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(54) A system for finish application

System zur Anwendung von Appretur

Système pour l'application d'apprêt

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Description

Field of the Invention

[0001] The present invention relates to a system for finish application which can be applied in a different way on the fiber and provides homogenous dispersion.

Background of the Invention

[0002] In acrylic fiber production, the fiber is produced in machines wherein the washing baths, pulling and drying rollers are located. In the fiber production machine the tow bands which are the band created with hundred of thousands fiber filaments are in continuous motion. During the continuous motion of the said fiber bands, a continuous friction and wearing can be seen between the tow and the rollers of the machine, and the bathing sticks which are metal or ceramic, or sometimes between the fiber filaments. As a result of fiber rubbing the metal rollers, static electricity occurs on the fiber. The electrification causes wrapping on the rollers in the textile machines and rupture on the rollers. And the filaments rubbing each other causes the strips to be hard and dusty and to be adhered to each other, ruptures during tambouring and quality loss.

[0003] A substance mixture which is lubricating and preventing static electricity called finish is used to reduce the friction between fiber-metal and fiber-fiber. And the finish provides the softness of the fiber.

[0004] In the embodiments known in the state of the art, the finish is applied to the fiber with immersing method in finish bath. The finish bath comes before the drying rollers in fiber exhaustion machines. During passing from the finish bath, some of the finish received by the tow holds onto the fiber, whereas the other part vanishes in the drying rollers.

[0005] In a further finish application, it is aimed that the finish applied with a brush on the idle roller located after the drying rollers is taken through the metal roller by touching the tow band. In the said method, the idle roller receives its drive from the tow band. The idle roller rotates at the same linear velocity with the tow band. The speed is about 100-150 m/min in production machines after the drying rollers. For this reason the finish cannot be applied to the surface of the tow in a desired quantity and homogeneity. Furthermore, there is a phase difference between reaching speed of the finish carried with the brush to the surface of the roller and transmission to the tow band from the roller. Because of these reasons, the finish cannot be applied on the tow band homogenously. In these kinds of systems, the idle roller and the tow band rotate at the same direction. The drive of the idle roller is enabled with the tow band passing thereon.

[0006] In another embodiment, in the system known as "kissing-roller mechanism" in the state of the art, vertical and horizontal applications are performed on both surfaces of the tow band. In the said system, both surfaces of the tow band are enabled to contact the finish by the tow band being passed between two rollers tangential in vertical or horizontal direction. The rollers on which the finish is applied rotate in the same direction with the tow band. The said system provides finish saving depending on the immersion method, whereas the finish dispersing more than desired on the tow band adheres to the latter rollers. And these adhesions cause wrapping. The first capital cost of this system is high. When the system is activated again after the failures in fiber production, fiber has some difficulties and it is difficult to process. And the said system brings about some difficulties. As a result of using more than one roller in finishing process, the cost is high because of the electricity. Furthermore, since more than one finish pools are used, the tow takes the excess finish to itself and this causes material consumption. And depending on using more than one roller, problems occurring in production increase and cause labor loss.

[0007] The finish is required to be given on the surface of the fiber filaments in order to provide easy flow of the tow band and other textile products on the textile machines from the tow band in n acrylic fiber production and after. In the said processes, in order that the fiber and its derivatives are processed on the machines easily, covering fiber filaments surfaces with film layer is an adequate factor. Leakage via the penetration of the finish applied into the fiber filament is an unwanted situation because of the raw material loss.

[0008] Korean patent document no KR20070094812 discloses covering a surface with a fluid. The surfaces are covered with fluids using primary and secondary roller system. In the said system, there is more than one roller present rotating in reverse direction in order to receive the resin to the surface.

[0009] International Patent document no WO2008059603 discloses impregnating fibers with a resin using "kiss roller". According to this, resin is contacted the fibers moving in horizontal axis using more than one rollers.

[0010] Patent documents no. US3811834, DE4205515, and GB 1002570 also known from prior art.

Summary of the Invention

[0011] The objective of the present invention is to realize a system for finish application wherein the finish loss occurring during drying is prevented.

[0012] A further objective of the present invention is to realize a system for finish application which creates the same effect with known methods by using less finish.

[0013] Another objective of the present invention is to realize a system for finish application which provides energy saving.

[0014] Another objective of the present invention is to realize a system for finish application which has low first capital cost.

[0015] Yet another objective of the present invention

is to realize a system for finish application which is easy to activate first and after the system is stopped.

[0016] A further objective of the present invention is to realize a system for finish application which enables less labor and effort to be spent.

[0017] A further objective of the present invention is to realize a system for finish application which enables different finish combinations to be given on the machine without mixing each other.

Detailed Description of the Invention

[0018] A system for finish application realized to fulfill the objective of the present invention is illustrated in the accompanying figure wherein:

Figure 1 is the schematic view of the finish application system.

[0019] The components given in the figures are individually numbered where the numbers refer to the following:

10- Finish application system
1- Feeding pump
2- Feeding tank
3- Filter
4- Circulation pump
5- Feeding tray
6- Feeding roller
7- Drive group
8- Feeding tray overflow
9- Tow band

[0020] The finish application system (10) comprises
at least one feeding pump (1) which enables the finish to be fed to the system (10),
at least one feeding tank (2) wherein the finish is stored before being fed to the system (10) via the feeding pump (1),
at least one circulation pump (4) which enables the finish coming from the finish feeding tank (2) to be transferred to the finish feeding tray (5),
at least one feeding tank filter (3) which enables the finish overflowing from the finish feeding tray (5) to be cleaned before being transferred to the finish feeding tank (2) again,
at least one finish feeding tray (5) which enables the finish to contact the rollers (6),
at least one feeding roller (6) which transfers the finish it receives from the feeding tray (5) to the tow bands (9) with rotary motion,
at least one drive group (7) which provides rotary motion to the feeding roller (6), at least one tow band (9) on which the finish is applied.

[0021] The finish is transferred to the finish feeding tank (2) via the finish feeding pump (1). The finish is transferred to the finish feeding tray (5) from the finish feeding tank (2) via the finish circulation pump (4). The feeding roller (6) rotating with the power given by the drive group (7) applies the finish it receives from the finish feeding tray (5) to the tow bands (9). The finish overflowing from the finish feeding tray (5) is transferred to the finish feeding tank filter (3) via the feeding tray overflow (8).

[0022] In the finish application system (10), the finish is applied to the surface of the tow band (9) via a single feeding roller (6) rotating with drive. The roller (6) wherein the finish is given to the tow band (9) is ceramic coated. The surface tension of the finish solution prepared in 10-20 % by mass aqueous medium is high and has a gluey structure. The finish present on the finish feeding tray (5) passes on the roller (6) easily as it rotates; the dispersion of the finish onto the tow band (9) is enabled because of its said features. The finish's penetration capability being high makes it easy to hold onto the surface of the fiber.

[0023] The ceramic coated feeding roller (6) enabling application of the finish on the surface of the tow band (9) has driven by means of the drive group (7). The linear speed can be adjusted between 10-25 m/min according to production capacity of the said feeding roller (6) and ktex (the description of the 1m of filament _bundle by weight in gram) value of the tow band produced. Thus, as a requirement of the production process the finish can be easily applied to the tow band (9) moving at a speed of 100-150 m/min with the help of ceramic coated feeding roller (6) having slower linear speed. Because of both high surface tension of the finish and its gluey structure, the finish covers the filaments climbing the surfaces of the filaments by means of the ceramic coated feeding roller (6) rotating in reverse direction of the tow band (9). The diameters of the said filaments are between 10-50 microns, and the finish can cover the surfaces of these.

[0024] The finish solution is subjected to the continuous circulation between the finish feeding tray (5) and the finish feeding tank (2). The finish feeding tray (5) has adjustable overflow line inside the tray. By means of this feature the sinking rate of the ceramic coated roller (6) inside the finish feeding tray (5) can be adjusted depending on the production type. The excess finish solution in the finish feeding tray (5) is subjected to recirculation by returning the compartment with filter (3) in the finish feeding tank (2), by this means the dirt and fiber filaments which may enter the system (10) are filtered.

[0025] Since the finish is given after the drying in the system (10), finish loss in drying is prevented. Since the finish is given after the fiber is collapsed (evacuating the air in the fiber filaments), it stays on the surface only and same results are obtained with less finish when compared with the known methods. With this system (10), 25-30% values of finish saving can be provided.

Claims

1. A system for finish application (10) comprising

- at least one feeding pump (1) which enables the system (10) to be fed with finish mixture prepared in aqueous medium in 10-20 % concentration by mass,
- at least one feeding tank (2) wherein the finish pumped via the feeding pump (1) is stored before being fed to the system,
- at least one circulation pump (4) which enables the finish coming from the finish feeding tank (2) to be transferred to the finish feeding tray (5),
- at least one feeding tank filter (3) through which the finish overflowing from the finish feeding tray (5) passes to be cleaned before being transferred to the finish feeding tank (2) again,
- at least one finish feeding tray (5) which enables the finish to be carried to the feeding roller (6),
- at least one drive group (7) which provides rotary motion to the feeding roller (6),
- at least one finish feeding tray overflow (8) wherein the finish overflowing from the finish feeding tray (5) is accumulated,
- at least one tow band (9) on which the finish is applied,
- at least one feeding roller (6) which transfers the finish it receives from the feeding tray (5) to the tow bands (9) with rotary motion
- the tow band (9) and the feeding roller (6) rotate in reverse directions
- **characterized in that** in the system the finish is given after the drying.

2. A finish application system (10) according to claim 1, **characterized by** feeding roller (6) the linear rotational speed of which is 10-25m/min.

3. A finish application system (10) according to claim 2, **characterized by** ceramic coated feeding roller (6).

4. A finish application system (10) according to claim 1 to 3, **characterized by** tow band (9) which moves at speed of 100-150 m/min.

Patentansprüche

1. Ein System für Beendung der Applikation (10), bestehend aus

- mindestens einer Zuführpumpe (1), die ermöglicht, daß das System (10) mit Fertigmischung zugeführt wird, die in wässrigem Medium von einer 10-20 % Massenkonzentration vorbereitet ist,
- mindestens einem Zuführtank (2), wo die Beschichtung, die durch Zuführpumpe (1) gepumpt wird, vor Zuführung zum System eingelagert wird,
- mindestens einer Umlaufpumpe (4), die ermöglicht, daß die vom Zuführtank (2) kommende Beschichtung zum Zuführtablett (5) übertragen wird,
- mindestens einem Zuführtankfilter (3), wodurch die Beschichtung, die vom Zuführtablett (5) überläuft, durchgeht, gereinigt wird, bevor er wieder zum Zuführtank (2) übertragen wird,
- mindestens einem Zuführtablett (5), die ermöglicht, daß die Beschichtung zur Speisewalze (6) getragen wird,
- mindestens einer Antriebsgruppe (7), die die Drehbewegung zur Speisewalze (6) sicherstellt,
- mindestens einer Überlaufvorrichtung (8), wo die Beschichtung, die vom Zuführtablett (5) überläuft, sich ansammelt,
- mindestens einem Schleppband (9), wo die Beschichtung ausgeübt wird,
- mindestens einer Speisewalze (6), die die Beschichtung, die vom Zuführtablett (5) erhalten wird, mit Drehbewegung zur Schleppbände (9) überträgt,
- der Schleppband (9) und die Speisewalze (6) rotieren in Gegenrichtungen
- **dadurch gekennzeichnet, daß** im System die Beschichtung nach dem Trocknen gegeben wird.

2. Ein Beschichtungsapplikationssystem (10) nach Anspruch 1, **dadurch gekennzeichnet, daß** die Speisewalze (6) eine lineare Drehgeschwindigkeit von 10-25 m/min. hat.

3. Ein Beschichtungsapplikationssystem (10) nach Anspruch 2, **dadurch gekennzeichnet, daß** die Speisewalze (6) Keramik bedeckt ist.

4. Ein Beschichtungsapplikationssystem (10) nach Anspruch 1 bis 3, **dadurch gekennzeichnet, daß** sich der Schleppband (9) mit einer Geschwindigkeit von 100-150 m/min. bewegt.

Revendications

1. Système pour l'application d'enduit (10) comprenant:

- au moins une pompe d'alimentation (1) qui permet au système (10) d'être alimenté avec un mélange de finition préparé en milieu aqueux dans une concentration de 10 à 20% en masse,
- au moins un réservoir d'alimentation (2) dans lequel la pompe de finition par la pompe d'alimentation (1) est stockée avant d'être alimentée vers le système,
- au moins une pompe de circulation (4) qui per-

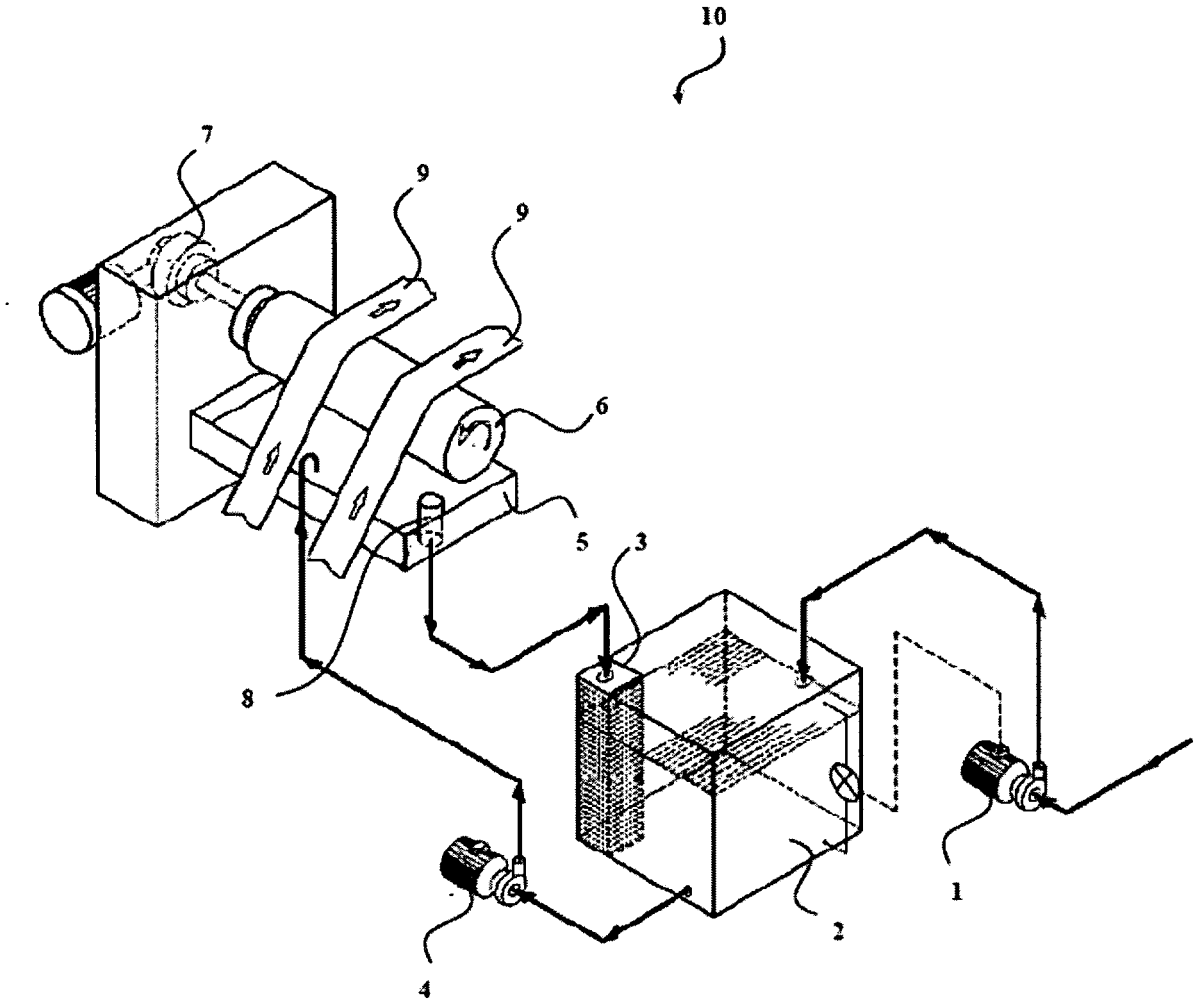
met de transférer la finition à partir du réservoir d'alimentation de finition (2) vers le bac d'alimentation de finition (5),
- au moins un filtre de réservoir d'alimentation (3) à travers lequel la finition débordant du bac d'alimentation de finition (5) passe à être nettoyée avant d'être transférée à nouveau dans le réservoir d'alimentation de finition (2),
- au moins un plateau d'alimentation de finition (5) qui permet de porter la finition au rouleau d'alimentation (6),
- au moins un groupe d'entraînement (7) qui fournit un mouvement de rotation au rouleau d'alimentation (6),
- au moins un débordement de bac d'alimentation de finition (8) dans lequel la finition débordant du plateau d'alimentation de finition (5) est accumulée,
- au moins un ruban de câble (9) sur laquelle la finition est appliquée,
- au moins un rouleau d'alimentation (6) qui transfère la finition qu'il reçoit du plateau d'alimentation (5) aux rubans de câble (9) avec un mouvement de rotation
- le ruban de câble (9) et le rouleau d'alimentation (6) tournent en sens inverse directions
- **caractérisé en ce que** dans le système la finition est donnée après le séchage.

2. Système d'application d'enduit (10) selon la revendication 1, **caractérisé par** un rouleau d'alimentation (6) dont la vitesse de rotation linéaire est de 10 à 25 m / min.

3. Système d'application d'enduit (10) selon la revendication 2, **caractérisé par** un rouleau d'alimentation revêtue de céramique (6).

4. Système d'application d'enduit (10) selon les revendications 1 à 3, **caractérisé par** un ruban de câble (9) qui se déplace à une vitesse de 100-150 m/min.

Figure 1



REFERENCES CITED IN THE DESCRIPTION

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