lapse of treatment time, and initial removing ability cannot be continuously exhibited. Even when a method for increasing the supply amount of water is adopted in order to suppress the increase in the resin concentration, the amount of wastewater increases together with the supply amount of water, and thus there is a problem that not only cleaning cost increases significantly but also an environmental load increases.

[0007] The coating film removing method disclosed in Patent Literature 2 uses an organic solvent in order to dissolve and remove a coating film, and requires a large amount of organic solvent in order to continuously exhibit initial removing ability similarly to Patent Literature 1, and thus has a problem that an environmental load significantly increases. In addition, as a device structure, the scraper disposed at the bottom of the dissolution tank is brought into direct contact with a surface of a coating film of a coating film-attached base film to be conveyed and scrapes the coating film. Since the base film is conveyed in a liquid, an organic solvent is likely to be interposed between the surface of the coating film and the scraper when the coating film is scraped with the scraper, and sufficient scraping ability cannot be obtained in some cases. In order to improve the scraping ability, it is conceivable to make an angle formed by a film surface on an upstream side and a film surface on a downstream side in a conveyance direction of the base film via the scraper an acute angle. However, since it is necessary to make the dissolution tank deep, the volume of the dissolution tank increases, and the amount of an organic solvent used is further increased, which further deteriorates an environmental load.

[0008] Therefore, embodiments of the present invention provide a coating film removing method and a coating film

removing device capable of dissolving a water-soluble resin using a small amount of cleaning liquid and efficiently and reliably removing the coating film from a surface of a coating film-attached base film containing a water-soluble resin on one surface of the base film in order to obtain a base film in which a regenerated film can be stably formed from the coating film-attached base film after use even when remelting is performed.

Solution to Problem

[0009] According to a first aspect of the present invention, there is provided a coating film removing method for removing a coating film containing a water-soluble resin from a base film having the coating film on at least one surface of the base film, the method including: applying a cleaning liquid containing water as a main component to the coating film in an amount in a range of 3 to 650 ml per 1 m^2 of a surface area of the coating film; and bringing a removing member into contact with a surface of the coating film to which the cleaning liquid is applied, and removing the coating film from the base film by relatively moving the base film with respect to the removing member in a longitudinal direction of the base film while setting an angle formed by the base films via the removing member to a range of 20 to 150° and applying a tension in a range of 10 to 1000 N/m in at least one longitudinal direction of the base film.

[0010] In an embodiment of the above coating film removing method, in a range in which the removing member is in contact with a surface of the coating film, when a length of the base film in a longitudinal direction is represented by a contact length L, a surface passing through a center position of the contact length and vertical to a surface of the removing member is referred to

as a vertical surface, a side on which the base film relatively approaches the removing member is referred to as an upstream side, and a side on which the base film relatively separates from the removing member is referred to as a downstream side, it is preferable that the contact length L [m] is in a range of 1×10^{-5} to 1×10^{-3} m, and it is preferable that an angle (acute angle) θ_1 [°] formed by the vertical surface and the base film on the upstream side of the vertical surface, an angle (acute angle) θ_2 [°] formed by the vertical surface and the base film on the downstream side of the vertical surface, a tension T_1 [N/m] applied to the base film on the upstream side of the vertical surface, and a tension T_2 [N/m] applied to the base film on the downstream side of the vertical surface satisfy the following formula (1).

Formula (1): $1.0 \times 10^6 \leq \{T_1 \times \cos(\theta_1) + T_2 \times \cos(\theta_2)\}/L \leq 2.4 \times 10^8$

[0011] In an embodiment of the above coating film removing method, it is preferable that an angle formed by one surface among two surfaces constituting the removing member and the base film before being in contact with the ridgeline is set to 5° or more, the ridgeline being a ridgeline of the removing member where the removing member starts to be in contact with a surface of the coating film and being sandwiched between the two surfaces of the removing member, the one surface of the removing member being on a side facing the base film before being in contact with the ridgeline.

In an embodiment of the above coating film removing method, it is preferable that the coating film contains a curable silicone resin.

[0012] According to a second aspect of the present invention, there is provided a coating film removing device for removing a coating film containing a water-soluble

resin from a base film having the coating film on at least one surface of the base film, the device including: a cleaning liquid applying mechanism for applying a cleaning liquid to the coating film; a removing member for removing the coating film to which the cleaning liquid is applied from the base film; a driving device for relatively moving the base film with respect to the removing member in a longitudinal direction of the base film; and a tension applying mechanism for applying a tension in at least one longitudinal direction of the base film, wherein the cleaning liquid applying mechanism is set to apply the cleaning liquid in an amount in a range of 3 to 650 ml per 1 m^2 of a surface area of the coating film, the removing member is disposed such that the removing member is in contact with a surface of the coating film to which the cleaning liquid is applied, and an angle formed by the base films via the removing member is in a range of 20 to 150°, and the tension applying mechanism is set to apply a tension in a range of 10 to 1000 N/m.

[0013] In an embodiment of the above coating film removing device, it is preferable that the removing member has a length of 1×10^{-5} to 1×10^{-3} m in a longitudinal direction of the base film in a range in which the removing member is in contact with a surface of the coating film.

An embodiment of the above coating film removing device further includes: an unwinding device for unwinding the coating film-attached base film wound in a roll shape; and a winding device for winding the base film from which the coating film has been removed.

Here, although the base film before being in contact with the removing member is the “base film having the coating film” and the base film after being in contact with the removing member is the “base film from which the coating film has been removed”, in the above embodiments of

the coating film removing methods and the coating film removing devices, the “base film” is used without any particular distinction.

Advantageous Effects of Invention

[0014] According to embodiments of the coating film removing method and the coating film removing device of the present invention, a coating film can be efficiently and reliably removed from a coating film-attached base film containing a water-soluble resin on one surface of the base film with a small amount of cleaning liquid.

Brief Description of Drawings

[0015] FIG. 1 is a schematic view of a removing device according to an embodiment of the present invention.

FIG. 2 is a schematic view of a removing member according to a first embodiment in the removing device of the present invention.

FIG. 3 is a schematic view of a removing member according to a second embodiment in the removing device of the present invention.

FIG. 4 is a schematic view of a removing member according to a third embodiment in the removing device of the present invention.

FIG. 5 is a graph illustrating a result of removing a coating film under conditions of Example 1.

FIG. 6 is a graph illustrating a result of removing a coating film under conditions of Example 2.

FIG. 7 is a graph illustrating a result of removing a coating film under conditions of Example 3.

Description of Embodiments

[0016] The present inventors have intensively studied a