

A PLANT CULTIVATION SYSTEM USING HUMIDIFIER

Technical field

The present invention relates to agriculture and engineering, devices and method, in particular humidifier cultivation and process.

5 Background

Humidity for cultivation is an important factor for cultivating all kinds of plants and every step in the cultivation. That is in the area of the trunk and leaves plant. When the humidity in the air is high, it will dehydrate the plant less. And when the humidity is in the air less, the plants will dehydrate higher and quickly lose water in the plant. The roots of the plant will grow
10 well and tilt to the area with water or humidity. In addition, each plant requires different humidity. Mushroom and moss is especially plant that needs humidity all the time, so it has to develop a humidifier to help plant grow.

WIPO Publication No. 204762524 reveals the automation system to control humidity, temperature, carbon dioxide and ammonia gas that suitable for mushroom cultivation. The
15 monitoring sensor and ultrasonic humidifiers can be used to replace the labor and worker in the cultivation industry. But the patent is only suitable for mushrooms. That is not suitable for other crops.

WIPO No. CN204350743 reveals the invention of equipment and the processes to control environment in the closed system which the humidity is increased by spraying water through the
20 closed system. This patent does not specify the importance and characteristics of the humidifier. They also focus on the overall system of closed plant cultivation.

WIPO Publication No. 1020020068980 reveals how to grow a plant using the ultrasonic humidifier. The mist increases humidity to the pot area by spraying mist from the top of the plant. And the humidifier also placed below the bottom of the pot.

25 The previous invention is to add humidity to the cultivation system and does not remove any water or solution which released into the recycle system. It cause the waste of resources and lose energy in industry. Recycling is also a way to preserve the environment.

At present the humidity increase in cultivation is a major problem. That is a short-lived fan. Because the fan is used to disperse the humidity that usually stick humidity. So the propeller
30 weight increased by varying the number of used hours. Finally the fan stopped working and

collapsed. That can solve by using a waterproof fan. It can increase the use life, but it is still collapsed. Or to switch to a cheap fan that can be replaced at any time with less cost than using expensive fans. Or using on-off fan timer for cleaning and maintenance periodically. This method is very difficult to use in the industry and still employs more people to maintenance.

5 Summary of Invention

According to the present invention there is provided the humidifier cultivation and process comprising:

The apparatus develops a humidifier system for cultivation. By developing recycled resources and solving problems. Short-lived fan or no fan required. It also applies to a variety of crops, not specific to what kind of plants. Use a blower with a special feature instead of a fan. The invention technique is to use a blower instead of a general fan. That is different from the fan. The fan has a pressure less than 1000 mnH₂O. The blower will have a pressure 1000 mnH₂O up to 10 mH₂O which is higher than the fan pressure. The process of carrying the solution vapor from the humidifier back into the system. And to create a special hose is to send the solution and / or solution vapor. To weld the equipment in some route for reducing the blower operation and remove the condensed solution from the blower release out of the blower.

Brief description of the drawings

An embodiment, incorporating all aspects of the invention, will now be described by way of example only with reference to the accompanying drawing in which

Figure 1 is block diagram of the process of humidity for cultivation in accordance with an embodiment of the process.

Figure 2 is block diagram show that the system of humidifier apparatus.

Detailed description

Cultivation according to the present invention is the cropping in the conditions inside the growing chamber (5). It has a cavity with entrance of atomize mist and / or solution at least one passage and has plants or roots or both of them.

Definition of humidifier according to the present invention refers to any device that creates or gives humidity to the system. The internal components work together by connecting at least one the passages of the atomize mist and / or solution at least four components. That are

including of storage tank (1), humidifier (3), growing chamber (5) and drain tank (7) which welded together like close path.

The process of humidity for cultivation describe as figure 1 which consists of the solution in the storage tank (1) flows through the pump (2) to the humidifier (3) and the solution volatile to atomize mist and enter into the blower (4). The blower (4) will suck the atomize mist and blow it through the passage or, in the present invention that the passage is two pipes. The first pipe is connected to the growing chamber (5) with the plant (8). So the part of plant (8) can be located either in the plant (8), whereas the plant (8) is the growing chamber (5) with trunk and / or some part of the plant (8) as well. When the atomize mist gives the humidity in the growing chamber (5), the condensation of atomize mist becomes liquid. The liquid flows through the pipe back into the humidifier (3) again. So the recycle of solution occur.

The second pipe of the blower (4) is connected to the drain tank (7) through a special design pipe (6) that look like trap and hole. It serves to keep the atomize mist and some of atomize mist such that the blower blows to the pipe of the growing chamber (5) and stick with an electronic blower. It causes damage and collapses in the end. When using water-resistant blowers, it is found that cannot be prevented all of water. When the stick atomize mist condense to solution that stick to the blower. So the weight of blowers increase and need more power to rotate. Then the inner components bum and eventually collapse. Hence, there creates a path or a passage or pipe for carrying the solution and the specific solution to the drain tank (7). The drain tank (7) act as the solution storage that limit the maximum and minimum volume of solution. When the solution and atomize mist enter the drain tank (7), they accumulate to the required level. So that the switch (701) and (702) transmit signal to drain the solution, that is to say, the solution level in the drain tank (7) is the maximum level. The switch (701) sends the signal to the pump (703) which carry the solution in pipe through the storage tank (1) again. As resulting, the recycle of the atomize mist and the solution is recycled back. And when the solution level of the drain tank (7) decreases to the lowest level, the switch (702) will transmit the signal to the pump (703) to stop working.

Special design pipe (6) has many designation, such as letter U, letter J, letter Wand to make cruel like hole at least 1 hole. That is to accumulate some of atomize mist and some of solution. By constructing the specific pipe, the pressure in the pipe at the blower (4) and in the

drain tank (7) is not equal. And the higher pressure area push the atomize mist and solution to the area with less pressure.

There are several ways to keep the pressure differentiate in the pipe. Appropriate methods include: 1. To narrow the pipe diameter. This eliminates the flow path by using pipe joints which different from the diameter of the pipe. This will make some of atomize mist and some of solution flow out of system. As a result, the other electrical components in the system are damaged by humidity. 2. By installing the open valve and close valve which change the direction current. 3. By installing the flux meter of the solution with pressure monitoring (Diaphragm type) which will lose pressure from the flux measurement sheet. 4. By bending pipe. The best way is to bend the pipe because it reduces the installation equipment and less energy. And more convenient to develop in the industry.

The bending of the pipe in the present invention is the special design pipe (6) with the above characteristics. The pressure inside the two pipes must be considered. The case is in the following table.

To compare pressure at nearby pipe	Incident
Storage tank more higher than blower	Blower collapsed
Storage tank higher than blower	Blower collapsed
Storage tank equal to blower	Blower collapsed
Storage tank less than blower	Solution flow in the pipe through storage tank
Storage tank more less than blower	Solution and atomize mist flow out

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How to make a appropriate special design pipe (6) is to set the pressure of the drain tank (7) less than the bowler both higher case and much smaller case. The implementation of a special design pipe (6) is to set the pressure of the drain tank (7) less than the blower a little. To

push the solution to the drain tank (7) by using a pipe like the letter U with unequal tail pipe. Its characteristic like the letter J both the letter J and / or the letter J backward. It will raise the pipe at the blower higher than the drain tank. If a pipe at blower is higher than the drain tank, the atomize mist and / or solution flow out to the growing chamber (5). If the pipe at storage tank is higher than the blower, the solution will drain to the bending pipe and flow back to the blower. The blower will collapse eventually.

Disclose the system of the humidifier apparatus, the humidifier (3) as shown in figure 2. For some the pipe such that carry the solution from the storage tank (1) through the pump (2) and to the humidifier (3) connected to the solenoid valve (305). Then goes into the tank of humidifier (302) which store the solution with maximum and minimum scales for the volume of solution in the tank. When a solution enters the tank of humidifier (302), the humidity generator (301) works by bringing the solution to evaporate to vapor or atomize mist flow in a pipe connected to the blower (4) which installed outside the humidifier (3).

The tank of humidifier (302) has a pipe that connected to the growing chamber (5) two ways. That is the blower for pulling the atomize mist to the growing chamber (5). And the path which has no blower is to carry the solution in the growing chamber (5) flow back to the tank of humidifier (302). When the solution in the tank of humidifier (302), up to the maximum value set, then the switch (303) acts to signal the solenoid valve (305) close. The solution from the storage tank (1) stop flowing. When the solution in the tank of humidifier (302) decreases to the minimum scale, the switch (304) activates the solenoid valve (305) to open causes the solution from the storage tank (1) into the tank of humidifier (302).

In addition, solenoid valves (305), switches (701) and (702) act as transmitters associated with the solution level according to the present invention. Can be replaced by any system such that sends a signal to control the volume of solution. Or to have automated.

According to aspect of the present invention the humidifier cultivation and process are described as the humidifier for cultivation and process, that including of,

i. Special design pipe (6) with passage or path of the atomize mist and / or solution to the drain tank (7) and blower (4) which has for some a point such that look like crap and hole.

And/ or,

ii. The system of humidifier apparatus is consist of for some closed path such that path is the way for the atomize mist and/or the solution and the closed path consist of at least 4 vertexes : the storage tank (1), the humidifier (3), the growing chamber (5) and the drain tank (7). Where the definition of closed path belongs to graph theory, mathematics.

5 Either i. or ii. , or both. The humidifier apparatus has special characteristics that suitable for the process, comprising:

1. Special design pipe (6) has the suitable designations, that is, similar to the letters U, the letters J, the letters W and letter J backward. The most suitable designations that is similar to the letter J and the letter J backward.

10 2. Special design pipe (6) shall be considered for the pressure of the pipe in the vicinity of the boiler (4) and the pipe near the drain tank (7). The suitable pressure is the pressure in the drain tank (7) is less than the pressure in the blower (4) area. The most suitable pressure is the pressure in the drain tank (7) is slightly less than the pressure in the blower (4).

15 3. The pipe which has the special design pipe (6) will be connect the blower (4) to the position before the blower (4), after the blower (4), such that count from the atomize mist path from the humidifier (3) or the same area as the blower installation. And bring the atomize mist and / or solution what sticky the blower (4), the atomize mist and / or solution in the boundary to the pipe which has the special pipeline (6). The suitable area for connect the blower (4) is the position of after the blower (4) nearly.

20 4. The special design pipe (6) is also a component of the passage of the atomize mist and / or solution path between the drain tank (7) and the growing chamber (5).

25 5. The process of humidity for cultivation, that is, for some a closed path such that a closed path includes the storage tank (1), the humidifier (3), the growing chamber (5) and the drain tank (7). Can be add any devices to connected each path among the storage tank (1), the humidifier (3), the growing chamber (5) and the drain tank (7), whereas the atomize mist and / or solution can be passed and circulating until the one loop of the close path.

30 6. The blower (4) will be act to absorb the humidity from the humidifier (3) and blow the atomize mist into the pipe to the growing chamber (5). The suitable characteristic is the blower with pressure of 1 000 mmH₂O to 1 0 mH₂O where the blower fan has either waterproof or non waterproof. The most suitable characteristic of blower fan is the waterproof.

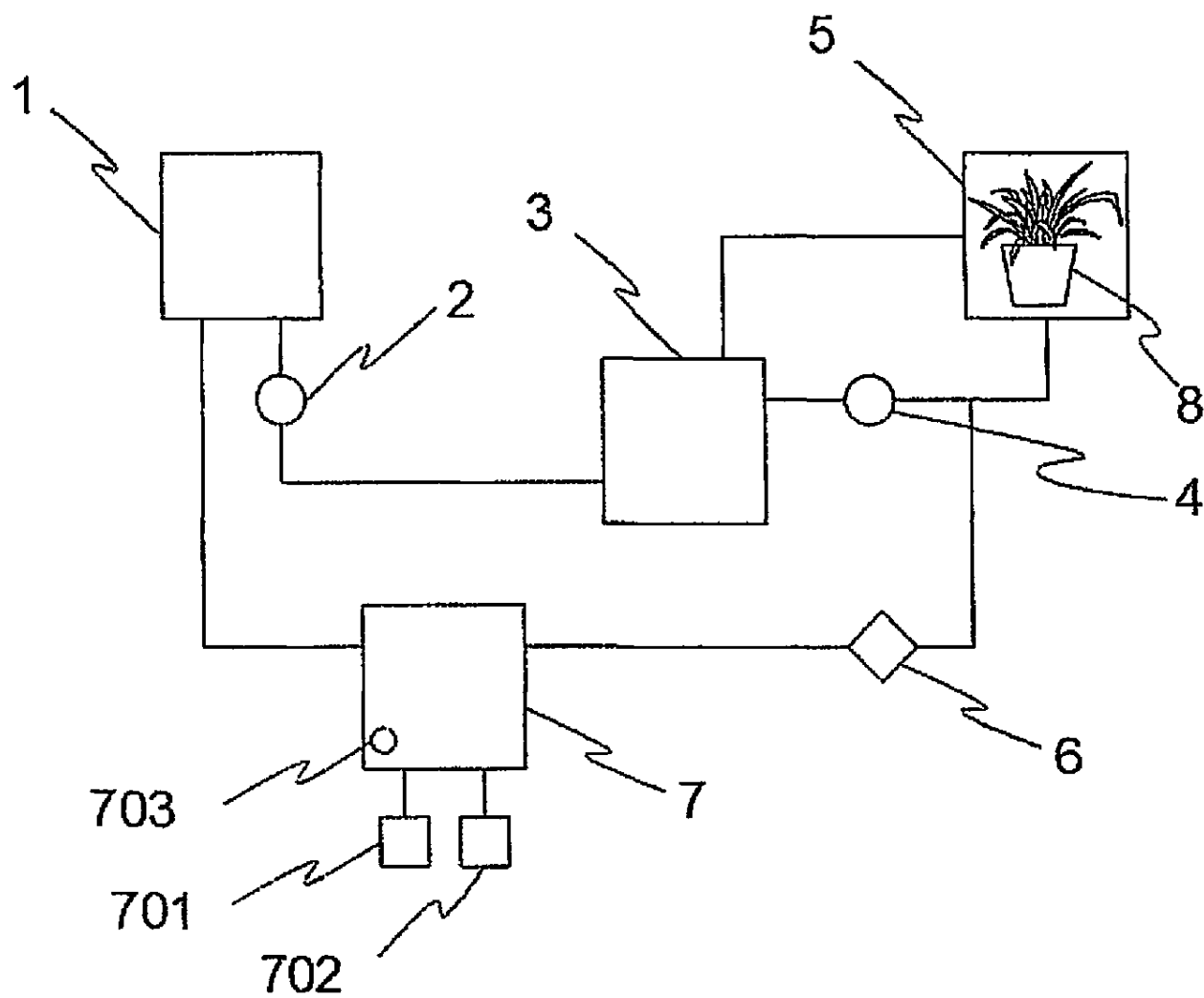


Figure 1