

WASHING AND MOISTURE ADDING DEVICE OF AN AIR-CONDITIONING BOX

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FIELD OF THE INVENTION

The present invention relates to a washing and moisture adding device of an air-conditioning box, and especially to a washing and moisture adding device having a higher efficiency in adding moisture and saving much water and power.

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BACKGROUND OF THE INVENTION

In the manufacturing process of chips, it is desirable that the temperature and the wetness must be controlled precisely, no dust occurs and no any chemical material will interfere with the reaction. To control the dust, it is required that the quality of the air must be controlled. In order to achieve the aforesaid requirement, air conditioner box is installed for processing drawing air. The air conditioner box is not only like a commercial air conditioner. In general, the air conditioner does not only filter air, but also the purity of the air can not be controlled. Besides, although air conditioner may be used to reduce moisture. However, air condition is used to remove surplus moisture and the control is loose so that it is only used in a general condition and thus is not suitable in the manufacturing process.

Therefore, a dustless chamber must have a dedicated air conditioner. The air in the whole manufacturing chamber must be controlled precisely.

Not only the impurity in the air must be removed the moisture in the air must be increased for preventing the electric static effect because the air is too dry. Meanwhile, a proper wetness is provided for manufacturing. The ways for adding moisture to air includes adding moisture by vapor or by
5 cooling. There are many necessary devices in these ways and thus costs are high. Furthermore, they have no function of washing air. While washing way in the prior art has the function of removing undesired particles in the air and adding moisture to the air. Two functions are combined for controlling the temperature and quality of air.

10 In the prior art structure, the sucked air is initially filtered and heated in advance. Referring to Fig. 1, a prior art process is illustrated. the air is at first passes through a filtering net 9 and a heating disk-like tube 3. Then, the air passes through a front end water stop screen 7 and then enters into a washing and heating area. A plurality of nozzles 10 jet water to be as a
15 water screen so as to be in contract with the sucked air. Then, a rear end water stop screen 71 serves to stop water drops of the wet air. After passing through a wet removing disk-like tube 4 and a reheat disk-like tube 8, the air further passes through a HEPA filtering net 2 and a drawing wind drawing machine 22. Finally, the air is exhausted to a dustless chamber.
20 With reference to Fig. 2, many banks of water tubes are installed in the washing area. Each bank of water tubes 73 are installed with several banks of sub-water tubes 74. Each sub-water tube 74 is connected with a plurality of nozzles 10 capable of jetting a large amount of water and thus a water screen is formed by the jetting water. While in this design, since
25 the front and read water stop screens suffer from a large wind resistance

and thus a large power is required. The form of the nozzle is illustrated in Figs. 3 and 4. The nozzle 10 has a seat 11. The channel 12 in the seat 11 has an L shape. Namely, from the inlet of the seat 11 to the bending portion is formed with tip taper portion 13. The outlet of the seat 11 is
5 locked to a cover 14. Between the cover 14 and the seat 11 is formed as a hemisphere, and the top thereof is formed with jetting holes 16 and a shade 15. A large rubber ring 17 is formed therebetween. The inlet of the seat 11 is connected to an upright water tube through a small rubber ring 18. This kind of nozzle needs a large amount of water so that the pump must have a
10 larger power. Therefore, the cost is high.

SUMMARY OF THE INVENTION

Accordingly, the primary object of the present invention is to provide a washing and moisture adding device of an air-conditioning box for
15 increasing the turbulent as air is mixed with water. The contact surface therebetween is increased. The jetting water is formed as many small drops. A W shape package plate for stopping water is used for as to provide more space for forming a turbulent flow and increasing the contact of the air and water. Therefore, the whole structure is simplified and the cost is down,
20 while the original washing and moisture adding functions are remained.

In order to achieve above object, in the air conditioner box, a water tube is installed for guiding water to transversal sub-water tubes, each sub-water tube is connected to an upright water tube. Each upright water tube is installed with a plurality of nozzles. Each nozzle may jet out very
25 small water drops to a package plate arranged as a W shape. In a V shape

space between the several banks of nozzles and the package plate, the small water drops are mixed with sucked air. The atomized water drops has a washing function to the air and then moisture are added to the air.

5 The various objects and advantages of the present invention will be more readily understood from the following detailed description when read in conjunction with the appended drawing.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a partial perspective view of the prior art.

10 Fig. 2 is a schematic view showing the spraying condition of the prior art.

Fig. 3 is an exploded perspective view of the nozzle of the prior art.

Fig. 4 is a cross sectional view of the nozzle of the prior art.

15 Fig. 5 is a perspective view of the overall application the present invention.

Fig. 6 is a partial exploded perspective view of the present invention.

Fig. 7 is a schematic view showing the spraying condition of the present invention.

Fig. 8 is a perspective view of the nozzles in the present invention.

20 Fig. 9 is a cross sectional view of the nozzles in the present invention.

Fig. 10 is an exploded perspective view of the nozzle in the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

25 In order that those skilled in the art can further understand the present

invention, a description will be described in the following in details. However, these descriptions and the appended drawings are only used to cause those skilled in the art to understand the objects, features, and characteristics of the present invention, but not to be used to confine the scope and spirit of the present invention defined in the appended claims.

Referring to Figs. 5 to 10, the washing and moisture adding device of an air-conditioning box of the present invention is illustrated. The front end of the air conditioner box 1 is installed with a device for drawing air to the air conditioner box 1. The air is at first drawn to a filtering net 9 for being processed. Then the air further passes through a heating disk-like tube 3 and a cooling disk-like tube 4 so as to flow into a washing and moisture adding section 5. Then very small atomized water drops are jetted from a plurality of nozzles 50 so as to be mixed with the drawn air. Then, the wet air is in contact with and captured by the bearing material in the package plate 6 arranged as a W bank. Then, the moisture is removed as the air passes through a moisture removing disk-like tube 44, and then the air further passes through the heating disk-like tube 8 and the HEPA filtering net 9 and finally is transferred to a dustless chamber. The air is drawn into the air conditioner box 1 through a wind drawing machine 21.

The primary structure of the present invention is installed in the washing and moisture adding section 5. The bottom of the washing and moisture adding section 5 is a water collector for collecting jetting liquid. In general, the liquid 60 uses pure water or filtered water and then is drawn into each nozzle 50 by a pump 61. A water tube 63 serves to guide water into at least one transverse manifold 64. Each manifold 64 are

connected to a plurality of upright tubes 64. Each upright tube 64 has a protruding tube 65 which is connected with a plurality of nozzles 50. Each nozzle 50 may jet very smaller water particles toward the bearing material 66 in the package 6. The bearing material 66 is a cellular structure and is
5 installed in the package 6.

Figs. 8 to 10 illustrates the structure of the nozzle 50. The nozzle 50 has a connecting seat 51. The connecting seat 51 has an outer thread 52 for being locked to each protruding tube 65 of each water tube 64. Another end surface of the connecting seat 51 is installed with a jetting hole 53. A
10 penetrating hole 54 is installed in the connecting seat 51. A plug 55 is installed in the penetrating hole 54. Another end of the plug 55 is engaged with a spring 56. Another end of the spring 56 is inserted into the inner surface of a channel 571 of a water guide cover 57. A lateral surface of the water guide cover 57 has a water inlet hole 572. A periphery of the water
15 guide cover 57 has a net seat 573 for fixing a filtering net 58 so that the water in the water tube 64 is filtered by the filtering net 58 and then enters into the channel 571 through the water inlet hole 572 and then into the penetrating hole 54. Then the water passes through the top of the ball surface of the plug 55 to the jetting hole 53 to jet liquid. Since the end
20 surface of the connecting seat 51 will stop the plug 55 so as to allow a little water to be jetted out. Each water tube is fixed by a fixing frame 67 which is connected to the upper side of the water collecting tank 7. Therefore, as illustrated in Fig. 7, in a V shape space between several banks of nozzles 50 and the package 6, water sprayed from each nozzle 50
25 so that small water drops with the drawing gas is mixed and flew in the V

shape space so as to generate a transfer function. That is, atomized water drops and particles is washed. Meanwhile, moisture is added to the air.

In the aforesaid structure, the nature mixing of turbulent flow is used in the present invention for replacing the prior art particle washing
5 through a water screen so as to provide a wide contact area and a longer contact time. Another, the suspending time of the particles is increased and the reaction time is increased. The combination for micro particles is increased so as to increment the moisture adding effect (the prior art has an effect of 80 ~ 90 %, while in the present invention, an effect of 90% is
10 achieved). The water consumption of the present invention is only one tenth to one fortieth of the prior art and the power necessary is only one fourth to one fifth of the prior art and therefore, the power consumption is less and the overall utility is increased. As a whole, the atomized water drops generates a preferred effect superior than the prior art in which large
15 amount of water is jetted out. Therefore, the present invention may save more power and provides a well utility.

Although the present invention has been described with reference to the preferred embodiments, it will be understood that the invention is not limited to the details described thereof. Various substitutions and
20 modifications have been suggested in the foregoing description, and others will occur to those of ordinary skill in the art. Therefore, all such substitutions and modifications are intended to be embraced within the scope of the invention as defined in the appended claims.

What is claimed is:

1. A washing and moisture adding device of an air-conditioning box being installed above a water collecting tank; being connected to the water
5 collecting tank through a pump, and being connected to a several sub-water tubes through a water tube; each sub-water tube being formed with a nozzle facing upwards; another side of the water collecting tank being installed with a package plate having a bearing material for stopping water jetting from the nozzles; characteristic in that: each
10 nozzle jets atomized water particles; and the transversal cross section of the package plate has a W shape so as to be formed a space between the package plate and the nozzles for forming a turbulent flow, thus, the small water particles serve to wash and add moisture air.

2. The washing and moisture adding device of an air-conditioning box as
15 claimed in claim 1, wherein each nozzle has a connecting seat; one end of the connecting seat is locked to each sub-water tube; another end surface of the connecting seat is installed with a jetting hole; the connecting seat is installed with a penetrating hole; a plug is installed in the penetrating hole; another end of the plug is connected with a
20 spring; another end of the spring is inserted into an inner surface of a channel of a water guide cover; a lateral side of the water guide cover has a water inlet; and a periphery of the water guide cover is fixed with a filtering net so that water is filtered by the filtering net and then enters into the channel and then flows into the penetrating hole.