CLAIMS:

1. An electroplating apparatus, comprising: multiple parallel paddles, the paddles being arranged parallel to a substrate and moving to stir electroplating solution, wherein the electroplating apparatus further comprises a controller and a driving mechanism, the driving mechanism being connected to the controller and the paddles respectively, and the controller controls the driving mechanism to make the paddles move periodically so that each corresponding point on the substrate accumulated time blocked by the paddles is equal within one cycle;

   taking the arrangement direction of the paddles as a coordinate axis direction, the movement steps of the paddles within one cycle comprising the following movement steps performed in succession:

   moving right from the coordinate origin to coordinate Δ without overshooting;

   moving left to coordinate c without overshooting;

   moving right to coordinate $\Delta+c$ without overshooting;

   moving left to coordinate $2c$ without overshooting;

   …

   moving right to coordinate Δ+(N-1) *c without overshooting;

   moving left to coordinate N*c without overshooting;

   moving right to coordinate Δ+N*c without overshooting;

   moving left back to the coordinate origin without overshooting;

   wherein $\Delta \geqslant a+b$, a is the width of the paddle, b is the narrowest width of the gap between adjacent paddles, $c = \begin{cases} a, & a < b \\ b, & a \geq b \end{cases}$, b=N*a or a=N*b, and N is an integer.

2. The electroplating apparatus according to claim **1**, wherein a diffusion plate is provided between the paddles and the substrate, and the diffusion plate has multiple through-holes.

3. The electroplating apparatus according to claim **1**, wherein the electroplating apparatus is provided with a guide rail, and the paddles are formed by opening strip-shaped through-holes

on a paddle plate, one side of which is connected to a driving mechanism and the other side is slidably connected to the guide rail via an eccentric bearing.

4. The electroplating apparatus according to claim **3**, wherein the driving mechanism, eccentric bearing, and guide rail are surrounded by a nitrogen protection box, and the nitrogen protection box is provided with a nitrogen inlet and a nitrogen outlet.

5. An electroplating apparatus, comprising: multiple parallel paddles, the paddles being arranged parallel to a substrate and moving to stir electroplating solution, wherein the electroplating apparatus further comprises a controller and a driving mechanism, the driving mechanism being connected to the controller and the paddles respectively, and the controller controls the driving mechanism to make the paddles move periodically so that each corresponding point on the substrate accumulated time blocked by the paddles is equal within one cycle;

taking the arrangement direction of the paddles as a coordinate axis direction, the movement steps of the paddles within one cycle comprising the following movement steps performed in succession:

moving right from an origin to coordinate Δ without overshooting;

moving left to coordinate c without overshooting;

moving right to coordinate $\Delta+c$ without overshooting;

moving left to coordinate $2c$ without overshooting;

…

moving right to coordinate $\Delta+(N-1)*c$ without overshooting;

moving left to coordinate $N*c$ without overshooting;

moving right to coordinate $\Delta+N*c$ without overshooting;

moving left to coordinate $N*c$ without overshooting;

moving right to coordinate $\Delta+(N-1)*c$ without overshooting;

…

moving left to coordinate $2c$ without overshooting;

moving right to coordinate $\Delta+c$ without overshooting;

moving left to coordinate c without overshooting;

moving right to coordinate Δ without overshooting;

moving left back to the origin without overshooting;

moving right to coordinate Δ+N*c without overshooting;

moving left back to the origin without overshooting;

wherein, $\Delta \geqslant a+b$, a is the width of the paddle, b is the narrowest width of the gap between adjacent paddles, $c = \begin{cases} a, & a < b \\ b, & a \geq b \end{cases}$, b=N*a or a=N*b, N is an integer.

6. The electroplating apparatus according to claim **5**, wherein a diffusion plate is provided between the paddles and the substrate, and the diffusion plate has multiple through-holes.

7. The electroplating apparatus according to claim **5**, wherein the electroplating apparatus is provided with a guide rail, and the paddles are formed by opening strip-shaped through-holes on a paddle plate, one side of which is connected to a driving mechanism and the other side is slidably connected to the guide rail via an eccentric bearing.

8. The electroplating apparatus according to claim **7**, wherein the driving mechanism, eccentric bearing, and guide rail are surrounded by a nitrogen protection box, and the nitrogen protection box is provided with a nitrogen inlet and a nitrogen outlet.

9. An electroplating apparatus, comprising: multiple parallel paddles, the paddles being arranged parallel to a substrate and moving to stir electroplating solution, wherein the electroplating apparatus further comprises a controller and a driving mechanism, the driving mechanism being connected to the controller and the paddles respectively, and the controller controls the driving mechanism to make the paddles move periodically so that each corresponding point on the substrate accumulated time blocked by the paddles is equal within one cycle;

taking the arrangement direction of the paddles as a coordinate axis direction, the movement steps of the paddles within one cycle comprising the following movement steps performed in succession:

moving right from an origin to coordinate Δ without overshooting;

moving left to coordinate c without overshooting;

moving right to coordinate $\Delta+c$ without overshooting;

moving left to coordinate $2c$ without overshooting;

...

moving right to coordinate $\Delta+(y-2)*c$ without overshooting;

moving left to coordinate $(y-1)*c$ without overshooting;

moving right to coordinate $\Delta+(y-1)*c$ without overshooting;

moving left back to the origin;

wherein, $\Delta \geqslant a+b$, a is the width of the paddle, b is the narrowest width of the gap between adjacent paddles, $c=\begin{cases} a, & a<b \\ b, & a \geq b \end{cases}$, $y=x*(N+1)$, $b=N*a$ or $a=N*b$, N is a non-integer greater than 1, and x is a value that makes $x*N$ be an integer.

10. An electroplating apparatus, comprising: multiple parallel paddles, the paddles being arranged parallel to a substrate and moving to stir electroplating solution, wherein the electroplating apparatus further comprises a controller and a driving mechanism, the driving mechanism being connected to the controller and the paddles respectively, and the controller controls the driving mechanism to make the paddles move periodically so that each corresponding point on the substrate accumulated time blocked by the paddles is equal within one cycle;

taking the arrangement direction of the paddles as a coordinate axis direction, the movement steps of the paddles within one cycle comprising the following movement steps performed in succession:

moving right from an origin to coordinate Δ without overshooting;

moving left to coordinate c without overshooting;

moving right to coordinate $\Delta+c$ without overshooting;

moving left to coordinate $2c$ without overshooting;

…

moving right to coordinate Δ+(y-2) *c without overshooting;

moving left to coordinate (y-1) *c without overshooting;

moving right to coordinate Δ+(y-1) *c without overshooting;

moving left to coordinate (y-1) *c without overshooting;

moving right to coordinate Δ+(y-2) *c without overshooting;

…

moving left to coordinate 2c without overshooting;

moving right to coordinate Δ+c without overshooting;

moving left to coordinate c without overshooting;

moving right to coordinate Δ without overshooting;

moving left back to the origin without overshooting;

moving right to coordinate Δ+(y-1) *c without overshooting;

moving left back to the origin without overshooting;

wherein, $\Delta \geqslant a+b$, a is the width of the paddle, b is the narrowest width of the gap between adjacent paddles, $c = \begin{cases} a, & a < b \\ b, & a \geq b \end{cases}$, y=x*(N+1), b=N*a or a=N*b, N is a non-integer greater than 1, and x is a value that makes x*N be an integer.

11. An electroplating method, comprising: setting multiple parallel paddles, the paddles being arranged parallel to a substrate and moving to stir electroplating solution, and controlling the paddles movement so that each corresponding point on the substrate accumulated time blocked by the paddles is equal within one cycle;

taking the arrangement direction of the paddles as a coordinate axis direction, the movement steps of the paddles within one cycle comprising the following movement steps performed in succession:

moving right from a coordinate origin to coordinate Δ without overshooting;

moving left to coordinate c without overshooting;

moving right to coordinate $\Delta+c$ without overshooting;

moving left to coordinate $2c$ without overshooting;

…

moving right to coordinate Δ+(N-1) *c without overshooting;

moving left to coordinate N*c *without overshooting*;

moving right to coordinate Δ+N*c without overshooting;

moving left back to the coordinate origin without overshooting;

wherein $\Delta \geqslant a+b$, a is the width of the paddle, b is the narrowest width of the gap between adjacent paddles, $c = \begin{cases} a, & a < b \\ b, & a \geq b \end{cases}$, b=N*a or a=N*b, and N is an integer.

12. An electroplating method, comprising: setting multiple parallel paddles, the paddles being arranged parallel to a substrate and moving to stir electroplating solution, and controlling the paddles movement so that each corresponding point on the substrate accumulated time blocked by the paddles is equal within one cycle;

taking the arrangement direction of the paddles as a coordinate axis direction, the movement steps of the paddles within one cycle comprising the following movement steps performed in succession:

moving right from an origin to coordinate Δ without overshooting;

moving left to coordinate c without overshooting;

moving right to coordinate $\Delta+c$ without overshooting;

moving left to coordinate $2c$ without overshooting;

…

moving right to coordinate Δ+(N-1) *c without overshooting;

moving left to coordinate N*c without overshooting;

moving right to coordinate Δ+N*c without overshooting;

moving left to coordinate N*c without overshooting;

moving right to coordinate Δ+(N-1) *c without overshooting;

…

moving left to coordinate 2c without overshooting;

moving right to coordinate Δ+c without overshooting;

moving left to coordinate c without overshooting;

moving right to coordinate Δ without overshooting;

moving left back to the origin without overshooting;

moving right to coordinate Δ+N*c without overshooting;

moving left back to the origin without overshooting;

wherein, $\Delta \geqslant a+b$, a is the width of the paddle, b is the narrowest width of the gap between adjacent paddles, $c = \begin{cases} a, & a < b \\ b, & a \geq b \end{cases}$, b=N*a or a=N*b, N is an integer.

13. An electroplating method, comprising: setting multiple parallel paddles, the paddles being arranged parallel to a substrate and moving to stir electroplating solution, and controlling the paddles movement so that each corresponding point on the substrate accumulated time blocked by the paddles is equal within one cycle;

taking the arrangement direction of the paddles as a coordinate axis direction, the movement steps of the paddles within one cycle comprising the following movement steps performed in succession:

moving right from an origin to coordinate Δ without overshooting;

moving left to coordinate c without overshooting;

moving right to coordinate Δ+c without overshooting;

moving left to coordinate 2c without overshooting;

...

moving right to coordinate Δ+(y-2) *c without overshooting;

moving left to coordinate (y-1) *c without overshooting;

moving right to coordinate Δ+(y-1) *c without overshooting;

moving left back to the origin without overshooting;

wherein, $\Delta \geqslant a+b$, a is the width of the paddle, b is the narrowest width of the gap between adjacent paddles, $c = \begin{cases} a, & a < b \\ b, & a \geq b \end{cases}$, y=x*(N+1), b=N*a or a=N*b, N is a non-integer greater than 1, and x is a value that makes x*N be an integer.

14. An electroplating method, comprising: setting multiple parallel paddles, the paddles being arranged parallel to a substrate and moving to stir electroplating solution, and controlling the paddles movement so that each corresponding point on the substrate accumulated time blocked by the paddles is equal within one cycle;

taking the arrangement direction of the paddles as a coordinate axis direction, the movement steps of the paddles within one cycle comprising the following movement steps performed in succession:

moving right from the origin to coordinate Δ without overshooting;

moving left to coordinate c without overshooting;

moving right to coordinate Δ+c without overshooting;

moving left to coordinate 2c without overshooting;

...

moving right to coordinate Δ+(y-2) *c without overshooting;

moving left to coordinate (y-1) *c without overshooting;

moving right to coordinate Δ+(y-1) *c without overshooting;

moving left to coordinate (y-1) *c without overshooting;

moving right to coordinate Δ+(y-2) *c without overshooting;

…

moving left to coordinate 2c without overshooting;

moving right to coordinate Δ+c without overshooting;

moving left to coordinate c without overshooting;

moving right to coordinate Δ without overshooting;

moving left back to the origin without overshooting;

moving right to coordinate Δ+(y-1) *c without overshooting;

moving left back to the origin without overshooting;

wherein, $\Delta \geqslant a+b$, a is the width of the paddle, b is the narrowest width of the gap between adjacent paddles, $c = \begin{cases} a, & a < b \\ b, & a \geq b \end{cases}$, y=x*(N+1), b=N*a or a=N*b, N is a non-integer greater than 1, and x is a value that makes x*N be an integer.