooled in the hoses, often long hoses, that lead to the water-damaged area, and because the energy in the high-pressure fans is not correctly utilized.

4) Temperatures and air volumes are not measured in present-day techniques, meaning that the installation cannot be controlled in an optimal manner.

OBJECTS OF THE INVENTION

[0014] With a starting point from the foregoing, the object of the invention is to provide a novel and simple method and apparatus of the aforesaid kind which will avoid the aforesaid drawbacks of known methods and air drying apparatus, and in which the components used are easy to handle, in which costs and sound levels are lower, in which the energy available is utilized effectively, and in which controls and supervision can be readily carried out.

SUMMARY OF THE INVENTION

[0015] This object is achieved with a method of the kind defined in Claim 1 in accordance with the invention and with an air drying apparatus as defined in claim 5.

[0016] The invention affords the important advantage of requiring only one single product which can be positioned in a room or space that has been subjected to water damage as a result of flooding, and in which all processing of the air takes place. This greatly facilitates

installation and handling, while requiring only a very small amount of space in which to carry out an air drying process.

[0017] The cost involved when applying the inventive method is much lower than the commensurate costs entailed by established techniques which require a large number of components.

[0018] A further advantage is that sound levels will be very low, as all components are collected and housed in one heat-insulated and sound-insulated box. This means that persons living or working in the vicinity of the moisture-damaged space will now not be subjected to noise pollution. In practice, the sound level may be as low as 46-47 dB, which corresponds to the high demands placed on noise emissions.

[0019] Because the air is processed or treated in a heat-insulated box and because the air also constitutes cooling air for cooling the electric motor of the high-pressure fan, all available energy is recovered and conserved for the pressurized dry air prior to the air being delivered directly to the water-damaged construction.

[0020] As a result, the construction will be heated considerably, e.g. to a temperature of 60-80°C, wherewith the water-vapour pressure and water evaporation will also increase and therewith provide much shorter drying times.

[0021] Drying times which are one-fifth to one-tenth of the times achieved with established techniques can be achieved when practicing the inventive method.

[0022] When practicing the invention, the freely sucked air is heated and dried in a first process air chamber by a drying and rotor is sucked into a second housing chamber which is delimited from said first process air chamber by a wall in which the drying rotor is accommodated, said second chamber being provided with a high-pressure fan such that the process air will pass the electric motor and be heated thereby before being delivered to the fan inlet, wherewith the pressurized and temperature-elevated dry air is delivered to the water-damaged layer or area directly from the second chamber through the chamber outlet, to which the outlet of the high-pressure fan is connected.

[0023] In comparison with the aforescribed DE-A1-38 15 161, the invention has the primary advantage that all air treatment takes place in the insulated housing that contains two mutually adjacent chambers, and that the dry pressurized air (0.5-1.5% relative humidity) heated to a temperature of 60-80°C is pressed into the water-damaged layer or area, therewith raising the temperature of the structure significantly and greatly increasing the water-vapour pressure in the pores of the structure and therewith enhancing water evaporation. The high-temperature dry air has a high water take-up capacity and carries away the water from the layer or area, said air being again drawn into the insulated housing and there dehumidified.

[0024] It is preferred to practice the method as stated in claim 2.

[0025] The energy in the wet regeneration air exiting from the housing can be delivered to the incoming process air through the medium of a heat-exchanger or condenser before the air is sucked into the first process-air chamber via the inlet of the low-pressure fan. Still warmer and drier air is obtained in this way.

[0026] It is preferred in practice that after being heated by the motor of the high-pressure fan, part of the process air in the second chamber is caused to depart from the second chamber via a separate valve-controlled outlet without passing the high-pressure fan.

[0027] Advantageous further embodiments of the air drying apparatus are set forth in Claims 6 to 10.

[0028] The invention will now be described in more detail with reference to an exemplifying embodiment thereof and also with reference to the accompanying schematic drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0029] Fig. 1 is a perspective view, partially cut-away, of an inventive air drying apparatus provided with a drying rotor.

[0030] Fig. 2 is a cross-sectional view of a room in a building where a floor insulating layer has suffered water damage and shows the air drying apparatus of Fig. 1 positioned in the room.

[0031] Finally, Fig. 3 is a cross-sectional view of the air drying apparatus shown in Fig. 1.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[0032] An air drying apparatus comprises a housing 1 which includes sound and heat insulation 3 and in which all of the apparatus components are housed. A drying rotor 5 is received in a recess in a vertical wall 4 and delimits, together with a horizontal floor 6 roughly in the centre of the housing, a first process-air chamber 7 from a second process-air chamber 8. The housing is supported by wheels 13 which coact with supports 13a, and is fitted with a handle 49 for moving the apparatus.

[0033] The air 10 to be treated enters the first chamber 7 through an inlet 2 and passes a process-air filter 9 mounted in a sound-insulated filter box 11 immediately in front of the filter inlet. The filter 9 and the box 11 function to capture and collect any solid particles carried by the air, for instance sand.

[0034] The process air is pressed into the first chamber 7 through the medium of a low-pressure fan 12. As a result of the overpressure in the chamber 7, the air 21 is forced through the rotor 5, said rotor being provided with passageways that contain moisture-adsorbing means, such as silica gel crystals, for instance. The rotor 5 is rotated continuously with the aid of a motor 14 and a drive belt 15.

[0035] The major part of the process air 21 pressurized by the fan 12 flows through a first part of the rotor

5 and is dehumidified therein, whereafter the thus dried air 16 enters the second chamber 8 (c.f. the arrow 16) where it flows down into the lower part of the apparatus and passes the electric motor 17 of a high-pressure fan 18 while cooling the motor and further heating the dry air prior to said air entering the inlet 18a of the high-pressure fan 18 and being pressurized by said fan.

[0036] Another part 22 of the air demisterized in the rotor 5 is deflected by a cover means 23 provided with heat-emitting devices 24 and arranged in the second chamber 8 in the close proximity of the rotor. The hot regeneration air - indicated by the arrow 25 - passes back through about one-fourth of the rotor 5, where it takes up the moisture that has been adsorbed in the rotor. This air then leaves the rotor as wet air 26 and exits from the apparatus through a wet air outlet 29 and is transported to the surroundings through a hose (not shown). Instead of providing the apparatus with a cover means 23 which deflects a part flow of the dry air from the rotor 5, air can be delivered from without and pressurized by a fan (not shown) and heated by heat-emitting means for use as regeneration air.

[0037] Prior to this, the energy in the wet regeneration air leaving the housing can be delivered to the process air prior to said air entering the housing 1 through the inlet 2, with the aid of a heat-exchanger or condenser (not shown).

[0038] The rotor 5 is regenerated more effectively when the heat-emitting devices 24 in the cover means 23 are placed closely adjacent the rotor 5, so that the radiation heat will be directed immediately onto the moisture-adsorbent medium in the rotor.

[0039] The dry and hot air leaving the outlet 18b of the high-pressure fan 18 has a temperature of 60-80°C and a relative humidity of 0.5-1.5%. The high-pressure fan outlet 18b is connected to the housing outlet 19 by a hose 27, and the dry and hot high-pressure air is led from the housing through a hose 28 directly down into the water-damaged insulating layer 30 beneath the concrete floor 31 of the room 32. The construction will therefore be heated considerably, causing the water present to evaporate and be carried away effectively by the hot and dry air, which seeps out through cracks 33 and is sucked into the inlet 2 of the drying apparatus in the aforescribed manner.

[0040] The second process-air chamber 8 includes a further outlet 36 which is controlled or regulated by a valve means 35 and through which dry, hot air 16 that has not been pressurized by the high-pressure fan 18 can be taken out for some other drying purpose when desired, for instance for drying a wall of a room whose floor insulating layer has suffered water damage.

[0041] A number of devices necessary for manoeuvring and operating the drying apparatus are installed on the front side of the housing 1, these devices including in the present case an electrical connection 40, an operating time meter 41, air-volume and temperature indicators 42, on and off switches 43, control lamps 44,

45, a hygostat 46 and overheating safety means 47.

[0042] The partition wall 4 which accommodates the rotor 5 in a recess therein and on which the electric motor 14 is also mounted may be in the form of a cassette and mounted in the upper part of the housing 1 and therewith delimit the two process-air chambers 7 and 8 from one another in cooperation with the horizontal bottom wall 6. The main part of the second process-air chamber 8 is located in the lower part of the housing, where it accommodates the high-pressure fan 18. It will be understood that the aforesaid delimitation and arrangement of the high-pressure fan in the lower part of the housing provides a highly compact design and that the apparatus as a whole contains only very few components. The thermal energy developed by the high-pressure fan motor is utilized to a maximum in improving the drying capacity of the air delivered, while the fan motor is cooled satisfactorily by the process air prior to entering the fan inlet 18a.

[0043] The temperature and air-volume indicators 42 provided on the apparatus make it possible to check carefully that the apparatus has been set-up in an optimal manner.

[0044] Other significant advantages afforded by the inventive apparatus over known techniques include the fact that the system is not a closed system; the low-pressure fan of the dehumidifier sucks-in air freely from the room, and constitutes an inexpensive, lightweight and energy lean unit.

[0045] Furthermore, the insulated box 1 does not accommodate a separate, complete dehumidifier, but that the product as a whole is incorporated as one single integrated unit, i.e. is not constructed from different separate assembled units. Moreover, the high-pressure fan 18 of the dehumidifier presses dry air directly into the water-damaged layer through the hose 28, i.e. is not connected to other apparatus components via a number of suction hoses.

[0046] All of these features of the inventive apparatus result in a small, light and easily handled apparatus which can be moved readily between different places of use.

Claims

1. A method of increasing the yield of an air drying process, said method including the steps

- a) freely sucking-in air from a room into a first process air chamber in a heat- and sound-insulated housing (1) by a first motor-driven fan and delivering the air to a drying rotor (5) containing a moisture adsorbent medium to dehumidify and dry the air by moisture exchange with heated regenerating air;
- b) sucking said demoiurized and heated air into a second air process chamber (8) delimited

from said first chamber (7) in said housing (1) by a high-pressure fan (18) driven by a second electric motor (17) in said second chamber (8), such that the process air passes said second electric motor and is heated thereby prior to entering the high-pressure fan inlet (18a); and
c) delivering the pressurized process air of higher temperature to the water damaged layer or area directly from the second chamber outlet, to which the outlet (19) of said high-pressure fan (18) is connected.

2. A method according to Claim 1, **characterized by** freely sucking-in the air by said first fan (12) to said first air chamber (7) through a filter (9) which partially defines a space (11) delimited from the first chamber (7) inwardly of the inlet and functioning to collect air-carried solid particles, such as sand.

3. A method according to Claim 1 or Claim 2, **characterized by** delivering the energy contained by the wet regeneration air leaving the housing to the incoming process air with the aid of a heat-exchanger or condenser prior to sucking said air into said inlet of the first process-air chamber (7).

4. A method according to any one of Claims 1-3, **characterized by** directing part of the process air in the second chamber (8) after heating it by said second motor (17) from the second process-air chamber through a separate valve-regulated outlet (36) without passing the high-pressure fan (18).

5. An air drying apparatus provided with a drying rotor and comprising:

- a) a heat- and sound-insulated housing (1) which is intended to be set-up in a moisture-damaged room or space and which includes an inlet (2) and an outlet (19);
- b) said drying rotor (5) located in said housing (1), said drying rotor including passageways which contain a moisture-adsorbent medium, e.g. silica gel crystals;
- c) a motor (14) which drives the rotor (5), preferably continuously;
- d) a first motor-driven fan (12) for sucking-in air freely from the room and delivering it to the drying rotor (5);
- e) air-heating devices (23, 24) and means for leading heated air in counterflow through a further part of the rotor (5) as regenerating air;
- f) a wet regeneration air outlet (29);
- g) a second motor-driven fan (18) of a high-pressure type in the housing (1) to which fan (18) dehumidified and heated process air exiting from said first part of the rotor is sucked, such that said air will pass the second electric

motor (17) of said second fan and be further heated thereby before entering the high-pressure fan inlet (18a), and after being pressurized is delivered directly to the water-damaged layer or area (30) through the housing outlet (19) to which the high-pressure fan outlet (18b) is connected.

6. Apparatus according to Claim 5, wherein

h) said drying rotor (5) is accommodated in a recess in a wall (4) in the housing (1);
i) the rotor accommodating wall (4) delimits first and second process-air chambers (7, 8) in the housing (1); and
j) the second fan (18) and its electric motor (17) are situated in the second process-air chamber (8).

7. Apparatus according to Claim 6, **characterized by** heat-exchanger or condenser means for delivering energy contained in the wet regeneration air leaving the housing (1) to the process air prior to said air entering the housing through the inlet (2).

8. Apparatus according to any one of Claims 5-7, **characterized in that** the second chamber (8) has provided therein a valve-regulated second outlet (36) for process air which is heated by the second electric motor (17) of the high-pressure fan but which has not been pressurized by said fan.

9. Apparatus according to any one of Claims 5-8, **characterized in that** the wall (4) which accommodates the rotor (5) delimits the first process-air chamber (7) from the second process-air chamber in conjunction with a defining wall or floor (6) in the centre of the housing; and in that the high-pressure fan is mounted in the lower part of the second chamber, generally beneath said horizontal wall or floor (6).

10. Apparatus according to any one of Claims 5-9, **characterized in that** that side of the housing on which the apparatus inlet and outlet (2; 19) are mounted is fitted with a plurality of apparatus operating and indicating devices, such as an operating time meter (41), air-volume and temperature indicators (42), control lamps (44, 45), a hygrostat (46) and an overheating safety device (47).

Patentansprüche

1. Verfahren zur Erhöhung des Wirkungsgrades eines Lufttrocknungsverfahrens mit den Schritten:

a) freies Ansaugen von Luft aus einem Raum

in eine erste Luftverarbeitungskammer in einem wärme- und geräuschisolierten Gehäuse (1) durch einen ersten motorgetriebenen Lüfter und Leiten der Luft in einen Trocknungsrotor (5), der ein feuchtigkeitsadsorbierendes Medium enthält, um die Luft durch Feuchtigkeitsaustausch mit erwärmter regenerierter Luft zu entfeuchten und zu trocknen;

b) Ansaugen der entfeuchteten und erwärmten Luft in eine zweite Luftverarbeitungskammer (8), die von der ersten Luftverarbeitungskammer (7) in dem Gehäuse (1) durch ein Hochdruckgebläse (18) abgegrenzt ist, der durch einen zweiten Elektromotor (17) in der zweiten Luftverarbeitungskammer (8) angetrieben wird, so daß die verarbeitete Luft den zweiten Elektromotor passiert und dadurch vor dem Eintritt in den Hochdruckgebläseeinlaß (18a) erwärmt wird; und

c) Leiten der Prozeßdruckluft mit höherer Temperatur direkt von dem zweiten Kammerauslaß, mit dem der Auslaß (19) des Hochdruckgebläses (18) verbunden ist, zur wasserbeschädigten Schicht bzw. Gebiet.

2. Verfahren nach Anspruch 1, **gekennzeichnet durch** freies Ansaugen der Luft durch das erste Gebläse (12) zu der ersten Luftkammer (7) durch einen Filter (9), der partiell einen Zwischenraum (11) bildet, der durch die erste Kammer (7) einlaßeinwärts begrenzt ist und zum Sammeln von in der Luft beförderten Feststoffen, wie z.B. Sand, dient.

3. Verfahren nach Anspruch 1 oder 2, **gekennzeichnet durch** Übertragen der Energie aus der feuchten zu generierenden Luft, die aus dem Gehäuse austritt, an die ankommende Prozeßluft mit Hilfe eines Wärmetauschers oder Kondensators, bevor die Luft in den Einlaß der ersten Prozeßluftkammer (7) gesaugt wird.

4. Verfahren nach einem der Ansprüche 1 bis 3, **gekennzeichnet durch** Leiten eines Teils der Prozeßluft der zweiten Kammer (8), nachdem sie durch den zweiten Motor (17) aus der zweiten Prozeßluftkammer erwärmt wurde, durch einen separaten ventilregulierten Auslaß (36) heraus, ohne das Hochdruckgebläse (18) zu passieren.

5. Lufttrocknungsvorrichtung mit einem Trocknungsrotor und mit:

a) einem wärme- und geräuschisolierten Gehäuse (1) zum Aufstellen in einem feuchtigkeitsgeschädigten Raum oder Zwischenraum mit einem Einlaß (2) und einem Auslaß (19);

- b) wobei der Trocknungsrotor (5) in dem Gehäuse (1) angeordnet ist und Durchgänge hat, die ein feuchtigkeitsadsorbierendes Medium, z. B. Kieselgelkristalle, enthalten;
- c) einem Motor (14) zum vorzugsweise kontinuierlichen Antreiben des Rotors (5);
- d) einem ersten motorgetriebenen Gebläse (12) zum freien Ansaugen von Luft aus dem Raum und Zuleiten in den Trocknungsrotor (5);
- e) Luftheizvorrichtungen (23, 24) und Mittel zum Leiten der erwärmten Luft im Gegenstrom als regenerierte Luft durch einen weiteren Teil des Rotors (5);
- f) einen Auslaß (29) für die feuchte Regenerationsluft;
- g) einem zweiten motorgetriebenen Hochdruckgebläse (18) in dem Gehäuse (1), wobei von dem Gebläse (18) entfeuchtete und erwärmte Prozeßluft, die aus dem ersten Teil des Rotors austritt, angesaugt wird, so daß die Luft den zweiten Elektromotor (17) des zweiten Gebläses passiert und dadurch weiter aufgeheizt wird, bevor sie in den Hochdruckgebläseeinlaß (18a) eintritt, und wobei die Luft, nachdem sie unter Druck gesetzt wurde, direkt zu der wasserbeschädigten Schicht oder Gebiet (30) durch den Gehäuseauslaß (19), mit dem der Hochdruckgebläseauslaß (18b) verbunden ist, geleitet wird.
6. Vorrichtung nach Anspruch 5, wobei
- h) der Trocknungsrotor (5) in einer Aussparung in einer Wand (4) in dem Gehäuse (1) untergebracht ist;
- i) die Wand (4) zum Unterbringen des Rotors eine erste und eine zweite Prozeßluftkammer (7, 8) in dem Gehäuse (1) abgrenzt;
- j) das zweite Gebläse (18) und der zugehörige Elektromotor (17) in der zweiten Prozeßluftkammer (8) angeordnet sind.
7. Vorrichtung nach Anspruch 6, **gekennzeichnet durch** einen Wärmetauscher oder einen Kondensator zum Zuführen von Energie aus der feuchten Regenerationsluft, die aus dem Gehäuse (1) austritt, zu der Prozeßluft, bevor diese Luft in das Gehäuse durch den Einlaß (2) eintritt.
8. Vorrichtung nach einem der Ansprüche 5 bis 7, **dadurch gekennzeichnet**, daß die zweite Kammer (8) einen ventilregulierten zweiten Auslaß (36) für Prozeßluft hat, die durch den zweiten Elektromotor (17) des Hochdruckgebläses erwärmt aber noch nicht durch dieses Gebläse unter Druck gesetzt wurde.
9. Vorrichtung nach einem der Ansprüche 5 bis 8, **dadurch gekennzeichnet**, daß die Wand (4) zum Unterbringen des Rotors (5) die erste Prozeßluftkammer (7) von der zweiten Prozeßluftkammer in Verbindung mit einer Begrenzungswand oder -boden (6) im Zentrum des Gehäuses abgrenzt und daß das Hochdruckgebläse in dem unteren Teil der zweiten Kammer im wesentlichen unterhalb von der horizontalen Wand oder Bodens (6) befestigt ist.
10. Vorrichtung nach einem der Ansprüche 5 bis 9, **dadurch gekennzeichnet**, daß die Seite des Gehäuses, auf der der Einlaß und der Auslaß (2, 19) der Vorrichtung angeordnet sind, mit einer Anzahl von Bedien- und Anzeigeelementen, wie z. B. Betriebszeitmeßgerät (41), Luftstrom- und Temperaturanzeigen (42), Kontrollampen (44, 45), einem Feuchtigkeitsregler (46) und einem Überhitzungs-Sicherungsmittel (47) ausgestattet ist.

Revendications

1. Procédé destiné à l'augmentation du rendement d'une opération de séchage par air, le procédé comprenant les étapes suivantes :
- a) l'aspiration libre de l'air d'une salle dans une première chambre d'air de traitement formée dans un boîtier (1) isolé thermiquement et acoustiquement par un premier ventilateur entraîné par un moteur et la transmission de l'air à un rotor de séchage (5) qui contient un milieu adsorbant l'humidité afin que l'air soit déshydraté et séché par échange d'humidité avec de l'air chauffé de régénération,
- b) l'aspiration de l'air chauffé et déshydraté dans une seconde chambre de traitement d'air (8) délimitée par rapport à la première chambre (7) dans le boîtier (1) par un ventilateur à haute pression (18) entraîné par un second moteur électrique (17) placé dans la seconde chambre (8), si bien que l'air traité passe le long du second moteur électrique et est chauffé par celui-ci avant de pénétrer par l'entrée (18a) du ventilateur à haute pression, et
- c) la distribution de l'air traité sous pression à une température accrue dans la région ou couche détériorée par l'eau directement depuis la sortie de la seconde chambre à laquelle est raccordée la sortie (19) du ventilateur à haute pression (18).

2. Procédé selon la revendication 1, caractérisé par l'aspiration libre de l'air par le premier ventilateur (12) vers la première chambre (7) par l'intermédiaire d'un filtre (9) qui délimite partiellement un espace (11) qui est aussi délimité par rapport à la première chambre (7) vers l'intérieur de l'entrée et dont le rôle est de collecter les particules solides entraînées par l'air, telles que le sable. 5
3. Procédé selon la revendication 1 ou 2, caractérisé par la transmission de l'énergie contenue par l'air humide de régénération quittant le boîtier à l'air traité introduit à l'aide d'un condenseur ou d'un échangeur de chaleur avant aspiration de l'air à l'entrée de la première chambre (7) d'air traité. 10 15
4. Procédé selon l'une quelconque des revendications 1 à 3, caractérisé par la direction d'une partie de l'air traité dans la seconde chambre (8) après son chauffage par le second moteur (17) en provenance de la seconde chambre d'air traité par une sortie séparée (36) réglée par une vanne sans passage dans le ventilateur à haute pression (18). 20
5. Appareil de séchage par air muni d'un rotor de séchage et comprenant : 25
- a) un boîtier (1) isolé thermiquement et acoustiquement, destiné à être placé dans une salle ou un espace détérioré par l'humidité et qui comprend une entrée (2) et une sortie (19), 30
 - b) le rotor de séchage (5) placé dans le boîtier (1), ce rotor de séchage comprenant des passages qui contiennent un milieu adsorbant l'humidité, par exemple des cristaux de gel de silice, 35
 - c) un moteur (14) qui entraîne le rotor (5), de préférence de façon continue, 40
 - d) un premier ventilateur (12) entraîné par un moteur et destiné à aspirer l'air librement depuis la salle et à le transmettre au rotor de séchage (5), 45
 - e) des dispositifs (23, 24) de chauffage d'air et un dispositif destiné à conduire l'air chauffé à contre-courant dans une autre partie du rotor (5) sous forme d'air de régénération, 50
 - f) une sortie (29) d'air humide de régénération, et
 - g) un second ventilateur (18) entraîné par un moteur du type à haute pression dans le boîtier (1), l'air de traitement chauffé et déshydraté sortant de la première partie du rotor étant aspiré vers ce ventilateur (18), si bien que l'air passe le long du second moteur électrique (17) du second ventilateur et subit un chauffage supplémentaire avant d'entrer à l'entrée (18a) du ventilateur à haute pression et, après mise sous pression, il est directement transmis à la 55
- région ou couche (30) détériorée par l'eau par l'intermédiaire de la sortie (19) du boîtier à laquelle est raccordée la sortie (18b) du ventilateur à haute pression.
6. Appareil selon la revendication 5, dans lequel :
- h) le rotor de séchage (5) est logé dans une cavité formée dans une paroi (4) réalisée dans le boîtier (1),
 - i) la paroi (4) de support du rotor délimite une première et une seconde chambre (7, 8) d'air de traitement dans le boîtier (1), et
 - j) le second ventilateur (18) et son moteur électrique (17) sont disposés dans la seconde chambre (8) d'air traité.
7. Appareil selon la revendication 6, caractérisé par un dispositif échangeur de chaleur ou condenseur destiné à transmettre l'énergie contenue dans l'air humide de régénération quittant le boîtier (1) à l'air traité avant que l'air ne pénètre dans le boîtier par l'entrée (2).
8. Appareil selon l'une quelconque des revendications 5 à 7, caractérisé en ce que la seconde chambre (8) comporte une seconde sortie (36) réglée par une vanne et destinée à l'air traité qui est chauffé par le second moteur électrique (17) du ventilateur à haute pression, mais qui n'a pas été mis sous pression par ce ventilateur.
9. Appareil selon l'une quelconque des revendications 5 à 8, caractérisé en ce que la paroi (4) qui supporte le rotor (5) délimite la première chambre (7) d'air traité par rapport à la seconde chambre d'air traité en coopération avec un plancher ou une paroi (6) de délimitation placée au centre du boîtier, et en ce que le ventilateur à haute pression est monté à la partie inférieure de la seconde chambre, sous le plancher ou la paroi horizontale (6) de manière générale.
10. Appareil selon l'une quelconque des revendications 5 à 9, caractérisé en ce que le côté du boîtier sur lequel sont montés l'entrée et la sortie (2 ; 19) de l'appareil a plusieurs dispositifs indicateurs et de fonctionnement de l'appareil, tels qu'un organe (41) de mesure du temps de fonctionnement, des indicateurs (42) de température et de volume d'air, des lampes témoins (44, 45), un hygrostat (46) et un dispositif (47) de sécurité en cas de surchauffe.

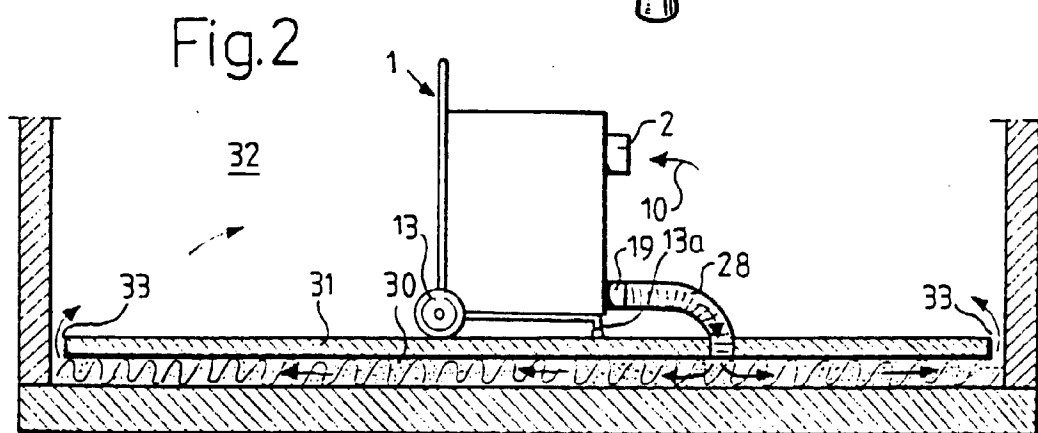
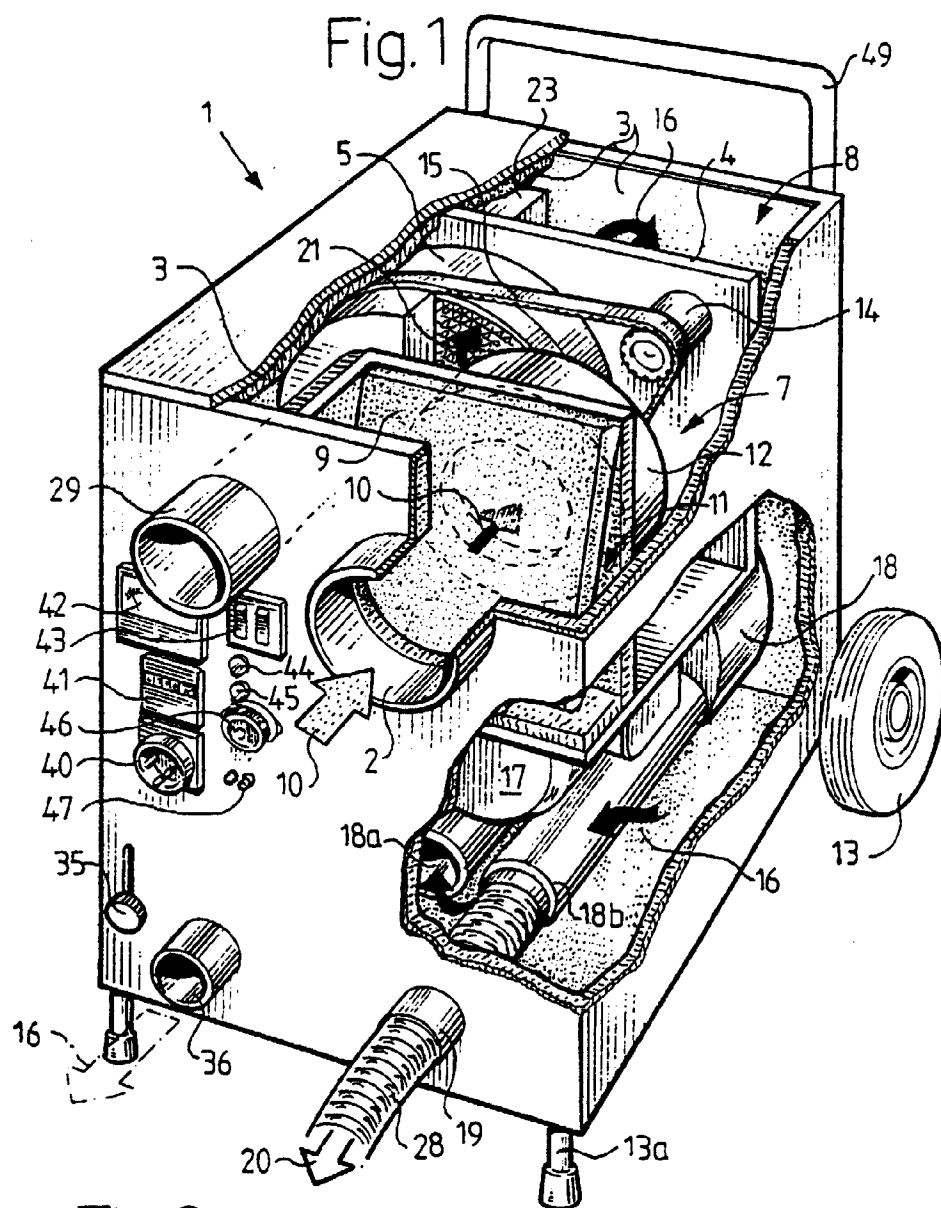


Fig.3

