CLAIMS

WHAT IS CLAIMED IS:

1. A wire electric discharge machine comprising an upper wire guide and a lower wire guide that stretch a wire electrode therebetween and a rotator that changes a feed direction of the wire electrode, the wire electric discharge machine being configured for machining a workpiece placed between the upper wire guide and the lower wire guide by generating a discharge between the workpiece and the wire electrode,

wherein a rotation axis of the rotator is disposed so as to be perpendicular to a straight line connecting the upper wire guide and the lower wire guide, and the rotator is disposed at a position deviated from the straight line connecting the upper wire guide and the lower wire guide in a rotation axis direction of the rotator, whereby the wire electrode is rotated around an axis.

2. The wire electric discharge machine according to claim 1, wherein the rotator comprises:

a winding part around which the wire electrode is wound; and

large diameter parts disposed at two ends of the winding part,

wherein a cross section of the outer circumference of the winding part is formed in an arc shape.

3. The wire electric discharge machine according to claim 1 or claim 2, wherein the wire electrode is disposed on an outer peripheral surface of the rotator to be inclined within a range of 0.1 to 1.0° (degrees) with respect to a direction orthogonal to the rotation axis direction of the rotator.

4. The wire electric discharge machine according to claim 1 or claim 2, further

comprising a control device and a rotator unit that incorporates the rotator,

wherein the rotator unit switches, according to a command from the control device, the rotator at three positions comprising a left position and a right position with respect to the straight line connecting the upper wire guide and the lower wire guide, and a center position on the straight line, thereby changing rotation/non-rotation and a rotation direction of the wire electrode.

5. The wire electric discharge machine according to claim 4, wherein the control device determines a position of the rotator based on information of a machining program of the wire electric discharge machine.

6. A wire electric discharge machine comprising an upper wire guide and a lower wire guide that stretch a wire electrode therebetween and a rotator that changes a feed direction of the wire electrode, the wire electric discharge machine being configured for machining a workpiece placed between the upper wire guide and the lower wire guide by generating a discharge between the workpiece and the wire electrode,

wherein the rotator is disposed so that a perpendicular line of a rotation axis of the rotator is inclined with respect to a straight line connecting the upper wire guide and the lower wire guide, and the wire electrode is disposed on an outer peripheral surface of the rotator, whereby the wire electrode is rotated around an axis.

7. The wire electric discharge machine according to claim 6, wherein the rotator comprises:

a winding part around which the wire electrode is wound; and

large diameter parts disposed at two ends of the winding part,

wherein the winding part is formed in a circular columnar shape.

8. The wire electric discharge machine according to claim 6 or claim 7, wherein the perpendicular line of the rotation axis of the rotator is disposed to be inclined within a range of 0.1 to 1.0° (degrees) with respect to the straight line connecting the upper wire guide and the lower wire guide.

9. A wire electric discharge machine comprising an upper wire guide and a lower wire guide that stretch a wire electrode therebetween and a pair of rotators that are disposed to clamp the wire electrode, the wire electric discharge machine being configured for machining a workpiece placed between the upper wire guide and the lower wire guide by generating a discharge between the workpiece and the wire electrode,

wherein the pair of rotators are disposed so that perpendicular lines of rotation axes of the rotators are each inclined with respect to a straight line connecting the upper wire guide and the lower wire guide, whereby the wire electrode is rotated around an axis.

10. The wire electric discharge machine according to claim 9, wherein in the pair of rotators, the perpendicular lines of the rotation axes of the rotators are each inclined within a range of 0.1 to 1.0° (degrees) with respect to the straight line connecting the upper wire guide and the lower wire guide.

11. A wire electric discharge machining method for machining the workpiece by generating a discharge between the workpiece and the wire electrode rotating around an axis in the wire electric discharge machine according to any one of claim 1 to claim 10,

wherein as viewed from an upstream side in a feed direction of the wire electrode, when a machining surface of the workpiece is on a right side in a machining

advancing direction, a rotation direction of the wire electrode around the axis is set to be counterclockwise, and

as viewed from the upstream side in the feed direction of the wire electrode, when a machining surface of the workpiece is on a left side in the machining advancing direction, the rotation direction of the wire electrode around the axis is set to be clockwise.