CLAIMS

[Claim 1] A polishing apparatus, comprising:

a surface-property measuring device configured to measure surface properties of a polishing pad;

a support arm for supporting the surface-property measuring device; and

a moving unit coupled to the support arm and configured to automatically move the surface-property measuring device from a retreat position to a measure position and

a position adjusting mechanism for automatically adjusting an attitude of the surface-property measuring device such that a lower surface of the surface-property measuring device moved to the measure position becomes to be parallel to a surface of the polishing pad,

wherein the position adjusting mechanism has a support base disposed below the support arm, and at least one adjustment pin which is fixed to an upper surface of the surface-property measuring device, and extends through a through-hole formed in the support base.

[Claim 2] The polishing apparatus according to claim 1, wherein the moving unit includes:

a fixed block which is fixed to the polishing apparatus;

a pivot block which is coupled to the support arm;

a rotational shaft for pivotably coupling the pivot block to fixed block; and

a pivot mechanism for pivoting the pivot block.

[Claim 3] The polishing apparatus according to claim 2, wherein the pivot mechanism is a piston-cylinder mechanism constructed of a piston coupled to the pivot block, and a cylinder in which the piston is housed so as to be movable back and forth.

[Claim 4] The polishing apparatus according to claim 2, wherein the rotational shaft

is fixed to the pivot block, and

the pivot mechanism is a motor coupled to the rotational shaft.

[Claim 5] The polishing apparatus according to claim 1, wherein the adjustment pin has a pin body having a diameter smaller than a diameter of the through-hole, and a pin head located above the through hole and having a size larger than the diameter of the through-hole.

[Claim 6] The polishing apparatus according to any one of claims 1 through 5, wherein the surface-property measuring device includes a nozzle configured to eject a pressurized gas obliquely with respect to a polishing surface of the polishing pad.

[Claim 7] The polishing apparatus according to claim 6, wherein the surface-property measuring device has a casing in which a measuring structure for measuring the surface properties of the polishing pad is housed,

the casing has a cutout formed in a bottom thereof, and

the nozzle is configured to eject the pressurized gas so as to flow the pressurized gas toward an opening of the cutout.

[Claim 8] The polishing apparatus according to any one of claims 1 through 7, further comprising a displacement mechanism for adjusting a position of the surface-property measuring device with respect to the polishing pad along the support arm,

wherein the displacement mechanism includes:

a slotted hole extending along the support arm;

a support shaft inserted into the slotted hole, and

the support shaft has a shaft body coupled to the surface-property measuring device, and a shaft head which is in contact with a stepped portion formed inside the slotted hole to thereby support the surface-property measuring device coupled to the shaft body.

[Claim 9] The polishing apparatus according to claim 8, wherein the displacement mechanism further includes a piston coupled to the surface-property measuring device, and a cylinder in which the piston is housed so as to be movable back and forth, and

the cylinder of the displacement mechanism is fixed to the support arm.

[Claim 10] The polishing apparatus according to any one of claims 2 through 4, wherein the pivot block is constructed of a first plate coupled to the support arm and a second plate coupled to the fixed block, and

the second plate is pivotably coupled to the first plate via a rotational pin.

[Claim 11] A polishing apparatus, comprising:

a surface-property measuring device configured to measure surface properties of a polishing pad;

a support arm for supporting the surface-property measuring device; and

a moving unit coupled to the support arm and configured to automatically move the surface-property measuring device from a retreat position to a measure position,

wherein the surface-property measuring device includes a nozzle configured to eject a pressurized gas obliquely with respect to a polishing surface of the polishing pad, wherein the surface-property measuring device has a casing in which a measuring structure for measuring the surface properties of the polishing pad is housed, and

positioning plates fixed to the casing, and

wherein the positioning plates keep a distance from the polishing pad to the measuring structure in the vertical direction, and an angle of the surface-property measuring device with respect to the polishing pad constant, when the positioning plates are brought into contact to the polishing pad.

[Claim 12] The polishing apparatus according to claim 6, wherein the surface-property measuring device has a casing in which a measuring structure for measuring the

surface properties of the polishing pad is housed, and

two filters disposed in the casing and having a translucency, respectively, and

wherein the measuring structure includes at least light source and a light receiver,

a light emitted from the light source is applied through one of the two filters onto the polishing pad, and

a light reflected by the polishing pad is received through the other of the two filters to the light receiver.

[Claim 13] The polishing apparatus according to claim 1, further comprising a dresser configured to dress a surface of the polishing pad,

wherein the surface-property measuring device is mounted to the dresser,

the support arm is a dresser arm for rotatably supporting a dresser shaft coupled to the dresser, and

the moving unit mechanism includes an elevating actuator for moving the dresser shaft up and down with respect to the dresser arm, and a rotational actuator for pivoting a support shaft coupled to the dresser arm.

[Claim 14] The polishing apparatus according to claim 12 or 13, wherein a dressing member provided at the dresser has a ring shape having a through-hole extending from an upper surface to a lower surface thereof, and

the surface-property measuring device measures the surface properties of the polishing pad through the through-hole of the dressing member.

[Claim 15] The polishing apparatus according to claim 13, wherein the surface-property measuring device comprises of a plurality of surface-property measuring devices mounted to the dresser.

[Claim 16] The polishing apparatus according to claim 15, wherein some of the plurality of surface-property measuring devices are surface-property measuring devices configured to apply a laser beam to the polishing pad and to receive reflected light that is reflected by the surface of the polishing pad, thereby measuring the surface properties of the pad.

[Claim 17] The polishing apparatus according to claim 15 or 16, wherein some of the plurality of surface-property measuring devices are surface-property measuring devices configured to measure the surface properties of the pad from image information of a surface of the polishing pad acquired by an imaging device.

[Claim 18] The polishing apparatus according to any one of claims 15 through 17, wherein a dressing member provided at the dresser has a ring shape having a through-hole extending from an upper surface to a lower surface thereof, and

one of the plurality of surface-property measuring devices measures the surface properties of the polishing pad through the through-hole of the dressing member.

[Claim 19] A polishing system, comprising:

a polishing apparatus according to any one of claims 1 through 18; and

a processing system in which data of the surface properties of the polishing pad obtained by use of a surface-property measuring device of the polishing apparatus is inputted,

wherein the processing system includes:

an input section in which the data of the surface properties of the polishing pad outputted from the polishing apparatus is inputted;

a processing section which determines dressing conditions based on the data of the surface properties of the polishing pad inputted to the input section; and

an output section which outputs the dressing condition, determined by the processing section, to the polishing apparatus, and

the polishing apparatus is configured to dress the polishing pad based on the dressing conditions outputted from the output section.

[Claim 20] The polishing system according to claim 19, wherein the processing system further includes a storage section which stores in advance teacher data for determining the dressing conditions, and

the processing section of the processing system determines the dressing conditions of the polishing apparatus based on the teacher data.

[Claim 21] The polishing system according to claim 19 or 20, wherein the polishing apparatus transmits data of the surface properties of the polishing pad, which is obtained after dressing of the polishing pad, to the input section of the processing system, and

the processing section of the processing system determines necessity of dressing, necessity of additional dressing, and replacement of a dresser, based on the data of the surface properties of the polishing pad which is obtained after dressing.

[Claim 22] The polishing system according to any one of claims 19 through 21, wherein the polishing apparatus transmits data of the surface properties of the polishing pad, which is obtained during dressing of the polishing pad, to the input section of the processing system, and

the processing section modifies, based on the data of the surface properties of the polishing pad during dressing, the dressing conditions in the middle of dressing process of the polishing pad.

[Claim 23] The polishing system according to any one of claims 19 through 22, wherein the processing system is connected the polishing apparatus through network.