variations in feeding speed of the wire and rotational speed of the bobbin.

MEANS FOR SOLVING THE PROBLEMS

[0016] The summary of the present invention is described as below.

[0016A] According to a first aspect, a wire winding device for winding a wire on a cylindrical bobbin having a flange on each end is provided. The wire winding device includes: a rotating means for rotating the bobbin; a traverser for moving one of an entry position of the wire into the bobbin and the bobbin in parallel to a rotation axis of the bobbin; a plurality of distance sensors for each measuring a winding radius of the wire; a memory for storing values of the winding radius measured by each of the plurality of distance sensors; and a controlling means for calculating one of a reversing position where the traverser for traversing the wire reverses and a reversing position where the traverser for traversing the bobbin reverses based on the values of the winding radius stored in the memory, wherein each of the distance sensors is arranged between the entry position of the wire into the bobbin and the flange, and each of the plurality of distance sensors detects the flange before the flange reaches the entry position of the wire when the flange approaches the entry position of the wire.

[0016B] According to a second aspect, a wire winding device for winding a wire on a cylindrical bobbin having a flange on each end is provided. The wire winding device includes: a rotating means for rotating the bobbin; a traverser for moving one of an entry position of the wire into the bobbin and the bobbin in parallel to a rotation axis of the bobbin; a plurality of distance sensors for each measuring a winding radius of the wire; a memory for storing values of the winding radius measured by each of the plurality of distance sensors; and a controlling means for calculating one of a reversing position where the traverser for traversing the wire reverses and a reversing position where the traverser for traversing the bobbin reverses based on the values of the winding radius stored in the memory, wherein each of the distance sensors is arranged between the entry position of the wire into the bobbin and the flange, and the reversing position of the traverser is set based on the values of the winding radius at the time when each of the plurality of distance sensors detects the flange.

[0016C] In an example, there is provided a wire winding device for winding a wire on a cylindrical bobbin having a flange on each end according to the present invention which includes: a rotating means for rotating the bobbin; a traverser for moving an entry position of the wire into the bobbin or the bobbin in parallel to a rotation axis of the bobbin; a plurality of distance sensors for each measuring

a winding radius of the wire; a memory for storing values of the winding radius measured by each of the plurality of distance sensors; and a controlling means for calculating a reversing position where the traverser for traversing the bobbin reverses or a reversing position where the traverser for traversing the wire reverses based on the values of the winding radius stored in the memory. Each distance sensor is arranged between the entry position of the wire into the bobbin and the flange. The phrase “an entry position of the wire into the bobbin” is a position where the wire comes in contact with the bobbin or the wire that has already been wound on the bobbin when the wire is wound on the bobbin.

[0017] In an example of the wire winding device, each of the plurality of distance sensors detects the flange before the flange reaches the entry position of the wire when the flange approaches the entry position of the wire.

[0018] In an example of the wire winding device, the reversing position of the traverser is set based on the values of the winding radius at the time when each of the plurality of distance sensors detects the flange.

[0019] In an example of the wire winding device, the reversing position of the traverser is set based on the values of the winding radius at least three locations stored in the memory in the order of winding.

[0020] In an example of the wire winding device, the reversing position of the traverser is modified for each

reversal of the traverser of the bobbin or the traverser of the wire.

[0021] In an example of the wire winding device, abrasive grains are fixed to a surface of the wire.

ADVANTAGES OF THE INVENTION

[0022] According to the present invention, it is possible to automatically keep a state in a flat manner in which each layer of the wire is wound regardless of variations in

CLAIMS

1. A wire winding device for winding a wire on a cylindrical bobbin having a flange on each end, comprising:

a rotating means for rotating the bobbin;

a traverser for moving one of an entry position of the wire into the bobbin and the bobbin in parallel to a rotation axis of the bobbin;

a plurality of distance sensors for each measuring a winding radius of the wire;

a memory for storing values of the winding radius measured by each of the plurality of distance sensors; and

a controlling means for calculating one of a reversing position where the traverser for traversing the wire reverses and a reversing position where the traverser for traversing the bobbin reverses based on the values of the winding radius stored in the memory,

wherein each of the distance sensors is arranged between the entry position of the wire into the bobbin and the flange, and

each of the plurality of distance sensors detects the flange before the flange reaches the entry position of the wire when the flange approaches the entry position of the wire.

2. The wire winding device according to claim 1, wherein the reversing position of the traverser is set based on the values of the winding radius at the time when each of the plurality of distance sensors detects the flange.

3. The wire winding device according to claim 1 or claim 2, wherein the reversing position of the traverser is set based on the values of the winding

radius at least three locations stored in the memory in the order of winding.

4. The wire winding device according to any one of claims 1 to 3, wherein the reversing position of the traverser is modified for each reversal of one of the traverser of the bobbin and the traverser of the wire.

5. The wire winding device according to any one of claims 1 to 4, wherein abrasive grains are fixed to a surface of the wire.

6. A wire winding device for winding a wire on a cylindrical bobbin having a flange on each end, comprising:

a rotating means for rotating the bobbin;

a traverser for moving one of an entry position of the wire into the bobbin and the bobbin in parallel to a rotation axis of the bobbin;

a plurality of distance sensors for each measuring a winding radius of the wire;

a memory for storing values of the winding radius measured by each of the plurality of distance sensors; and

a controlling means for calculating one of a reversing position where the traverser for traversing the wire reverses and a reversing position where the traverser for traversing the bobbin reverses based on the values of the winding radius stored in the memory,

wherein each of the distance sensors is arranged between the entry position of the wire into the bobbin and the flange, and

the reversing position of the traverser is set based on the values of the winding radius at the time when each of the plurality of distance sensors detects the flange.

7. The wire winding device according to claim 6, wherein the reversing position of the traverser is set based on the values of the winding radius at least three locations stored in the memory in the order of winding.

8. The wire winding device according to claim 6 or claim 7, wherein the reversing position of the traverser is modified for each reversal of one of the traverser of the bobbin and the traverser of the wire.

9. The wire winding device according to any one of claims 6 to 8, wherein abrasive grains are fixed to a surface of the wire.