CLAIMS

1. A slicer, characterized in that the slicer comprises: a slicer body formed with a cutting chamber; a liquid path part; and an electric control part; wherein the liquid path part and the electric control part are configured on the outside of the cutting chamber, and the liquid path part and the electric control part are configured such that the slicer creates an avoidance space, so that workpieces can be fed and/or discharged through the avoidance space.

2. The slicer according to claim 1, wherein the electric control part comprises a first electric control cabinet and a second electric control cabinet, which are arranged concentratedly or separately, and the liquid path part comprises a liquid supply cylinder and a liquid path system; the liquid path system comprises a first liquid path unit and a second liquid path unit, which are arranged concentratedly or separately; preferably, the first liquid path unit and the second liquid path unit are separately arranged on both sides of the cutting chamber, and the first electric control cabinet and the second electric control cabinet are respectively arranged above the first liquid path unit and the second liquid path unit, so that the avoidance space is formed between the first electric control cabinet and the second electric control cabinet; preferably, a reserved space is formed below the first liquid path unit, and the liquid supply cylinder is arranged in the reserved space; preferably, the first liquid path unit and the second liquid path unit are concentratedly arranged to form a first assembly, and the first electric control cabinet and the second electric control cabinet are concentratedly arranged to form a second assembly; the first assembly and the second assembly are separately arranged on both sides of the cutting chamber so that the avoidance space is formed between them; preferably, the liquid supply cylinder is arranged between the second assembly and the second assembly; preferably, the first liquid path unit and the second liquid path unit are concentratedly arranged to form a first assembly, and the first electric control cabinet and the second electric control cabinet are concentratedly arranged to form a second assembly; the first assembly and the second assembly are arranged on one side of the cutting chamber along a feeding and discharging direction of workpiece by being longitudinally stacked, so that the avoidance space that is open is formed between the cutting chamber and said one side; preferably, the liquid supply cylinder is arranged on

the side of a structure formed by the longitudinal stacking of the first assembly and the second assembly, and is projected toward the cutting chamber along the feeding and discharging direction of workpiece; the cutting chamber and the liquid supply cylinder at least partially overlap with each other; preferably, the first liquid path unit and the second liquid path unit are concentratedly arranged to form a first assembly, and the first electric control cabinet and the second electric control cabinet are concentratedly arranged to form a second assembly; the first assembly is arranged on one side of the cutting chamber along the feeding and discharging direction of workpiece, and the second assembly and/or the liquid supply cylinder are configured in a movable manner to the cutting chamber, so that the avoidance space that is open is formed above the first assembly.

3. A slicing cellular production line, characterized in that the production line comprises: at least one production line body; at least one slicer according to claim 1 or 2, which is configured on the production line body; and a transfer mechanism, which is capable of carrying workpieces and at least capable of delivering/removing the workpieces to/from the slicer through the avoidance space, wherein the transfer mechanism comprises one or more of ceiling rail robot, ground rail robot, truss robotic arm, AGV, RGV, and opening and closing assembly; preferably, the transfer mechanism comprises at least one ceiling rail robot, which is at least capable of carrying the workpieces and delivering and/or removing them to/from the slicer through the avoidance space.

4. The slicing cellular production line according to claim 3, wherein the production line body is provided with a feeding assembly and a discharging assembly, and the transfer mechanism can move between a feeding area corresponding to the feeding assembly and a discharging area corresponding to the discharging assembly; and/or the transfer mechanism can move within the feeding area and/or the discharging area.

5. The slicing cellular production line according to claim 4, wherein the transfer mechanism can move close to/ away from the slicer at a certain position between the feeding area and the discharging area; and/or the transfer mechanism can move close to/ away from the slicer in a vertical direction.

6. The slicing cellular production line according to claim 3, wherein the production line body is provided with a transition tooling, which can be arranged on the transfer mechanism, and the workpieces can be carried onto the transition tooling; the transition tooling comprises: a first movable part, which can move in a direction close to/away from the cutting chamber of the slicer, and which is provided with at least one docking structure that can fix the first movable part to the workpieces; a carrying part, which can carry the workpieces, so that when the workpieces are carried on the carrying part, the carrying part and the workpieces move along with the movement of the first movable part; preferably, the carrying part comprises a second movable part, which comprises a first part and a second part, between which a relative movement can be generated in a direction of moving close to/ away from each other to tightly hold the workpieces; and a tooling base, on which the first movable part is arranged.

7. The slicing cellular production line according to claim 6, wherein the workpiece is carried on a crystal holder, and the docking structure can be matched with the crystal holder to achieve a fixed connection between the workpiece and the first movable part; the crystal holder comprises an operating end, and the docking structure can be fixedly connected to the crystal holder by extending into the operating end; preferably, the first movable part is a strip-shaped structure, which is provided with multiple docking structures along its length direction; the strip-shaped structure has a first end and a second end; the strip-shaped structure is provided with the docking structure at the first end or at a position near the first end, and the strip-shaped structure is provided with the docking structure at the second end or at a position near the second end.

8. The slicing cellular production line according to claim 7, wherein the transition tooling comprises: a first driving component, which is capable of driving the first movable part to move in a direction close to/away from the cutting chamber; preferably, the first driving component drives the first movable part to move close to/away from the cutting chamber through the first screw and nut mechanism; and a second driving component, which is capable of driving the first part and/or the second part to move; preferably, the screw of the second screw and nut mechanism has two threaded segments with opposite screwing directions, and the second driving component can drive the first part and the second part to move close to/away from each other through the second screw and nut mechanism.

9. The slicing cellular production line according to claim 1, wherein the transfer mechanism comprises: a feeding transfer mechanism, which is capable of at least transferring the workpieces in the feeding area close to/away from the slicer; and/or a discharging transfer mechanism, which is capable of at least transferring the workpieces in the discharging area close to/away from the slicer; preferably, the production line body is provided with a transfer platform, and the ceiling rail robot can deliver/remove the workpieces to/from the transfer platform; and/or the feeding transfer mechanism and/or the discharging transfer mechanism can deliver/remove the workpieces to/from the transfer platform; preferably, the transfer platform can be arranged in the feeding area and/or the discharging area; preferably, the transfer platform is arranged in a movable manner on the production line body; preferably, the feeding transfer mechanism and/or the discharging transfer mechanism comprise an opening and closing assembly, which can clamp and transfer the workpieces; preferably, the feeding transfer mechanism and/or the discharging transfer mechanism comprise a frame, and the opening and closing assembly can move along the frame; in a case where there are multiple production line bodies, the opening and closing assembly can switch between different production line bodies through its movement along the frame.

10. A control method for the slicing cellular production line according to any one of claims 3 to 9, characterized in that the slicing cellular production line comprises a production line body, which comprises a transfer mechanism and multiple slicers, and

the control method comprises: obtaining the current slicing task; selecting at least one slicer from the multiple slicers to perform the current slicing task, based on the current slicing task; and at least operating the transfer mechanism to deliver/remove the workpieces to/from a position that matches the at least one slicer; wherein the transfer mechanism comprises one or more of ceiling rail robot, ground rail robot, truss robotic arm, AGV, RGV, and opening and closing assembly;

preferably, the production line body is provided with a feeding assembly and a discharging assembly, and comprises a transfer mechanism, a transition tooling, and multiple slicers;

the transfer mechanism comprises a ceiling rail robot, a first transfer platform configured in a feeding area corresponding to the feeding assembly, and a second transfer platform configured in a discharging area corresponding to the discharging assembly; the ceiling rail robot is capable of moving between the feeding area corresponding to the feeding assembly and the discharging area corresponding to the discharging assembly, as well as within the feeding area and/or the discharging area; correspondingly, the control method comprises: obtaining the current slicing task; selecting at least one slicer from the multiple slicers to perform the current slicing task, based on the current slicing task; making the ceiling rail robot drive the first transfer platform and/or the second transfer platform to operate, so as to deliver/remove the workpieces placed on the first transfer platform and/or the second transfer platform to/from a position that matches the at least one slicer; and coordinating the operation of the transition tooling and the ceiling rail robot to deliver/remove the workpieces to/from a cutting area of the slicer; or

the transfer mechanism comprises a ceiling rail robot, a truss robotic arm, and two transfer platforms respectively configured in a feeding area corresponding to the feeding assembly and a discharging area corresponding to the discharging assembly; one of the feeding area and the discharging area is provided with the truss robotic arm that can move within the corresponding feeding area or discharging area; the ceiling rail robot can move between the feeding area corresponding to the feeding assembly and the discharging area corresponding to the discharging assembly, and can move within the feeding area or discharging area which is not provided with the truss robotic arm; correspondingly, the control method comprises: obtaining the current slicing task;

selecting at least one slicer from the multiple slicers to perform the current slicing task, based on the current slicing task; making the ceiling rail robot drive the transfer platform in the feeding area or the discharging area which is not provided with the truss robotic arm to operate and/or coordinating the operation of the truss robotic arm and the transfer platform in the feeding area or the discharging area which is provided with the truss robotic arm, so as to deliver/remove the workpieces placed on the corresponding transfer platform to/from a position that matches the at least one slicer; and coordinating the operation of the transition tooling and the ceiling rail robot to deliver/remove the workpieces to/from the cutting area of the slicer; or

the transfer mechanism comprises a ceiling rail robot, two transfer platforms and two truss robotic arms respectively configured in a feeding area corresponding to the feeding assembly and a discharging area corresponding to the discharging assembly; the ceiling rail robot can move between the feeding area corresponding to the feeding assembly and the discharging area corresponding to the discharging assembly, and the truss robotic arms can move within the corresponding feeding area or discharging area; correspondingly, the control method comprises: obtaining the current slicing task; selecting at least one slicer from the multiple slicers to perform the current slicing task, based on the current slicing task; operating the ceiling rail robot and/or operating the transfer platform corresponding to the feeding area or the discharging area and/or coordinating the operation of the truss robotic arm and the corresponding transfer platform in the feeding area or the discharging area, so as to deliver/remove the workpieces placed on the corresponding transfer platform to/from a position that matches the at least one slicer; and coordinating the operation of the transition tooling and the ceiling rail robot to deliver/remove the workpieces to/from the cutting area of the slicer; or

the transfer mechanism comprises a ceiling rail robot, two transfer platforms respectively configured in a feeding area corresponding to the feeding assembly and a discharging area corresponding to the discharging assembly, and truss robotic arms configured in the feeding area and/or the discharging area; the ceiling rail robot can move between the feeding area corresponding to the feeding assembly and the discharging area corresponding to the discharging assembly, and can move within the feeding area or the discharging area which is not provided with the truss robotic arm; at

least one of the truss robotic arms configured in the feeding area and/or the discharging area can move between at least two of the multiple production line bodies; correspondingly, the control method comprises: obtaining the current slicing task; selecting at least one slicer from the multiple slicers to perform the current slicing task, based on the current slicing task; making the ceiling rail robot drive the transfer platform in the feeding area or the discharging area which is not provided with the truss robotic arm to operate; and/or coordinating the operation of the truss robotic arm and the transfer platform in the feeding area and/or the discharging area which is provided with the truss robotic arm; and/or moving the truss robotic arm between at least two of the multiple production line bodies, so as to deliver/remove the workpieces placed on the corresponding transfer platform to/from a position that matches the at least one slicer; and coordinating the operation of the transition tooling and the ceiling rail robot to deliver/remove the workpieces to/from the cutting area of the slicer.

11. The control method according to claim 10, wherein the “selecting at least one slicer from the multiple slicers to perform the current slicing task based on the current slicing task” comprises: selecting multiple created slicing tasks as the current slicing tasks; judging whether the multiple created slicing tasks can be performed simultaneously; and if yes, determining multiple slicers from the multiple slicers to perform the current slicing tasks.

12. The control method according to claim 11, wherein the “judging whether the multiple created slicing tasks can be performed simultaneously” comprises: if not, re-selecting the current slicing task or taking at least one of the selected multiple created slicing tasks as the current slicing task; and determining a slicer from the multiple slicers to perform the current slicing task.

13. The control method according to claim 12, wherein the “determining a slicer from the multiple slicers to perform the current slicing task” comprises: during the slicing operation of the slicer, judging whether the remaining cutting time is smaller than

a material pre-requesting time; and if yes, allowing the slicer to be determined as the slicer to perform the current slicing task.

14. The control method according to claim 11, wherein the “determining a slicer from the multiple slicers to perform the current slicing task” comprises: during the slicing operation of the slicer, judging whether the slicer has issued a retracting signal; and if yes, allowing the slicer to be determined as the slicer to perform the current slicing task.

15. The control method according to claim 10, wherein the transition tooling comprises a first movable part, and at least one docking structure is provided on the first movable part; and the “coordinating the operation of the transition tooling and the ceiling rail robot to deliver/remove the workpieces to/from the cutting area of the slicer” comprises: fixing the docking structure to the workpieces, and moving the first movable part in a direction close to/away from the cutting chamber of the slicer, so as to deliver/remove the workpieces to/from the cutting area of the slicer;

or, wherein the slicer is capable of creating an avoidance space, and workpieces located at a position that matches the at least one slicer can be fed and/or discharged for the cutting area of the slicer through the avoidance space.