DESCRIPTION

TITLE OF THE INVENTION: WINDING MACHINE ~~AND WINDING METHOD~~

TECHNICAL FIELD

[0001]

The present invention relates to a winding machine for pipe rehabilitation that rehabilitates an aging pipe and a winding method.

BACKGROUND ART

[0002]

The conventional winding machine includes drive roller portions rotated by a hydraulic motor at a plurality of portions. A rehabilitating pipe increases its weight as the rehabilitating pipes are formed. Additionally, since the rehabilitating pipe contacts an existing pipe, friction resistance with the existing pipe increases as a rehabilitating pipe is formed. Therefore, at the drive roller portion at the subsequent part among drive roller portions disposed at a plurality of portions, a driving force required to rotate the rehabilitating pipe gradually increases. In contrast to this, at the drive roller portion at the preceding part, a plastic strip is sent by a driving force that is equal to that of the initial state. As a result, a difference occurs between a rotation speed of the rehabilitating pipe and a supply speed of the plastic strip. That is, the plastic strip is excessively supplied compared with the formation speed of the rehabilitating pipe. This easily causes a problem that the pipe diameter of the rehabilitating pipe gradually increases.

[0003]

In contrast to this, a conventional winding machine 8 illustrated in FIG. 18 includes a tension roller portion 83 at the upper side of a supporting member as well as a plurality of drive roller portions 81 and 82 (for example, see Patent Literature 1). These plurality of drive roller portions 81 and 82 and tension roller portion 83 are rotatably driven by the respective individual hydraulic motors. Respective hydraulic motors are

CLAIMS

1. A winding machine for forming a rehabilitating pipe by spirally winding a plastic strip, comprising:

a frame that includes a plurality of plates and a plurality of rollers, the plurality of plates coupling one another in a circumferential direction, the plurality of plates being combined in approximately ring shape, the plurality of rollers being rotatably disposed between the plates facing one another, the frame being separable into a plurality of pieces;

an introduction unit disposed at the frame, the introduction unit including an inner roller and an outer roller, the inner roller and the outer roller interposing a preceding part and a subsequent part of the plastic strip in a spirally aligned state, the inner roller and the outer roller including a roller portion, the roller portion not transmitting power at least to the subsequent part of the plastic strip;

a drive unit disposed at the frame, the drive unit including an inner roller and an outer roller, the inner roller and the outer roller interposing a preceding part and a subsequent part of the plastic strip in a joined state, the inner roller and the outer roller transmitting power to the plastic strip; and

at least one guide member disposed at the frame, the guide member guiding the plastic strip, wherein

the introduction unit and the drive unit are disposed above a horizontal surface including a axial center of the frame.

2. The winding machine according to claim 1, wherein

the introduction unit is configured to:

position the plastic strip such that the preceding part and the subsequent part of plastic strip are mutually joined together; or

position the preceding part and the subsequent part of the plastic strip in the position and mutually join the preceding part and the subsequent part together.

3. The winding machine according to claim 2, wherein

the introduction unit and the drive unit are disposed so as to arrange the drive unit after the introduction unit along a supply route of the plastic strip, and

the drive unit draws the subsequent part of the plastic strip through the introduction unit.

4. The winding machine according to claim 1, wherein

the drive unit includes a reducer and a motor, the drive unit rotating two rollers in mutually opposite directions.

5. The winding machine according to claim 1, wherein

the guide members are disposed at a plurality of positions at the frame so as to define a supply route of the plastic strip at an inner peripheral side of the outline of the frame.

6. The winding machine according to claim 1, comprising

a cradle that supports the frame in a state where the frame is suspended.

7. The winding machine according to claim 1, wherein

the frame includes a first adjustment mechanism, the first adjustment mechanism being disposed on at least one portion among coupling portions between the plates, the first adjustment mechanism adjusting a distance between the plates in a circumferential direction.

8. The winding machine according to claim 1, wherein

the frame includes a second adjustment mechanism at one portion among coupling portions between the plates, the second adjustment mechanism adjusting a gap axially of the mutual plates.

9. A winding method by forming a plastic strip into a rehabilitating pipe, comprising:

installing a winding machine at an end portion of a pipe line to be rehabilitated, the winding machine forming and rotating the rehabilitating pipe; and

supplying a plastic strip to the winding machine, the plastic strip being supplied through a route that passes through an inner peripheral side on an outer extension of the rehabilitating pipe, wherein

in a process where the plastic strip is sent forward of the supply route, the method further comprising:

sending a subsequent part of the plastic strip to the preceding part of the plastic strip from the inner peripheral side of the preceding part and aligning the preceding part and the subsequent part spirally;

joining the subsequent part from the inner peripheral side of the preceding part of the aligned plastic strip to form a rehabilitating pipe; and

sending out the rehabilitating pipe in the pipe line by rotating the rehabilitating pipe while drawing the subsequent part of the plastic strip to the winding machine.

10. The winding method according to claim 8, wherein

the plastic strips include a main joining portion and a sub joining portion, wherein

the method includes:

mutually joining the preceding portion and the subsequent portion together from an inner peripheral side of the plastic strip; and

subsequently joining the main joining portion and the sub joining portion together.