

CLOSED PLANTING FACTORY

TECHNICAL FIELD

[0001]The technical field relates to a planting factory, and more particularly to a closed planting factory with the features of constant temperature and movable planting frames.

BACKGROUND

[0002]According to the warning announced by the United Nation's Food and Agriculture Organization (FAO) in June, 2010, food shortage becomes an increasingly more serious problem, and the global food price is estimated to be increasing 40% in the coming ten years. Facts show that the prediction made in this announcement is not scaremongering, and the real situation even goes farther than that. According to the updated food price index and agricultural producer price index announced by FAO in February 2011, the price of wheat in international markets in the past three years rose by 181%, and the overall food price rose by 83%. Therefore, the severe food shortage warning is once again conveyed to different countries. According to the survey, over more than 30 countries of the world encounter food crisis now. If the global population continues increasing, the severe food shortage problem will become more serious, so that every country actively proposes appropriate and feasible solutions to minimize the price fluctuation caused by importing food and primarily increases domestic food self-selling and self-sufficiency percentages to achieve self-sufficiency of food supply. To enhance food production and overcome the limited land issue, the inventor of this disclosure has filed the patent applications entitled "Three-dimensional farm structure" and "Improved three-dimensional farm structure on March 24, 2011 and May 31, 2011 respectively, in hope of changing a general planar farm into a vertical farm and using a manual control method to increase the planting amount of agricultural products per unit area, so that the production of agricultural products is increased by several times in a small ground area. Actual test results show that such reform can achieve the expected objective.

[0003]As the name suggests, three-dimensional farm is a vertical farm which cultivates plants vertically and controls the planting manually to increase the planting amount to several times. In vertical farming, it is a very important subject to maximize the utility of the limited space of the farm while facilitating farmers to manage the cultivation, fertilization, and collection.

[0004] In addition, the global weather is not the same as the past and no longer follows seasonal changes anymore. On the other hand, the global weather is changeable and unpredictable. Even in the same day, the temperature difference may be up to 10℃, and the environment is polluted by industries and human factors and deteriorated seriously. Therefore, the planting quantity and economic benefits of outdoor planting and three-dimensional farming relying on weather conditions are decreased significantly.

SUMMARY

[0005] Therefore, it is a primary objective of this disclosure to provide a closed planting factory comprising: a closed space; a constant-temperature air conditioning equipment; an automatic water supply system; and a plurality of movable planting frames.

[0006] This disclosure has the following advantages: The movable planting frame may be moved to the walkway in the closed space as needed, so that the planting area no longer requires any walkway to achieve the effects of increasing the quantity of cultivated plants and facilitating the control and management of the planting factory. With the operation of the constant-temperature air conditioning equipment, the planting area and the walkway area are always maintained within a temperature difference range of the constant temperature, so that the temperature of the planting area falls within an environment suitable for growing plants to improve the growth rate of the plants.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] FIG. 1 is a schematic view of the planar structure of this disclosure;

[0008] FIG. 2 is a first schematic view of the structure of a movable planting frame of this disclosure;

[0009] FIG. 3 is a second schematic view of the structure of a movable planting frame of this disclosure;

[0010] FIG. 4 is a schematic view showing a constant-temperature airflow direction of a system of this disclosure; and

[0011] FIG. 5 is a schematic view of the configuration of an automatic water supply system of this disclosure.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0012] The technical characteristics, contents, advantages and effects of this disclosure will be apparent with the detailed description of a preferred embodiment

accompanied with related drawings as follows.

[0013] With reference to FIGS. 1~3 for a schematic view of a planar structure of a closed planting factory of this disclosure and schematic views of the structure of a movable planting frame of this disclosure, the closed planting factory comprises: a closed space (1), a plurality of movable planting frames (2), a constant-temperature air conditioning equipment (3), and an automatic water supply system (4). The closed space (1) may be a closed three-dimensional space such as a closed house, a basement, or a closed container, and the closed space (1) is divided into a pre-operation area (10), a planting area (11) and a walkway area (12), and the pre-operation area (10) may be used as a control room of an electrical equipment, a light source equipment, and a water supply system, and a disinfection area is provided for disinfection before a person's entry, and the planting area (11) is the space for cultivating plants and includes a light source (110) installed at a predetermined position for manually controlling the brightness of the planting area (11), and the movable planting frames (2) are frames for cultivating plants or frames for placing potted plants and installed and concentrated in closed space (1), and having a wheel (20) installed at the bottom of the frame or a roller (21) installed at the top of the frame and hanged onto a track frame (22), so that the frames can be moved to the open area to facilitate planting, controlling and collecting the plants. The concentrated equipments not just facilitates control and management only, but also saves internal space of the closed space (1) and energy, so as to increase the quantity of cultivated plants in the closed space (1) and improve economic benefits effectively.

[0014] With reference to FIG. 4 for a schematic view showing a constant-temperature airflow direction of this disclosure, this disclosure leverages the operation of the constant-temperature air conditioning equipment (3) and the configuration of a duct (30) to create a constant-temperature airflow path of the constant-temperature air conditioning equipment (3) starting from the top of the pre-operation area (10) to the top of a side of the planting area (11), and then moving downward towards the walkway area (12), and finally flowing back from the through hole (120) at the bottom of the walkway area (12) to the pre-operation area (10), and discharging outside the closed space (1) through the operation of heat exchange of the constant-temperature air conditioning equipment (3), so as to complete the air flow circulation and maintain the planting area (11) and the walkway area (12) in the closed space (1) in an environment with an appropriate temperature difference and make use of the effect of the temperature difference to simulate the plant growth hormone to expedite the growth of the plants.

[0015] With reference to FIG. 5 for a schematic view of the configuration of an automatic water supply system in accordance with this disclosure, a sump (40) is disposed at the bottom surface of the planting area (11) of this disclosure, and a water circulation pump (41) is installed to the sump (40). With the pumping by the water circulation pump (41) and the guide of the pipeline (42) of the water circulation pump (41), water in the sump (40) is pumped to the potted plants at the uppermost level to sprinkle the potted plants, so that each potted plant is moisturized with an appropriate amount of water timely based on the law of water flowing downward until the water content of the potted plants at the lowest level is saturated, and then the saturated water discharged into the sump (40) below, and water is recycled and reused to achieve the effects of automatically supplying water and recycling and reusing the water resource.

[0016] In summation of the description above, this disclosure provides a simple structure of a closed plant factory to increase the quantity of cultivated plants while facilitating the control and management of the plant factory and control the growth rate of the plant without being affected by external weather conditions. The technical measure of this disclosure can achieve the expected objectives and provide substantial effects. This disclosure complies with patent application requirements, and thus is filed for patent application.

[0017] While this disclosure is described in some detail hereinbelow with reference to certain illustrated embodiments, it is to be understood that there is no intent to limit it to those embodiments. On the contrary, the aim is to cover all modifications, alternatives and equivalents falling within the spirit and scope of this disclosure as defined by the appended claims.

WHAT IS CLAIMED IS:

1. A closed planting factory, comprising:
a closed space, divided into a pre-operation area, a planting area, and a walkway area, a pre-operation area, and used as a control room of an electrical equipment, a light source equipment, and a water supply system, and a disinfection area provided for disinfection before a person's entry, and the planting area being a space for cultivating a plant, and a light source being installed at a predetermined position in the planting area for manually controlling the brightness of the planting area;
a plurality of movable planting frames, each being a frame for cultivating a plant or placing a potted plant, and installed in the closed space, and having a wheel installed at the bottom of the frame to allow the frame to move to the open area;
a constant-temperature air conditioning equipment, installed in the pre-operation area, and the operation of the constant-temperature air conditioning equipment and the configuration of a duct accomplishing a constant-temperature airflow path of an airflow of the constant-temperature air conditioning equipment in a direction from the top of the pre-operation area to the top of a side of the planting area and then from the bottom towards the walkway area, and finally from a through hole at the bottom of the walkway area back to the pre-operation area, and a heat exchange operation of constant-temperature air conditioning equipment discharging the airflow outside the closed space to complete an air flow circulation and maintain the planting area and the walkway area in the closed space at an environment with a temperature difference, and the effect of the temperature difference stimulating a plant growth hormone to expedite the growth of the plant; and
an automatic water supply system, comprising a sump disposed at the bottom of the planting area, a water circulation pump installed on the sump, and with the pumping of the water circulation pump and the guide of a pipeline, water in the sump being pumped to the potted plants at the uppermost level to sprinkle the potted plant, so that each potted plant is moisturized with an appropriate amount of water timely based on the law of water flowing downward until the water content of the potted plants at the lowest level is saturated, and then the saturated water discharged into the sump below, and water is recycled and reused to achieve the effects of automatically supplying water and recycling and reusing the water resource.
2. The closed planting factory as claimed in claim 1, wherein the closed space is a closed three-dimensional space including a closed house, a basement, or a closed

container.