Description

Title: Device for spraying an etching solution onto a substrate

Technical field

The invention relates to a device for spraying an etching solution onto a substrate.

Prior art

In methods for manufacturing semiconductor substrates, it is known practice to polish the edge of a substrate in order to remove excess material or to eliminate surface defects.

This polishing, which is of the chemical-mechanical type, is generally known as “Edge Polishing”. This method consists in chemically modifying the surface of the substrate by means of an etching solution while mechanically etching said surface by means of an abrasive tool arranged next to the periphery of the substrate, which is fixed in place on a substrate holder.

The etching solution is sprayed in the region to be etched, between the surface of the periphery of the substrate and the abrasive tool, by means of one or more nozzles.

Each nozzle is held in a fixed position with respect to the substrate by means of a nozzle holder.

In order to allow maintenance of the installation, in particular cleaning or replacement of the nozzles, each nozzle is removable from the nozzle holder.

However, at present no means exists for precisely adjusting the orientation of the nozzle with respect to the holder.

This problem is all the more bothersome since the free volume around each nozzle and the holder thereof is very limited and does not allow an operator to easily handle the nozzle.

Indeed, faulty adjustment of a nozzle, resulting in the etching solution being sprayed onto a different location on the substrate than the edge to be polished, causes a significant reject rate among the polished substrates.

Brief description of the invention

An aim of the invention is to design a device that may make it possible to precisely orient the nozzle with respect to the substrate to be polished in spite of a limited free volume restricting access to the nozzle.

An aspect of the invention provides a device for spraying an etching solution onto a peripheral surface of a substrate, comprising:

- at least one nozzle designed to spray said etching solution,
- a nozzle holder that is deformable between an adjusting position, in which the nozzle is able to pivot about an axis of the nozzle holder, and a fixing position, in which the nozzle is fixed with respect to the nozzle holder,

the nozzle holder comprising a variable-width slot extending radially with respect to the axis and an annulus extending about the axis, said annulus being interrupted by the slot and being deformable by moving edges of the slot towards one another, said slot having, in the adjusting position, a first width designed to allow the nozzle to pivot about the axis and, in the fixing position, a second width less than the first width, designed to fix the holder around the nozzle by clamping,

- a shaft having a bearing surface in the form of a cylinder of revolution rigidly secured to the nozzle, the bearing surface being pivotable in a cylindrical opening in the nozzle holder in the adjusting position.

The second width may be zero.

In certain embodiments, the device also comprises a screw cooperating with the nozzle holder in order to vary the width of the slot.

In a particularly advantageous manner, the screw extends perpendicularly to the slot.

The device may also advantageously comprise a cover designed to prevent liquid passing between the bearing surface of the shaft and a surface defining the cylindrical opening in the nozzle holder.

In certain embodiments, the device also comprises a mechanism for altering the orientation of the nozzle with respect to the holder.

Said mechanism may advantageously comprise a peg secured to the nozzle parallel to the axis and a metric screw, screwed into the holder, that cooperates with said peg such that advancement or retraction of said metric screw with respect to the holder causes said peg to pivot with respect to the axis.

Brief description of the drawings

Further features and advantages of the invention will become apparent from the following detailed description, with reference to the appended drawings, in which:

[Fig 1] is an overall view of a device according to one embodiment of the invention with a nozzle for spraying the etching solution;

[Fig 2] is an overall view of a nozzle and its holder;

[Fig 3] is an exploded view of the assembly in Figure 2;

[Fig 4] is an exploded perspective view of the main components of the assembly in Figure 2.

Reference signs that are identical from one figure to another denote elements that are identical or have a similar function.

Detailed description of embodiments

Figure 1 is a perspective view of a device according to one embodiment of the invention.

Claims

1. A device for spraying an etching solution onto a peripheral surface of a substrate, comprising:
   - at least one nozzle designed to spray said etching solution,
   - a nozzle holder that is deformable between an adjusting position, in which the nozzle is able to pivot about an axis of the nozzle holder, and a fixing position, in which the nozzle is fixed with respect to the nozzle holder,
   said nozzle holder comprising a variable-width slot extending radially with respect to the axis and an annulus extending about the axis, said annulus being interrupted by the slot and being deformable by moving edges of the slot towards one another, said slot having, in the adjusting position, a first width designed to allow the nozzle to pivot about the axis and, in the fixing position, a second width less than the first width, designed to fix the nozzle holder around the nozzle by clamping, and
   - a shaft having a bearing surface in the form of a cylinder of revolution rigidly secured to the nozzle, the bearing surface being pivotable in a cylindrical opening in the nozzle holder in the adjusting position.

2. The device according to Claim 1, wherein the second width is zero.

3. The device according to Claim 1 or 2, further comprising a screw cooperating with the nozzle holder in order to vary the width of the slot.

4. The device according to Claim 3, wherein the screw perpendicularly to the slot.

5. The device according to one of Claims 1 to 4, further comprising a cover designed to prevent liquid passing between the bearing surface of the shaft and a surface defining the cylindrical opening in the nozzle holder.

6. The device according to one of Claims 1 to 5, further comprising a mechanism for altering the orientation of the nozzle with respect to the nozzle holder.

7. The device according to Claim 6, wherein said mechanism comprises a peg secured to the nozzle parallel to the axis and a metric screw, screwed into the holder, that cooperates with said peg such that advancement or retraction of said metric screw with respect to the nozzle holder causes said peg to pivot with respect to the axis.