Claims

1. A method for slicing off a multiplicity of wafers from workpieces (12) by means of a wire saw during a sequence of slicing operations subdivided into initial cuts and first and second subsequent cuts, where the wire saw comprises a wire web (11) of moving wire sections (2) of a sawing wire (1) and a setting device, and the wire web (11) is stretched in a plane between two wire guide rollers (3, 4), with each of the two wire guide (3, 4) rollers being mounted between a fixed bearing (38) and a movable bearing (39), said method comprising

during each one of the slicing operations, by means of the setting device, the feeding of the respective workpiece (12) through the wire web (11) along a feed direction (17) perpendicular to a workpiece axis (14) and perpendicular to the plane of the wire web (11) in the presence of a working fluid and of hard substances which act abrasively on the workpiece (12), which comprises

during each one of the slicing operations, the oscillating axial moving of the movable bearings (39) of the two wire guide rollers (3, 4); and

the feeding of the workpiece (12) through the wire web (11) with simultaneous displacement of the workpiece (12) along the workpiece axis (14) by means of a setting element in accordance with the mandate of a correction profile which comprises an oscillating component which is opposite to the effect which the axial moving of the movable bearings (39) has on the shape of the sliced-off wafers.

2. The method as claimed in claim 1, wherein the correction profile, in the case of each of the initial cuts, includes a first shape profile-based component, which is proportional to the difference of a first average shape profile and of the shape profile of a reference wafer, and the first average shape profile is determined from wafers which have been sliced off in the course of one or more initial cuts of a preceding sequence of slicing operations.

3. The method as claimed in claim 2, wherein the correction profile, in the case of each one of the first subsequent cuts, includes a second shape profile-based component, which is proportional to the difference of a second average shape profile and of the shaped profile of the reference wafer, and the second average shape

profile is determined from wafers which have been sliced off in the course of one or more of the initial cuts in the sequence.

4. The method as claimed in claim 3, wherein the correction profile, in the case of each one of the second subsequent cuts, includes a third shape profile-based component, which is proportional to the difference of a third average shape profile and of the shape profile of the reference wafer, and the third average shape profile is determined from wafers which originate from at least 1 to 5 slicing operations in the sequence that have immediately preceded the respective second subsequent cut.

5. The method as claimed in any of claims 1 to 4, wherein the setting element operates piezoelectrically, hydraulically, pneumatically, electromechanically, or thermally.

6. The method as claimed in any of claims 1 to 5, wherein the oscillating axial moving of the movable bearings (39) is brought about by means of further setting elements which engage on the fixed bearings (38) and operate piezoelectrically, hydraulically, pneumatically, or electromechanically.

7. The method as claimed in any of claims 1 to 5, wherein the oscillating axial moving of the movable bearings (39) is brought about by temperature-controlling the fixed bearings (38) with a cooling fluid, the cooling fluid being subjected to a multiplicity of pairs of switches comprising cooling and heating relative to a mean temperature.

8. The method as claimed in claim 7, wherein, in the switches, a temperature change in the cooling fluid is brought about that has an amplitude relative to the mean temperature of not less than 0.5°C and not more than 10°C.

9. The method as claimed in claim 8, wherein the product of the amplitude of the temperature change and the reciprocal of the time spacings of the switches is not less than 0.025°C/min and not more than 4°C/min.

10. The method as claimed in claim 9, wherein the product is not less than 0.1°C/min and not more than 1°C/min.

11. The method as claimed in any of claims 7 to 10, wherein during the passage of the workpiece (12) through the wire web (11), at least 10 pairs of switches comprising cooling and heating of the cooling fluid are performed.

12. The method as claimed in claim 4, comprising the determining of the first, second, and third average shape profiles on the basis of a wafer-based selection of wafers.

13. The method as claimed in claim 4, comprising the determining of the second and third average shape profiles on the basis of a cut-based selection of wafers.

14. The method as claimed in claim 4, comprising the determining of the second and third average shape profiles on the basis of a wafer-based and a cut-based selection of wafers.

15. The method as claimed in claim 4, comprising the determining of the first, second, and third average shape profiles on the basis of an averaging the shape profile of the wafers.

16. The method as claimed in any of claims 1 to 15, which comprises, when configuring the correction profile, taking account of a wire saw-specific proportionality constant and of a deflection of the wire sections (2).

17. The method as claimed in any of claims 1 to 16, wherein the sawing wire (1) is a hypereutectic pearlitic steel wire and has a diameter of 70 to 175 µm.

18. The method as claimed in any of claims 1 to 17, wherein the sawing wire (1) has a structure which comprises a multiplicity of protuberances and indentations perpendicular to the longitudinal wire axis.

19. The method as claimed in any of claims 1 to 17, comprising the supplying of a cooling lubricant as working fluid to the wire sections (2) during each one of the slicing operations, with the hard substances consisting of diamond and being fixed on

the surface of the sawing wire (1) by electroplating, by synthetic resin bonding or by form-fitting bonding, and the cooling lubricant being free of substances which act abrasively on the workpiece (12).

20. The method as claimed in any of claims 1 to 18, comprising the supplying of the working fluid in the form of a slurry of the hard substances in glycol or oil to the wire sections (2) during each one of the slicing operations, with the hard substances consisting of silicon carbide.

21. The method as claimed in any of claims 1 to 20, comprising the moving of the sawing wire (1) in a continued sequence of pairs of directional reversals, with each pair of directional reversals comprising a first moving of the sawing wire (1) in a first longitudinal wire direction by a first length, and a second, subsequent moving of the sawing wire (1) in a second longitudinal wire direction by a second length, with the second longitudinal wire direction being opposite to the first longitudinal wire direction, and the first length being greater than the second length.

22. The method as claimed in claim 21, wherein the sawing wire (1) during movement in the first longitudinal wire direction by the first length is supplied to the wire web (11) with a first tensile force from a first wire stock, and during movement in the second longitudinal wire direction by the second length is supplied to the wire web (11) with a further tensile force from a second wire stock, with the further tensile force being lower than the first tensile force.

23. The method as claimed in any of claims 1 to 22, wherein the workpiece (12) consists of a semiconductor material.