

SPECIFICATION

SOLAR CELL CURING AND HYDROGEN PASSIVATION INTEGRATED MACHINE

Technical Field of the Invention

5 The present disclosure relates to the technical field of solar cell production, in particular to a solar cell curing and hydrogen passivation integrated machine.

Background of the Invention

10 After the solar cells are manufactured, they need to be dried and cured through a curing furnace, and then through a hydrogen passivation furnace for hydrogen passivation. In the prior art, the curing furnace for curing solar cells and the hydrogen passivation furnace for hydrogen passivation are independently installed, in this way, after the solar cells are cured in the curing furnace, the solar cells need to be transported by a transport mechanism to a hydrogen passivation furnace for hydrogen passivation treatment. The process steps are complicated, continuous
15 production cannot be realized, and the production efficiency is low; moreover, the solar cells are prone to damage during the transportation process, thereby affecting the quality of the solar cells.

Summary of the Invention

20 The purpose of the present disclosure is to provide an improved solar cell curing and hydrogen passivation integrated machine in view of the problems in the prior art.

 To achieve the above purpose, the technical solution employed by the present disclosure is:

 a solar cell curing and hydrogen passivation integrated machine, comprises a rack, a curing furnace used for carrying out curing treatment on solar cells, a hydrogen passivation furnace used for carrying out hydrogen passivation treatment on the solar cells, and a conveying device used
25 for conveying the solar cells, the curing furnace and the hydrogen passivation furnace are sequentially arranged on the rack, one end portion of the curing furnace outputting pieces is adjacent to one end portion of the hydrogen passivation furnace intaking pieces, the conveying device is continuously arranged on the rack, and the conveying device respectively passes through the curing furnace and the hydrogen passivation furnace.

Preferably, the hydrogen passivation furnace comprises an optical module, an electrical module, and a temperature control system for controlling the temperature in the furnace cavity of the hydrogen passivation furnace, the optical module, the electrical module and the temperature control system are all arranged on the rack, the optical module and the electrical module are connected by a line, and the temperature control system comprises a control box arranged on the rack and located at the bottom of the optical module, a heating unit arranged in the control box, and a cooling unit arranged on the control box.

Further, the optical module comprises a light source box arranged on the rack, a plurality of independently controllable light source devices arranged on the light source box, and a plurality of condensing lens devices covering outside the light-emitting surfaces of the light source devices, and each light source device provides at least one unit of light intensity.

Furthermore, the optical module further comprises a first cooling device for cooling light-emitting back sides of the light source devices and/or a second cooling device for cooling light-emitting front sides of the light source devices, the first cooling device is a water-cooling unit, and the second cooling device is a wind cooling unit.

Preferably, the curing furnace comprises a heating module for heating and curing solar cells, and a waste discharge device and a combustion tower arranged on the top of the heating module, the heating module is arranged on the rack, the top of the heating module is provided with waste discharge ports, the combustion tower and the waste discharge device are respectively connected to different waste discharge ports, the heating module has a heating chamber, the heating chamber comprises a plurality of unit heating chambers arranged side by side, the temperature of each of the unit heating chambers can be independently controlled, and the conveying device passes through each of the unit heating chambers.

Further, the heating module comprises an upper heating module and a lower heating module, the upper heating module and the lower heating module are both arranged on the rack in a manner of being able to be raised and lowered up and down.

Preferably, the conveying device comprises a plurality of conveying rollers rotatably arranged on the rack and a driving device arranged on the rack for driving the rotation of the

conveying rollers, and the plurality of the conveying rollers is arranged in parallel, and the driving device comprises a transmission shaft rotatably arranged on the rack, a driving wheel fixedly arranged on the transmission shaft, and a driven wheel fixedly arranged on one end portion of each of the conveying rollers, and a motor for driving the transmission shaft to rotate, the driving
5 device further comprises a transmission mechanism that is arranged between the driven wheel and the driving wheel and drives the driven wheel to rotate when the driving wheel rotates, and the transmission mechanism is a magnetic transmission mechanism, a belt transmission mechanism or a gear transmission mechanism.

Preferably, the conveying device comprises a plurality of conveying rollers rotatably
10 arranged on the rack, each of the conveying rollers is provided with a positioning structure for positioning solar cells at the same axial position, the positioning structure comprises a recess portion arranged on each conveying roller and two positioning portions at two ends of the recess portion, and the solar cells are located in the recess portion, and are limited by the positioning portions on their opposite sides.

Preferably, the integrated machine further comprises a third cooling device arranged on the
15 rack, the third cooling device is arranged on the rack close to the end portion of the hydrogen passivation furnace in the outputting direction, the third cooling device comprises a cooling box arranged on the rack and a cooling fan arranged on the cooling box, the cooling box has a cooling chamber, the conveying device passes through the cooling chamber, the cooling box is provided
20 with an air inlet and an air outlet, the air inlet and the air outlet are respectively located above and below the conveying device, the cooling fan is arranged at the air inlet, the cooling box is provided with a confluence area with a tapered structure, and the air outlet is arranged at a small end of the confluence area.

Preferably, the solar cells comprise crystalline silicon cells, amorphous silicon cells or
25 hetero-junction cells.

Due to the use of the above technical solutions, the present disclosure has the following advantages over the prior art: the solar cell curing and hydrogen passivation integrated machine is simple in structure; the solar cells can be directly conveyed to the hydrogen passivation furnace

through the conveying device to be subjected to hydrogen passivation treatment after being cured in the curing furnace, the technological process is continuous, the technological step of carrying the solar cells is omitted, and damage caused by carrying the solar cells can be avoided while the production efficiency is improved.

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Brief Description of the Drawings

Figure 1 is a schematic structure diagram of the solar cell curing and hydrogen passivation integrated machine of the present disclosure (the electrical module of the hydrogen passivation furnace is omitted);

10 Figure 2 is a schematic structure diagram of the curing furnace of the solar cell curing and hydrogen passivation integrated machine of the present disclosure;

Figure 3 is a partial enlarged view of Part A in Figure 2;

Figure 4 is a schematic structure diagram of the hydrogen passivation furnace and the third cooling device of the solar cell curing and hydrogen passivation integrated machine of the present disclosure (part of the rack is omitted);

15 Figure 5 is a partial enlarged view of Part A in Figure 4;

Figure 6 is a schematic structure diagram of the optical module of the solar cell curing and hydrogen passivation integrated machine of the present disclosure;

Figure 7 is a schematic structure diagram of the temperature control system of the solar cell curing and hydrogen passivation integrated machine of the present disclosure (one sidewall is omitted).

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Detailed Description of Exemplary Embodiments

In the following, the technical solution of the present disclosure is further described combining with the accompanying drawings.

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As shown in Figure 1, a solar cell curing and hydrogen passivation integrated machine of the present disclosure comprises a rack 1, a curing furnace 2 used for carrying out curing treatment on solar cells, a hydrogen passivation furnace 3 used for carrying out hydrogen

passivation treatment on the solar cells, and a conveying device 4 used for conveying the solar cells, the curing furnace 2 and the hydrogen passivation furnace 3 are sequentially arranged on the rack 1, one end portion of the curing furnace 2 outputting pieces is adjacent to one end portion of the hydrogen passivation furnace 3 intaking pieces, the conveying device 4 is continuously arranged on the rack 1, and the conveying device 4 respectively passes through the curing furnace 2 and the hydrogen passivation furnace 3.

As shown in Figure 2, the curing furnace 2 comprises a heating module 21, a waste discharge device 22 and a combustion tower 23, the heating module 21 is used to heat and cure solar cells, the waste discharge device 22 is used to extract waste gas generated in the heating module 21, the combustion tower 23 is used to burn the waste gas generated in the heating module 21, the heating module 21 is arranged on the rack 1, and the waste discharge device 22 and the combustion tower 23 are arranged on the top of the heating module 21.

The heating module 21 comprises an upper heating module 211 and a lower heating module 212 arranged on the rack 1, the conveying device 4 is arranged between the upper heating module 211 and the lower heating module 212, and the upper heating module 211 and the lower heating module 212 are fastened to form a heating chamber between the upper heating module 211 and the lower heating module 212. The heating chamber is partitioned into a plurality of unit heating chambers, the temperature of each of the unit heating chambers can be independently controlled, so that the temperature control accuracy of the heating module 21 can be improved, and the drying effect of the solar cells can be improved to improve the quality of the solar cells.

Each unit heating chamber is provided with a plurality of heating elements, and each heating element can be independently controlled, so as to realize independent control of the heating temperature in each unit heating chamber. In this embodiment, the heating element can be one or more of a heating tube, a heating rod, and a heating wire.

The heating module 21 further comprises hot air circulation devices respectively arranged in the respective unit heating chambers, the hot air circulation devices allow the hot air to flow in the respective unit heating chambers, thereby making the temperature distribution in the respective unit heating chambers more uniform.

The heating module 21 further comprises a heat preservation device arranged on the sidewall of the heating chamber, in this embodiment, the heat preservation device is provided on the sidewalls of the upper heating module 211 and the lower heating module 212, and the heat preservation device may adopt heat preservation cotton arranged on the sidewalls of the upper heating module 211 and the lower heating module 212. The heat preservation device can ensure the stability of the temperature in the heating chamber, thereby ensuring the drying effect of the solar cells.

The upper heating module 211 and the lower heating module 212 are both arranged on the rack 1 in a manner of being able to be raised and lowered up and down, and the curing furnace 2 further comprises a first driving device for driving the upper heating module 211 to rise up and lower down and a second driving device for driving the lower heating module 212 to rise up and lower down, the first driving device and the second driving device are both arranged on the rack 1, and the first driving device and the second driving device can both be independently controlled, and the upper heating module 211 is arranged on the first driving device, and the lower heating module 212 is arranged on the second driving device, so that the upper heating module 211 and the lower heating module 212 can be raised and lowered independently, which facilitates the operator to clean up the debris of the solar cells that have fallen into the lower heating module 212, and facilitates the maintenance operation of the integrated machine. Of course, the upper heating module 211 and the lower heating module 212 can also be fixedly arranged on the rack 1.

The top of the upper heating module 211 is provided with waste discharge ports, as shown in Figures 1 to 3, each waste discharge device 22 comprises a main pipe 221 and a plurality of branch pipe assemblies 222, and one end portion of each branch pipe assembly 222 is respectively connected to one waste discharge port, and the other end of each branch pipe assembly 222 is connected to the main pipe 221. The waste discharge device 22 further comprises an exhaust device 223 which is connected to the main pipe 221. The exhaust device 223 is used to extract the high-temperature waste gas in the heating chamber into each branch pipe assembly 222, and then collect it in the main pipe 221, and finally discharge it outside the waste discharge device 22 for treatment, such waste discharge method can make the waste discharge more thorough. In this

embodiment, the exhaust device 223 adopts a centrifugal fan.

The main pipe 221 and/or each branch pipe assembly 222 is further provided with a regulating valve 224, the opening and closing of the regulating valve 224 and the degree of opening of the regulating valve 224 may control the discharge volume of the waste discharge device 22, so that the temperature inside the heating module 21 is kept balanced.

The bottom of the combustion tower 23 is provided with a gas inlet, the gas inlet is connected to the waste discharge port of the top of the heating module 21, the combustion tower 23 is located at an end portion of the heating module 21 in the intaking direction of the curing furnace 2, that is to say, the waste gas generated in the initial heating stage in the heating module 21 first enters the combustion tower 23 for combustion, this is because the waste gas generated in the initial heating stage of the heating module 21 contains more particulate waste gas, and the waste gas is fully burned in the combustion tower 23 and then discharged to the outside, which can reduce environmental pollution, while in the subsequent heating of the heating module 21, the content of pollutants in the generated waste gas is less, and the waste gas can be directly discharged to the outside through the waste discharge device 22.

As shown in Figure 4, the hydrogen passivation furnace 3 comprises an optical module 31 and an electrical module 32, the optical module 31 and the electrical module 32 are both arranged on the rack 1, the optical module 31 and the electrical module 32 are connected by a line, and the electrical module 32 is used to provide electrical energy to the optical module 31.

The optical module 31 comprises a light source box 311 arranged on the rack 1, a light source backplane arranged in the light source box 311, and a plurality of independently controllable light source devices arranged on the light source backplane, each light source device provides at least 1 unit of light intensity, and the light-emitting front side of the light source faces towards the conveying device 4. In this embodiment, the light source box 311 is of a U-shape structure with an opening downward, the plurality of light source devices is arranged in a matrix form, and is LED light sources.

The optical module 31 further comprises a plurality of condensing lens devices covering outside the light-emitting surfaces of the light source devices, preferably, the light-emitting

surface of each light source device is covered with one condensing lens device. The condensing lens devices can adjust the angle of the light emitted by the light source devices, thereby increasing the light intensity, thereby improving the hydrogen passivation effect of the solar cells.

As shown in Figure 6, the optical module 31 further comprises a first cooling device for cooling light-emitting back sides of the light source devices. In this embodiment, the first cooling device adopts a water cooling device, specifically, this water cooling device comprises a cooling water tank, a water inlet pipe 312a, and a water outlet pipe 312b, the cooling water tank is located in the light source box 311 and arranged on the light source backplane, meanwhile, the cooling water tank is arranged on the light-emitting back sides of the light source devices, the cooling water tank is provided with a water inlet and a water outlet, one end portion of the water inlet pipe 312a is connected to the water inlet, and the other end portion extends to the outside of the light source box 311, and one end portion of the water outlet pipe 312b is connected with the water outlet, and the other end extends to the outside of the light source box 311. The cooling water tank is further provided with a water flow channel for the cooling water to flow. The light source backplane is cooled by providing a water-cooling device to prolong its service life.

As shown in Figure 6, the optical module 31 further comprises a second cooling device for cooling light-emitting front sides of the light source devices. In this embodiment, the second cooling device adopts an air cooling device, specifically, the air cooling device comprises an air knife arranged within the light source box 311, an air inlet channel 313a and an air outlet channel 313b, the air inlet channel 313a and the air outlet channel 313b are respectively located at opposite ends of the light source box 31 in the length direction, the air outlet channel 313b is provided with an exhaust blower, two ends of the air inlet channel 313a are respectively connected with an air compressor and the air knife, and the wind from the air knife cools the solar cells. By providing the air-cooling device, the air on the light-emitting front sides of the light source devices can be circulated, so that the temperature of the light-emitting surfaces of the light source devices can be reduced, and the service life of the light source device can be prolonged.

The hydrogen passivation furnace 3 further comprises a temperature control system 33 arranged on the rack 1, the temperature control system 33 is used to adjust the temperature in the

furnace cavity of the hydrogen passivation furnace 3, in this embodiment, the temperature control system 33 is provided at the bottom of the light source box 311 and below the conveying device 4. The temperature control system 33 comprises a control box 331 arranged on the rack 1, a heating unit 332 arranged in the control box 331, and a cooling unit 333 arranged on the control box 331, and an end portion of the control box 331 faces the conveying device 4 is open. When the temperature in the furnace cavity of the hydrogen passivation furnace 3 is lower than the set temperature during the hydrogen passivation process, the heating unit 332 is activated to increase the temperature in the furnace cavity of the hydrogen passivation furnace 3; when the temperature in the furnace cavity of the hydrogen passivation furnace 3 is higher than the set temperature, the cooling unit 333 is activated to reduce the temperature in the furnace cavity of the hydrogen passivation furnace 3. In this embodiment, the heating unit 332 may be a heating wire or a heating tube, and the cooling unit 333 may be a cooling fan.

As shown in Figure 7, the temperature control system 33 further comprises a mesh plate 334 arranged in the control box 331, the bottom of the control box 331 is provided with an air inlet, the cooling unit 333 is arranged at the air inlet, and the mesh plate 334 is located between the heating unit 332 and the bottom of the control box 331, the mesh plate 334 is provided with a plurality of meshes penetrating the upper and lower end faces of the mesh plate 334, and by providing the mesh plate 334, the temperature distribution in the control box 331 can be more uniform.

As shown in Figures 1 to 5, the conveying device 4 comprises a plurality of conveying rollers 41 arranged in parallel at intervals, each of the conveying rollers 41 can be arranged to rotate in the same direction around its own axis, the solar cells are placed on the conveying rollers 41, and when the plurality of conveying rollers 41 is rotated in the same direction, the solar cells are conveyed forward.

The conveying device 4 further comprises a driving device for driving the rotation of the respective conveying rollers 41, as shown in Figure 3, the driving device comprises a transmission shaft 42 rotatably arranged on the rack 1, driving wheels 43 fixedly arranged on the transmission shaft 42, and driven wheels 44 fixedly arranged on one end portion of each of the

conveying rollers 41, and a motor for driving the transmission shaft 42 to rotate, and the driving device further comprises a transmission mechanism that is arranged between the driven wheel 44 and the driving wheel 43 and drives the driven wheel 44 to rotate when the driving wheel 43 rotates, and the transmission mechanism may employ a magnetic transmission mechanism, a belt transmission mechanism or a gear transmission mechanism. The shaft axis of the driving wheel 43 is perpendicular or parallel to the shaft axis of the driven wheel 44.

As shown in Figure 1, Figure 2, Figure 4 and Figure 5, each conveying roller 41 is provided with a positioning structure for positioning the solar cell at the same axial position, and by the provision of the positioning structure, the linear transmission of solar cells during the transmission process can be ensured, position deviation is avoided, and the transmission accuracy of solar cells is improved.

The positioning structure comprises a recess portion 411 arranged on each conveying roller 41 and two positioning portions 412 at two ends of the recess portion 411, the solar cells are located in the recess portion 411, and the opposite sides thereof are limited by the positioning portions 412 on the two sides of the recess portion 411.

The solar cell curing and hydrogen passivation integrated machine further comprises a third cooling device 5 arranged on the rack 1, and the third cooling device 5 is located on the rack 1 close to the end portion of the hydrogen passivation furnace 3 in the outputting direction. Specifically, as shown in Figure 1 and Figure 4, the third cooling device 5 comprises a cooling box 51 arranged on the rack 1 and a cooling fan 52 arranged on the cooling box 51, the cooling box 51 has a cooling chamber, the conveying device 4 passes through the cooling chamber, the cooling box 51 is provided with an air inlet and an air outlet 511, the air inlet and the air outlet 511 are respectively located above and below the conveying device 4, the cooling fan 52 is arranged at the air inlet, the cooling box 51 is provided with a confluence area 512 with a tapered structure, and the air outlet 511 is arranged at a small end of the confluence area 512. When the third cooling device 5 is activated, the cooling fan 52 is rotated, sucking the cold air outside the third cooling device 5 into the cooling chamber from the air inlet, and blowing it to the solar cells, thereby cooling the solar cells; the air flow after cooling the solar cells is collected at the

confluence area 512, and then is discharged to the outside of the third cooling device 5 through the air outlet 511.

During the solar cell manufacturing process, the solar cells are first transferred to the heating module 21 of the curing furnace 2 through the conveying device 4 for heating and curing, the waste gas generated by the heating module 21 in the heating and curing process is discharged from the combustion tower 23 and the waste discharge device 22 to the outside of the curing furnace 2; after the curing process is completed, the solar cells are directly transferred by the conveying device 4 to the hydrogen passivation furnace 3 for hydrogen passivation treatment, and during the hydrogen passivation process, the temperature during the hydrogen passivation treating process is controlled by controlling the heating unit 332 and the cooling unit 333 in the temperature control system 33, and the light intensity during the hydrogen passivation treating process is controlled by controlling the light source devices to meet the temperature and light requirements during the hydrogen passivation process, so as to improve the hydrogen passivation effect of solar cells, thereby improving the power generation efficiency of solar cells; after the hydrogen passivation treatment is completed, the solar cells are transferred by the conveying device 4 to the third cooling device 5 for cooling, so as to reduce the temperature of the solar cells.

The solar cell curing and hydrogen passivation integrated machine is simple in structure, the solar cells can be directly conveyed to the hydrogen passivation furnace through the conveying device to be subjected to hydrogen passivation treatment after being cured in the curing furnace, the technological process is continuous, the technological step of carrying the solar cells is omitted, which can improve the production efficiency, thereby increasing production capacity; and it can also avoid damage to the solar cells during the carrying process, which affects the quality of the solar cells.

The embodiments described above are only for illustrating the technical concepts and features of the present disclosure, and are intended to make those skilled in the art being able to understand the present disclosure and thereby implement it, and should not be concluded to limit the protective scope of this disclosure. Any equivalent variations or modifications according to

the spirit of the present disclosure should be covered by the protective scope of the present disclosure.

CLAIMS

1. A solar cell curing and hydrogen passivation integrated machine, is characterized in that, it comprises a rack, a curing furnace used for carrying out curing treatment on solar cells, a
5 hydrogen passivation furnace used for carrying out hydrogen passivation treatment on the solar cells, and a conveying device used for conveying the solar cells, the curing furnace and the hydrogen passivation furnace are sequentially arranged on the rack, one end portion of the curing furnace outputting pieces is adjacent to one end portion of the hydrogen passivation furnace
10 intaking pieces, the conveying device is continuously arranged on the rack, and the conveying device respectively passes through the curing furnace and the hydrogen passivation furnace.

2. The solar cell curing and hydrogen passivation integrated machine according to claim 1, is characterized in that, the hydrogen passivation furnace comprises an optical module, an electrical module, and a temperature control system for controlling the temperature in the furnace cavity of
15 the hydrogen passivation furnace; the optical module, the electrical module and the temperature control system are all arranged on the rack, the optical module and the electrical module are connected by a line, and the temperature control system comprises a control box arranged on the rack and located at the bottom of the optical module, a heating unit arranged in the control box,
20 and a cooling unit arranged on the control box.

3. The solar cell curing and hydrogen passivation integrated machine according to claim 2, is characterized in that, the optical module comprises a light source box arranged on the rack, a plurality of independently controllable light source devices arranged on the light source box, and
25 a plurality of condensing lens devices covering outside the light emitting surfaces of the light source devices, and each light source device provides at least one unit of light intensity.

4. The solar cell curing and hydrogen passivation integrated machine according to claim 3, is characterized in that, the optical module further comprises a first cooling device for cooling light-emitting back sides of the light source devices and/or a second cooling device for cooling

light-emitting front sides of the light source devices, the first cooling device is a water-cooling unit, and the second cooling device is a wind cooling unit.

5 5. The solar cell curing and hydrogen passivation integrated machine according to claim 1, is characterized in that, the curing furnace comprises a heating module for heating and curing solar cells, and a waste discharge device and a combustion tower arranged on the top of the heating module; the heating module is arranged on the rack, the top of the heating module is provided with waste discharge ports, the combustion tower and the waste discharge device are respectively connected to different waste discharge ports, the heating module has a heating chamber, the
10 heating chamber comprises a plurality of unit heating chambers arranged side by side, the temperature of each of the unit heating chambers can be independently controlled, and the conveying device passes through each of the unit heating chambers.

15 6. The solar cell curing and hydrogen passivation integrated machine according to claim 5, is characterized in that, the heating module comprises an upper heating module and a lower heating module, the upper heating module and the lower heating module are both arranged on the rack in a manner of being able to be raised and lowered up and down.

20 7. The solar cell curing and hydrogen passivation integrated machine according to claim 1, is characterized in that, the conveying device comprises a plurality of conveying rollers rotatably arranged on the rack and a driving device arranged on the rack for driving the rotation of the conveying roller, and the plurality of the conveying rollers is arranged in parallel, and the driving device comprises a transmission shaft rotatably arranged on the rack, a driving wheel fixedly arranged on the transmission shaft, and a driven wheel fixedly arranged on one end portion of
25 each of the conveying rollers, and a motor for driving the transmission shaft to rotate, the driving device further comprises a transmission mechanism that is arranged between the driven wheel and the driving wheel and drives the driven wheel to rotate when the driving wheel rotates, and the transmission mechanism is a magnetic transmission mechanism, a belt transmission mechanism

or a gear transmission mechanism.

8. The solar cell curing and hydrogen passivation integrated machine according to claim 1 or 7, is characterized in that, the conveying device comprises a plurality of conveying rollers rotatably arranged on the rack, each of the conveying rollers is provided with a positioning structure for positioning solar cells at the same axial position, the positioning structure comprises a recess portion arranged on each conveying roller and two positioning portions at two ends of the recess portion, and the solar cells are located in the recess portion, and are limited by the positioning portions on their opposite sides.

9. The solar cell curing and hydrogen passivation integrated machine according to claim 1, is characterized in that, the integrated machine further comprises a third cooling device arranged on the rack, the third cooling device is arranged on the rack close to the end portion of the hydrogen passivation furnace in the outputting direction, the third cooling device comprises a cooling box arranged on the rack and a cooling fan arranged on the cooling box, the cooling box has a cooling chamber, the conveying device passes through the cooling chamber, the cooling box is provided with an air inlet and an air outlet, the air inlet and the air outlet are respectively located above and below the conveying device, the cooling fan is arranged at the air inlet, the cooling box is provided with a confluence area with a tapered structure, and the air outlet is arranged at a small end of the confluence area.

10. The solar cell curing and hydrogen passivation integrated machine according to claim 1, is characterized in that, the solar cells comprise crystalline silicon cells, amorphous silicon cells or hetero-junction cells.