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(54) Title: WEB DRAFTING ASSEMBLY OF CARDING MACHINE

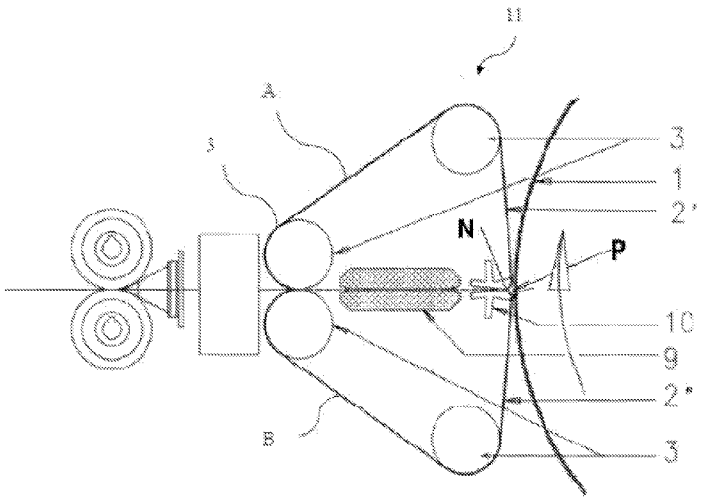


Fig 4

(57) Abstract: A web drafting assembly (11) of a carding machine is disclosed. The web drafting assembly (11) comprises: an upper and a lower apron assembly (A, B) arranged proximal to a doffer cylinder (1) for receiving fiber web from the doffer cylinder (1). Each of the upper and lower apron assembly(A,B) comprises, at least one apron(2',2"), one or more drive roller(3) for driving the aprons(2',2"),and at least one guide member(10) provided proximal to the doffer cylinder(l) for supporting the aprons(2',2"),and a portion(P) between ends of the guiding members(10) and the doffer cylinder(l) forms the fiber web pick off point. Further, at least one support plate (9) is provided inside each upper and lower apron assembly (A, B) to facilitate firm movement of the fiber web towards exit of the web drafting assembly.

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WEB DRAFTING ASSEMBLY OF CARDING MACHINE

TECHNICAL FIELD

Embodiments of the present disclosure relates to a web drafting assembly in a textile fibre processing machine. More particularly, embodiments of the disclosure relates to a web drafting assembly incorporated in the wider carding machine i.e. the carding machine of working width more than 1m, preferably 1.5m.

BACKGROUND OF THE DISCLOSURE

Carding is a mechanical process that opens, removes trash and neps, breaks up flocks and unorganized clumps of fibre and then aligns the individual fibres so that they are more or less parallel with each other. Finally, converts the mixed and fluffed-up form of textile material into a soft, untwisted thin rope of sliver form. The fiber mat fed to the carding machine should be of a high degree of uniformity to ensure consistent opening and carding. This uniformity is achieved using the chute feed system, which aims at feeding a fiber sheet of a uniform packing density and uniform linear density to the carding machine.

Fibres that are opened and cleaned by licker-in system are transferred to the main cylinder by stripping action. Fibres stripped by the cylinder from the licker-in are transferred to the carding zone, which is the area between the main cylinder and the flats. In principle, a carding action is accomplished when the wire of the two surfaces are inclined in opposite directions and the direction and the rates of motion are such that one surface passes the other, point against point. The flats are wired clothed bars rotating at a very slow speed against the high speed cylinder.

Fibres that are coming out of the carding zone form a very thin web. The weight of the web is determined by extent of carding such as flats or cylinder settings, the relative carding speed, and the type of cloth on both cylinder and the flats. The web is extracted from the main cylinder by another cylinder called a doffer. The substantial reduction of the surface speed of the doffer as compared to that of the cylinder results in a condensation effect. The fiber web is stripped from the doffer using a stripper roller. It is

then passed through a pair of squeeze or crush rolls before it is finally accumulated widthwise into a fiber strand form. The calender rolls compress the fiber strand to provide better integrity and stable flow of material. The fiber strand or the card sliver proceeds upward over guide pulleys to enter the coiler system. This consists of a trumpet guide and a second pair of calender rolls that delivers the carded sliver through a revolving tube into the card sliver can. The rate of sliver delivery varies from about 40 to 300 meters per minute.

Additional to the facts, it is well known about the wider carding technology, wherein the working width of carding cylinder is about 1 to 2m, preferably 1.5m. The advantage of wider carding machine can be seen by comparing with normal carding machine. For example by comparing 1.5m wide card with the 1m wide carding machine, in the 1.5m carding machine the fibre density increases to 1.5 times without affecting the chance of deterioration in output quality at economically higher production rate.

The above details indicate how delicate it is to run the machine for handling a thin sheet of individualized fibres called a 'web', which is finally condensed into a sliver. The tasks of the carding machine are opening to individual fibre, elimination of short fibres, impurities and dust, disentangling of neps, fibre blending, orientation of slivers, and sliver formation. Among them, the sliver quality of good fibre orientation plays a major crucial role in the textile yarn spinning process. In the carding machine, web formation starts in the doffer as the fibres are removed from cylinder. The doffer rotates at a considerably slower surface speed than the cylinder speed.

It is a known fact that the drafting of the fibres helps in parallelising the hooks created in the carding machine. Fibres in a card web are less consolidated and not aligned. It is known fact about the drafting of the slivers, rovings or strands. That the drafting is the process of elongating a strand of fibres, with the intention of orienting the fibres in the direction of the strand and reducing its linear density. In a roller drafting system, the strand is passed through a series of sets of rollers, each successive set rotating at a surface velocity greater than that of the previous set. During drafting, the fibres must be moved relative to each other as uniformly as possible by overcoming the cohesive friction.

Uniformity implies in this context that all fibres are controllably rearranged with a shift relative to each other equal to the degree of draft. Such an apparatus is suitable for drafting slivers, rovings or strands since the sliver, roving or strand is thick enough or is immediately twisted so there is little problem of the fibres lapping around the front rollers. It is known that drafting the fibres in the card web, by a relatively small draft, between a pair of rollers/aprons, separated by a gap called nipping distance, removes the hooks and results in lesser waste in combing process. Such drafting assemblies with various embodiments are disclosed in prior arts US 3119152 and 1029/KOL/2005.

As disclosed in US 3119152, in order for web drafting to be beneficial, the distance between the two nip points formed for drafting the web is not to be more than 50% of the fiber span. The ratio for surface speed for drafting the web must be greater than 1 in order that drafting and increased alignment of the fibre is accomplished. Mainly, a drafting ratio of 1.5 to 4 is preferable with optimum ratio as 3.

FIGS. 1 and 2 are the various embodiments for method of obtaining parallelization of textile fibres in a web coming from a doffer cylinder (1) of a carding machine disclosed in the prior art US3119152. The pick-off point (6) is defined by a nose bar (7). A nip point (8) is defined by the point of first contact between nip roller (3) or top belt or apron (2') and the bottom drafting belt (2) or apron (2"). The nipping distance is defined by the distance between pick-off point (6) and nip point (8). The best nip distance is 30-50% fiber span. The distance between (8) and (8') is termed as gripping zone.

The disclosed art explains the drafting of the cotton web for improved fiber orientation and hook removal, using pair of conveyors or aprons (2) to avoid lapping of web and formation of acute angle by the apron (2) surface. In order for web drafting to be beneficial, the distance between the two nip points formed for drafting the web is not to be more than 50% of the fibre span. The ratio of the surface speed for drafting the web must be greater than 1 in order that drafting and increased alignment of the fibre is accomplished. As disclosed, a drafting ratio of 1.5 to 4 is preferable with optimum ratio as 3.

Fig 3 is another known prior art of 1029/KOL/2005A. The aprons (2) close to the nip point are arranged to be wedge shaped, with the arms of the aprons (2) on each side of a nip roller assembly covering towards the nip rollers (3a, 3b) and having an acute angle between them.

In this art of drafting assembly, the diameter of the nip rollers (3a and 3b) being used for drafting is a consideration in conjunction with the optimum nipping distance. If the nip rollers (3a and 3b) are too small, there is a tendency for the fibres to lap or wrap around the nip rollers (3a and 3b). However if the nip rollers (3a and 3b) is made too large, the nip distance becomes too large which is disadvantageous. The apparatus according to this prior art utilize the wedge shaped aprons (2) with the arms of the aprons (2) on each side of a nip rollers (3a and 3b) converging towards the nip rollers (3a and 3b) and having an acute angle between them. The disadvantage again here is the diameter of the nip rollers (3a and 3b) that are so small and practically they are lower than 50% span of a cotton fibre which is about 10-15mm. As per the knowledge gained from the prior arts, for effective drafting, the drafting ratio has to be more than 1 i.e. the draft ratio should be between 1.5 and 4. In this case of 1029/KOL/2005, if the front nip roller (3b) runs 1.5 to 4 times faster than rear nip roller (3a), it will result in heavier fibre density formation in cylinder which is a technological disadvantage or leads to lower throughput in card, ultimately resulting into an economic disadvantage as mentioned earlier.

In practical sense, consider a card producing sliver to process ring spun yarn having a production output 60 kg per hour has sliver weight of 3-5 g/m. In this the front nip rollers has to run at a surface speed of 200 m/min approximately leading to a rotational speed of at least 6000 rpm and the rear nip rollers are to run at least 4000 rpm considering the minimum required drafting ratio of 1.5. Running at this speed for the smaller diameter nip rollers are practically not possible with the present technology and the art 1029/KOL/2005 does not teach the features to run the rollers at this higher speeds.

Another important factor to be considered is the sliver weight which again for a ring spun yarn, the optimum will be 3-5 g/m to have optimum fibre density in cylinder for a one meter wide card. By considering the drafting ratio, the fibre density is to be either double

the requirement in cylinder or the delivered sliver weight should be at least 50% thinner. This leads to reduction in throughput in card. The existing systems and prior arts have failed to take the aforesaid aspect into account. Further, the prior arts and the existing systems runs the carding process at slower delivery speeds, which may not meet the today's demand on requirement of high production cards. The end results are heavier fibre density in cylinder which is a technological disadvantage or lower throughput in card which is an economical disadvantage.

In light of foregoing discussion, it is necessary to develop a web drafting apparatus incorporated in the wider carding machine i.e. the carding machine of working width more than 1m, preferably 1.5m to overcome the aforementioned limitations.

SUMMARY

The shortcomings of the prior arts are overcome and additional advantages are provided through the provision of an assembly as claimed in the present disclosure. Additional features and advantages are realized through the techniques of the present disclosure. Other embodiments and aspects of the disclosure are described in detail herein and are considered a part of the claimed disclosure.

In one non-limiting exemplary aspect of the present disclosure, there is provided a web drafting assembly of a carding machine. The assembly comprises: an upper and a lower apron assembly arranged proximal to a doffer cylinder for receiving fiber web from the doffer cylinder. Each of the upper and lower apron assembly comprises, at least one apron, one or more drive roller for driving the aprons, wherein the drive rollers are oriented at predetermined angles inside respective loop of each upper and lower apron assembly, and at least one guide member provided proximal to the doffer cylinder for supporting the aprons, wherein a portion between ends of the guiding members and the doffer cylinder forms the fiber web pick off point. Further, at least one support plate is provided inside each upper and lower apron assembly to facilitate firm movement of the fiber web towards exit of the web drafting assembly.

In an embodiment of the disclosure, the guide member is selected from atleast one of a guide plate of predetermined cross section, a nose bar, and a combination of the guide plate and the nose bar. Further, the shape of the guide plate is selected from at least one of "T" shape, "V" shape, "Y" shape and any other shape which serve the purpose.

In an embodiment of the present disclosure, the web drafting assembly further comprises nip roller assembly in between doffer cylinder and said upper and lower apron assembly. The nip roller assembly comprises at least one apron, and one or more drive rollers for driving the aprons.

In an embodiment of the present disclosure, the guide member is provided distal to the doffer cylinder inside the apron upper and lower assembly. Further, at least one nip roller assembly is provided at downstream to the upper and lower apron assembly of the web drafting assembly.

Another non-limiting exemplary aspect of the present disclosure provides for a carding assembly comprising, at least one carding roller, a doffer cylinder arranged proximal to the carding roller for forming a fiber web; and a drafting assembly for drafting the fiber web. The assembly comprises an upper and a lower apron assembly arranged proximal to a doffer cylinder for receiving fiber web from the doffer cylinder. Each of the upper and lower apron assembly comprises at least one apron, one or more drive roller for driving the aprons, and at least one guide member provided proximal to the doffer cylinder for supporting the aprons, wherein a portion between ends of the guiding members and the doffer cylinder forms the fiber web pick off point. Further, at least one support plate is provided inside each upper and lower apron assembly to facilitate firm movement of the fiber web towards exit of the drafting assembly.

The foregoing summary is illustrative only and is not intended to be in any way limiting. In addition to the illustrative aspects, embodiments, and features described above, further aspects, embodiments, and features will become apparent by reference to the drawings and the following detailed description.

BRIEF DESCRIPTION OF THE ACCOMPANYING DRAWINGS

The novel features and characteristic of the disclosure are set forth in the appended claims. The disclosure itself, however, as well as a preferred mode of use, further objectives and advantages thereof, will best be understood by reference to the following detailed description of an illustrative embodiment when read in conjunction with the accompanying figures. One or more embodiments are now described, by way of example only, with reference to the accompanying figures wherein like reference numerals represent like elements and in which:

FIGS. 1 and 2 illustrates the apparatus for doffing and drafting fibrous web as disclosed in the prior art US3119152.

FIG. 3 illustrates drafting assembly having wedge shape loop with an acute angle as disclosed in the prior art 1029/KOL/2005.

FIGS. 4 and 5 illustrate a web drafting assembly of the carding machine as one embodiment of the present disclosure.

FIG. 6 illustrates another embodiment of the web drafting assembly of the carding machine of the present disclosure.

FIG. 7 illustrates yet another embodiment and variant embodiment of the web drafting assembly of the carding machine as shown in FIG. 6.

FIGS. 8 and 9 illustrate further embodiments of the web drafting assembly of the carding machine which can be made within the scope of the present disclosure.

The figures depict embodiments of the disclosure for purposes of illustration only. One skilled in the art will readily recognize from the following description that alternative embodiments of the structures and methods illustrated herein may be employed without departing from the principles of the disclosure described herein.

DETAILED DESCRIPTION

The foregoing has broadly outlined the features and technical advantages of the present disclosure in order that the detailed description of the disclosure that follows may be better understood. Additional features and advantages of the disclosure will be described hereinafter which form the subject of the claims of the disclosure. It should be appreciated by those skilled in the art that the conception and specific embodiment disclosed may be readily utilized as a basis for modifying or designing other structures for carrying out the same purposes of the present disclosure. It should also be realized by those skilled in the art that such equivalent constructions do not depart from the spirit and scope of the disclosure as set forth in the appended claims. The novel features which are believed to be characteristic of the disclosure, both as to its organization and method of operation, together with further objects and advantages will be better understood from the following description when considered in connection with the accompanying figures. It is to be expressly understood, however, that each of the figures is provided for the purpose of illustration and description only and is not intended as a definition of the limits of the disclosure.

It is to be noted at this point that all of the components, whether alone or in any combination, are claimed as being essential to the invention, in particular the details depicted in the drawings and reference numerals in the drawings are as given below.

To overcome the problems mentioned above, the present disclosure provides a web drafting apparatus incorporated in the wider carding machine i.e. the carding machine of working width more than 1m, preferably 1.5m to overcome the aforementioned limitations.

FIGS. 4 and 5 are exemplary embodiments of the present disclosure illustrating a web drafting assembly (11) for a wider carding machine. The web drafting assembly (11) comprises a pair of apron assemblies (A and B) used to collect web from doffer cylinder (1). Each of the pair of apron assemblies (A and B) comprises at least one apron (2' and 2'') and a plurality of drive rollers (3) for driving the aprons (2' and 2''). The diameters of the rollers (3) are defined as per the requirement for an instance, 68 mm

approximately. Further, the web drafting assembly (11) comprises the supportive structures such as support plates (9), guide members (10), and nose bar (7) etc.

The present disclosure provides the construction of the web drafting assembly (11) in a carding machine of working width more than 1m, preferably 1.5m. This advantage can be seen more when comparing the wider card technology, (for example 1.5m wide card with 1m wide card) the fibre density increases to 1.5 times without affecting the chance of deterioration in output quality at economically higher production rate. The coarser sliver delivered from the wider card is drafted further in web drafting to get a sliver of normal weight of 3-5 g/m. For a ring spun sliver weight of 3-5 g/m of 1m card the equivalent sliver weight produced on the 1.5 card will be 5-8 g/m. This sliver weight after drafting will be reduced to normal sliver weight of 2.5 to 4 g/m considering a web draft of 2. As per that, different embodiments of web drafting assembly have been explained.

Referring to the FIG. 4 in detail, the FIG. 4 illustrates a simple construction of web drafting assembly (11). The web drafting assembly (11) comprises an upper and lower apron assembly (A and B) arranged proximal to a doffer cylinder (1) for receiving fibre web from the doffer cylinder (1). The upper and lower apron assembly (A and B) comprises aprons (2' and 2'') which are driven by a drive roller (3). The drive rollers (3) abut with a certain angle against the inside of each respective loop of the upper and lower apron assembly (A and B) to drive the rotation of the aprons (2). Further, upper and lower apron assembly (A and B) comprises at least one guide member (10) provided proximal to the doffer cylinder (1) for supporting the aprons (2' and 2''). The guide members (10) act as a nose bar and give a rigid support. A portion (P) which is formed between ends of the guiding members (10) and the doffer cylinder (1) forms the fibre pick off point. Further, the web drafting assembly (11) comprises a support plate (9) inside each of the upper and lower apron assembly (A and B) to facilitate firm movement of the fibre towards exit of the web drafting assembly (11). The pair of apron assembly (A and B) is shown in line to doffer center forming equal angle by apron to doffer cylinder (11). However, in an alternative embodiment, the same can be oriented above doffer center also.

In an embodiment of the present disclosure, the guide member (10) can be a guide plate of predetermined cross section. In another embodiment, the guide member (10) can be a nose bar (7). Alternatively, the guide member (10) can be combination of the guide plate and the nose bar. Thus, the guide member (10) is selected from at least one of guide plate of predetermined cross section, a nose bar (7) and a combination of the guide plate and the nose bar. The guide plate is selected from a group comprising but not limited to "T" shape, "V" shape, "Y" shape and any other shape which serve the purpose.

FIG. 5 illustrates the construction of the web drafting assembly (11) which is more similar to the previous embodiment shown in FIG. 4, but some changes with the inclusion of nose bar (7), guide plate (10) and varied angle of loop apron (2) arrangement are made to the embodiment disclosed in Fig. 4. The upper and lower apron assembly (A and B) as shown in FIG. 5 are arranged in different angle and nearly opposite to each other. Further, a nose bar (7) is provided in upper apron assembly (A) proximal to the doffer cylinder (1) to form a rigid support for the apron (2'). Further, the guide plate (10) is provided in lower apron assembly (B) proximal to the doffer cylinder (1) to form a rigid support for the aprons (2'') preceding the doffer cylinder (1). At least one support plate (9) is provided inside the upper and lower apron assemblies (A and B), which further ensures the accurate and firm movement of fibre web towards the exit end of the web drafting assembly (11). The pick off point (P) is formed between doffer cylinder (1) and point of closest proximity of the lower apron assembly (B) formed by the guide plate (10). Further, a nip point (N) is formed between nose bar (7) and the upper apron assembly (A). The distance between the pick off point (P) and the nip point (N) is the nipping distance which is about 30-50 percent of the fiber span.

FIG. 6 is an exemplary embodiment of the present disclosure which illustrates yet another embodiment of the web drafting assembly (11). The web drafting assembly (11) as shown in FIG. 6 is provided with a pair of nip roller assemblies (3a' and 3a") positioned in between the doffer cylinder (1) and the upper and lower apron assembly (A and B). Each of the nip roller assembly (3a) comprises at least one nip roller (3a' and 3a''), atleast one apron (2a) and atleast one drive roller (2a' and 2a'') for driving the aprons (2a). The upper and lower apron assembly (A and B) comprises aprons (2' and 2'') associated with

each apron (2a) of the nip roller assembly (3a) to drive within the loop. The aprons (2' and 2'') are driven by a drive roller (3) which abuts with a certain angle against the inside of each respective loop and which drives rotation of the loop. These are arranged to grip the fibre web received at a nip point and traveling towards the upper and lower apron assembly (A and B) which forms less than 90 degree angled loop arrangement. The upper and lower apron assembly (A and B) forms less than 90 degree angle with nip roller assembly (3a). The web drafting assembly (11) comprises upper and lower apron assembly (A and B) which rotates in higher speed than the preceding nip roller assembly (3a). Thus, this results in drafting of fibre web to a required amount.

In an embodiment of the present disclosure, the diameter of the nip rollers (3a' and 3a'') is around 40mm approximately and the diameter of the drive rollers (3) is around 68mm approximately. Further, the distance between the nipping point of nip roller assembly (3a) to the nose guide member (10) of the upper and lower apron assembly (A and B) is around 16mm.

The web drafting assembly (11) further comprises a stripper roller (5) arranged between the doffer cylinder (1) and the nip roller assemblies (3a). The stripper roller (5) helps in stripping the fibre web from the doffer cylinder (1) to the subsequent web drafting assembly (11). A clearer roller (4) is arranged above the stripper roller (5) for cleaning the choked fibres on the stripper roller (5). At the bottom of the stripper roller (5), a guide plate (12) is arranged to guide the fibre from the doffer cylinder (1) towards the drafting assembly (11).

With the afore explained web drafting assembly, for a sliver delivery speed of 300m/min, nip rollers (3a' and 3a") are required to run at 1200 rpm approximately with a web draft of 2. This construction will be feasible in high speed working conditions and may not be an issue unlike in the prior art. This kind of web drafting assembly (11) is not restricted to worsted fibre and could operate for parallelizing the cotton web too. The carded web from the doffer (1) is transferred to the apron (2a) of the nip roller assembly (3a) and passed to the upper and lower apron assembly (A and B). By increasing the speed of apron (2a) of the nip roller assembly (3a) than the rear aprons (2' and 2'') of the upper

and lower apron assembly (A and B), draft is introduced to the carded web. Thus, the sliver weight after drafting will be reduced from coarser 5-8 g/m to normal sliver weight of 2.5 to 4 g/m considering a web draft of 2 in the wider card technology.

FIG. 7 is an exemplary variant of the embodiment of the FIG. 6. The web drafting assembly comprises an upper and lower apron assembly (A and B) as explained in FIG. 6. Further, the web drafting assembly (11) as shown in FIG. 7 is provided with an upper and lower nip rollers (3a' and 3a'') positioned in between the doffer cylinder (1) and the upper and lower apron assembly (A and B). The aprons and driving rollers are not provided for nip rollers (3a' and 3a") in this embodiment. In an embodiment of the present disclosure, the diameter of the nip rollers (3a' and 3a'') is around 40mm approximately and the diameter of the drive rollers (3) of the upper and lower apron assembly (A and B) is around 68mm approximately. The distance between the nipping point of nip rollers (3a' and 3a'') to the nose bar (7) of the upper and lower apron assembly (A and B) is around 17mm. The carded web from the doffer cylinder (1) is transferred to the nip roller (3a' and 3a'') assembly and passed to the upper and lower apron assembly (A and B). By increasing the speed of aprons (2' and 2'') of the upper and lower apron assembly (A and B) than the nip rollers (3a' and 3a'') draft is introduced to the carded web.

FIGS. 8 and 9 are exemplary embodiments of the present disclosure illustrating the further embodiments of the web drafting assembly (11) of the carding machine.

Referring to FIG. 8 in detail, the web drafting assembly (11) comprises an upper and lower apron assembly (A and B) succeeding the doffer cylinder (1) for receiving fibre web from the doffer cylinder (1). The upper and lower apron assembly (A and B) comprises aprons (2' and 2'') which are driven by drive rollers (3). The drive rollers (3) abut with a certain angle against the inside of each respective loop of the upper and lower apron assembly (A and B) to drive the rotation of the aprons (2' and 2''). Further, upper and lower apron assembly (A and B) comprises at least one guide member (10) provided distal to the doffer cylinder (1) for supporting the aprons (2' and 2''). The guide members (10) act as a nose bar and give a rigid support. The guide members (10) are arranged to

grip the fibre web received at a front nip point and traveling towards nip rollers (3a' and 3a'') and transport it to an exit point. The drafting assembly further comprises the upper and lower nip rollers (3a' and 3a'') positioned in the downstream of the upper and lower apron assembly (A and B) for drafting the fibre web. The diameter of the nip rollers (3a' and 3a'') and the drive rollers (3) is around 40mm approximately. The distance between the nipping point of nose bar (10) of the upper and lower assembly (A and B) and the nip rollers (3a' and 3a'') is around 16mm. The carded web from the doffer (1), is transferred to the upper and lower apron assembly (A and B) and then passed to the nip rollers (3a' and 3a'').

The web drafting assembly (11) further comprises a stripper roller (5) arranged between the doffer cylinder (1) and the nip rollers (3a' and 3a''). The stripper roller (5) helps in stripping the fibre web from the doffer cylinder (1) to the subsequent web drafting assembly (11). A clearer roller (4) is arranged above the stripper roller (5) for cleaning the choked fibres on the stripper roller (5). At the bottom of the stripper roller (5), a guide plate (12) is arranged to guide the fibre from the doffer cylinder (1) towards the drafting assembly (11).

FIG. 9 is an exemplary embodiment of the present disclosure which illustrates yet another embodiment of the web drafting assembly (11). The web drafting assembly (11) as shown in FIG. 9 comprises the upper and lower apron assemblies (A and B) comprising aprons (2' and 2''), and a drive roller (3) which abuts with a certain angle against the inside of each respective loop and which drives rotation of the loop. The upper and lower aprons assemblies (A and B) have support surfaces as nose bar (10) to grip the aprons (2' and 2''). Further, the web drafting assembly (11) comprises a pair of nip roller assemblies (3a' and 3a") positioned in the downstream of the upper and lower apron assembly (A and B). Each of the nip roller assembly comprises at least one nip roller (3a' and 3a''), atleast one apron (2a) and atleast one drive roller (2a' and 2a'') for driving the aprons (2a). The web drafting assembly (11) comprising the aprons (2' and 2'') of upper and lower assembly (A and B) which rotates in slower speed than the succeeding apron (2a) assembly, thus it applies the required draft on the fibre web and align the fibre web without hooks. The web drafting assembly (11) further comprises a stripper roller (5)

arranged between the doffer cylinder (1) and upper and lower apron assembly (A and B). The stripper roller (5) helps in stripping the fibre web from the doffer cylinder (1) to the subsequent web drafting assembly (11). Above the stripper roller (5), there arranged a clearer roller (4) for cleaning the choked fibres on the stripper roller (5). At the bottom of the stripper roller (5), a guide plate (12) is arranged to guide the fibre from the doffer cylinder (1) towards the drafting assembly (11).

In an embodiment of the present disclosure, the diameter of the nip rollers (3a' and 3a'') and the drive roller (3) is around 40mm approximately. The distance between the nipping point of nip roller assembly (3a' and 3a") and the nose bar (10) of the upper and lower apron assembly (A and B) is around 16mm. The carded web from the doffer cylinder (1) is transferred to the upper and lower apron assembly (A and B) and passed to the nip roller assembly (3a' and 3a").

These embodiments clearly depict the constructions of improved and various methods of web drafting assembly (11) in a wider carding machine of the textile yarn spinning process. This present disclosure will provide an optimum linear fibre density or count of the sliver with an economical means and higher production rate. It improves the reliability of the construction of various web drafting assemblies (11) and quality of the output sliver for the ease of operations in the subsequent processes.

Advantages

In one embodiment, the present disclosure provides a web drafting assembly of carding machine which can be used in wider carding machine, i.e. carding machine of working width more than 1m, preferably 1.5m.

In one embodiment, the present disclosure provides a web drafting assembly of carding machine which is simple in construction and easy to assemble.

In one embodiment, the present disclosure provides a web drafting assembly of carding machine which is retrofit able onto the existing carding machine.

Equivalents

With respect to the use of substantially any plural and/or singular terms herein, those having skill in the art can translate from the plural to the singular and/or from the singular to the plural as is appropriate to the context and/or application. The various singular/plural permutations may be expressly set forth herein for sake of clarity.

It will be understood by those within the art that, in general, terms used herein, and especially in the appended claims (e.g., bodies of the appended claims) are generally intended as "open" terms (e.g., the term "including" should be interpreted as "including but not limited to," the term "having" should be interpreted as "having at least," the term "includes" should be interpreted as "includes but is not limited to," etc.). It will be further understood by those within the art that if a specific number of an introduced claim recitation is intended, such an intent will be explicitly recited in the claim, and in the absence of such recitation no such intent is present. For example, as an aid to understanding, the following appended claims may contain usage of the introductory phrases "at least one" and "one or more" to introduce claim recitations. However, the use of such phrases should not be construed to imply that the introduction of a claim recitation by the indefinite articles "a" or "an" limits any particular claim containing such introduced claim recitation to inventions containing only one such recitation, even when the same claim includes the introductory phrases "one or more" or "at least one" and indefinite articles such as "a" or "an" (e.g., "a" and/or "an" should typically be interpreted to mean "at least one" or "one or more"); the same holds true for the use of definite articles used to introduce claim recitations. In addition, even if a specific number of an introduced claim recitation *is* explicitly recited, those skilled in the art will recognize that such recitation should typically be interpreted to mean *at least* the recited number (e.g., the bare recitation of "two recitations," without other modifiers, typically means *at least* two recitations, or *two or more* recitations). Furthermore, in those instances where a convention analogous to "at least one of A, B, and C, etc." is used, in general such a construction is intended in the sense one having skill in the art would understand the convention (e.g., "a system having at least one of A, B, and C" would include but not be limited to systems that have A alone, B alone, C alone, A and B together, A and C together, B and C together, and/or A, B, and C together, etc.). In those

instances where a convention analogous to "at least one of A, B, or C, etc." is used, in general such a construction is intended in the sense one having skill in the art would understand the convention (e.g., "a system having at least one of A, B, or C" would include but not be limited to systems that have A alone, B alone, C alone, A and B together, A and C together, B and C together, and/or A, B, and C together, etc.). It will be further understood by those within the art that virtually any disjunctive word and/or phrase presenting two or more alternative terms, whether in the description, claims, or drawings, should be understood to contemplate the possibilities of including one of the terms, either of the terms, or both terms. For example, the phrase "A or B" will be understood to include the possibilities of "A" or "B" or "A and B."

While various aspects and embodiments have been disclosed herein, other aspects and embodiments will be apparent to those skilled in the art. The various aspects and embodiments disclosed herein are for purposes of illustration and are not intended to be limiting, with the true scope and spirit being indicated by the following claims.

Referral Numerals:

Reference Number	Description
A	Upper apron assembly
B	Lower apron assembly
P	Pick off point
N	Nipping point
1	Doffer cylinder
2	Apron
2' and 2''	Aprons of upper and lower apron assembly
2a	Apron of nip roller assembly
2a' and 2a''	Drive rollers of the nip roller assembly
3	Drive rollers of the upper and lower apron assembly
3a, 3b	Nip roller assembly

3a' and 3a''	Nip rollers
4	Clearer roller
5	Strip roller
6	Pick off point of prior art
7	Nose bar
8	Nip point of prior art
8 – 8'	Gripping zone of prior art
9	Support plates
10	Guide members or nose bar
11	Web drafting assembly
12	Guide member

We claim:

1. A web drafting assembly (11) of a carding machine, said assembly (11) comprises:

an upper and a lower apron assembly (A and B) arranged proximal to a doffer cylinder (1) for receiving fiber web from the doffer cylinder (1), wherein each of the upper and lower apron assembly (A and B) comprises;

at least one apron (2' and 2'');

one or more drive roller (3) for driving the aprons (2' and 2'');

at least one guide member (10) provided proximal to the doffer cylinder (1) for supporting the aprons (2' and 2''), wherein a portion (P) between ends of the guiding members (10) and the doffer cylinder (1) forms the fiber web pick off point; and

at least one support plate (9) provided inside each upper and lower apron assembly (A and B) to facilitate firm movement of the fiber web towards exit of the drafting assembly.

2. The web drafting assembly as claimed in claim 1, wherein the guide member (10) is selected from atleast one of a guide plate of predetermined cross section, a nose bar, and a combination of the guide plate and the nose bar.

3. The web drafting assembly as claimed in claim 2, wherein shape of the guide plate is selected from at least one of "T" shape, "V" shape, "Y" shape and any other shape which serve the purpose.

4. The web drafting assembly as claimed in claim 1, wherein the drive rollers (3) are oriented at predetermined angles inside respective loop of each upper and lower apron assembly (A and B).

5. The web drafting assembly as claimed in claim 1 further comprises nip roller assembly (3a' and 3a") in between doffer cylinder (1) and said upper and lower apron assembly (A and B).

6. The web drafting assembly as claimed in claims 1 and 5 wherein each of the nip roller assembly (3a' and 3a'') comprises at least one apron (2a), and one or more drive rollers (2a' and 2a'') for driving the aprons (2a).

7. The web drafting assembly as claimed in claim 1, wherein the guide member (10) is provided distal to the doffer cylinder (1) inside the apron upper and lower assembly (A and B).

8. The web drafting assembly as claimed in claim 1, wherein at least one nip roller assembly (3a' and 3a'') is provided at downstream to the upper and lower apron assembly (A and B).

9. The web drafting assembly as claimed in claim 8 wherein each of the nip roller assembly (3a' and 3a'') comprises at least one apron (2a), and one or more drive rollers (2a' and 2a'') for driving the aprons (2b).

10. A carding assembly comprises:

at least one carding roller;

a doffer cylinder (1) arranged proximal to the carding roller for forming a fiber web; and

a drafting assembly (11) for drafting the fiber web, said assembly (11) comprises:

an upper and a lower apron assembly (A and B) arranged proximal to a doffer cylinder (1) for receiving fiber web from the doffer cylinder (1), wherein each of the upper and lower apron assembly (A and B) comprises;

at least one apron (2' and 2'');

one or more drive roller (3) for driving the aprons (2' and 2'');

at least one guide member (10) provided proximal to the doffer cylinder (1) for supporting the aprons (2' and 2''), wherein a

portion (P) between ends of the guiding members (10) and the doffer cylinder (1) forms the fiber web pick off point; and

at least one support plate (9) provided inside each upper and lower apron assembly (A and B) to facilitate firm movement of the fiber web towards exit of the drafting assembly.

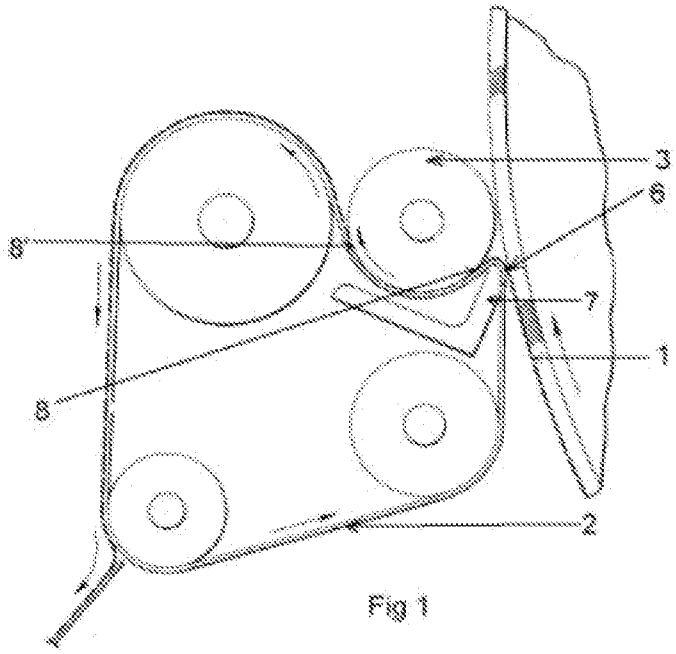


Fig 1

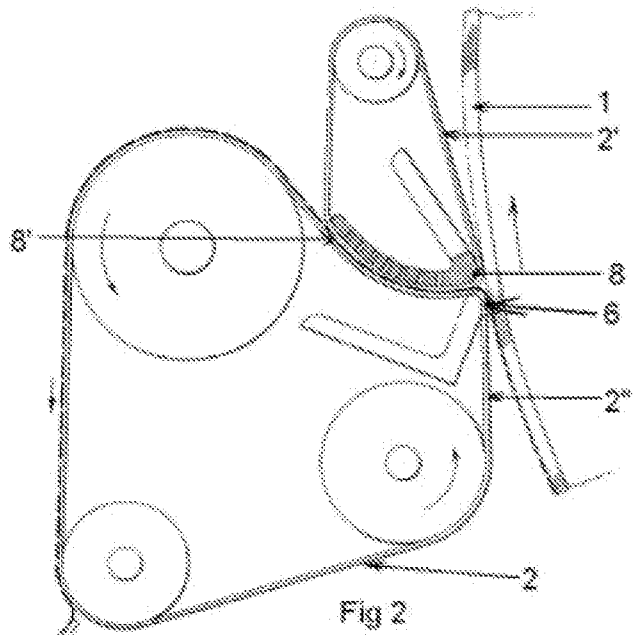


Fig 2

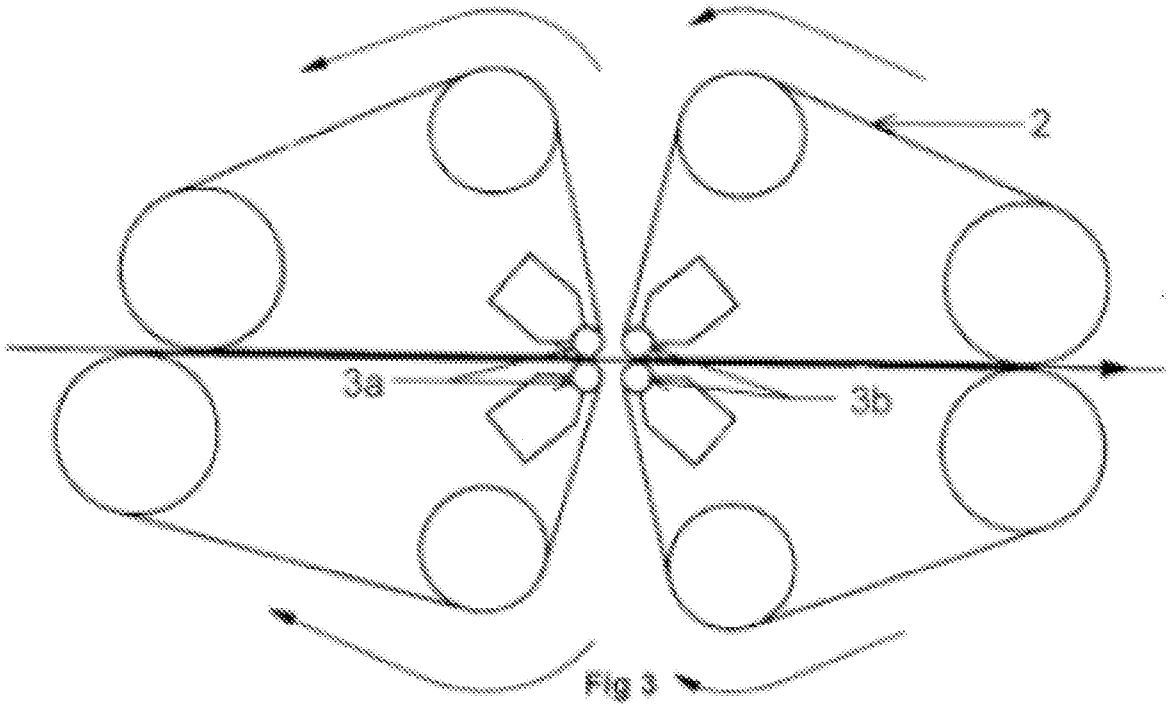


Fig 3

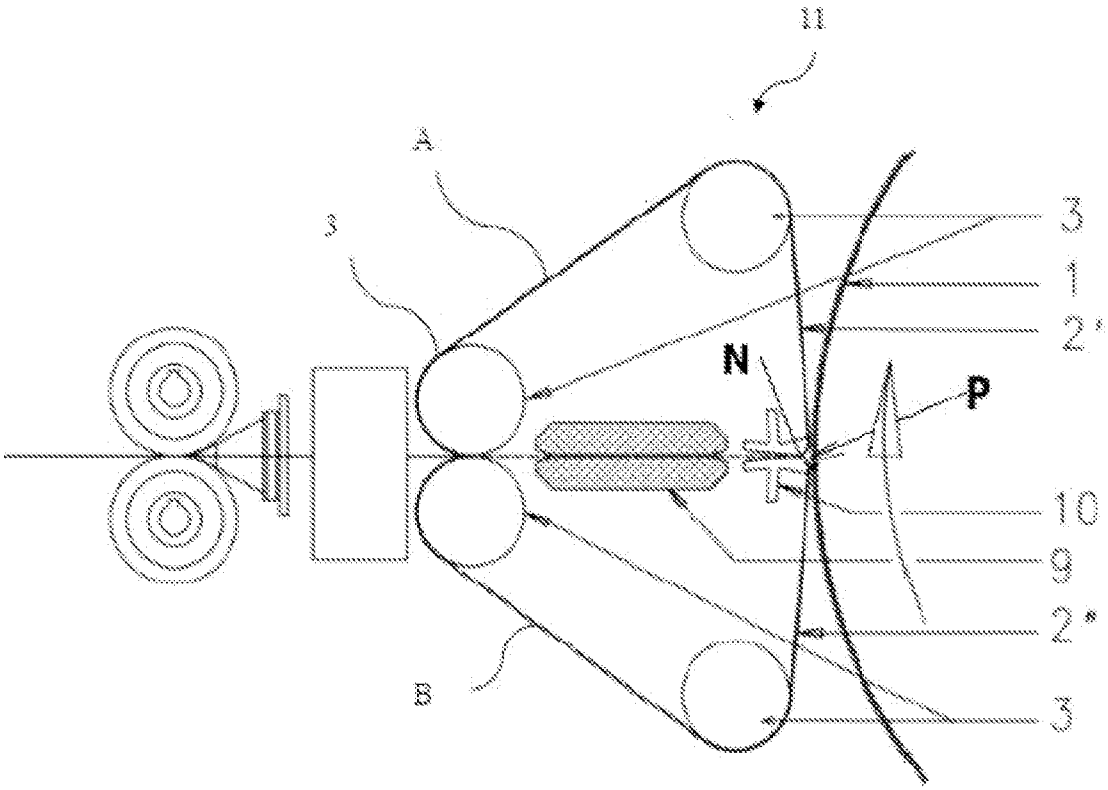


Fig 4

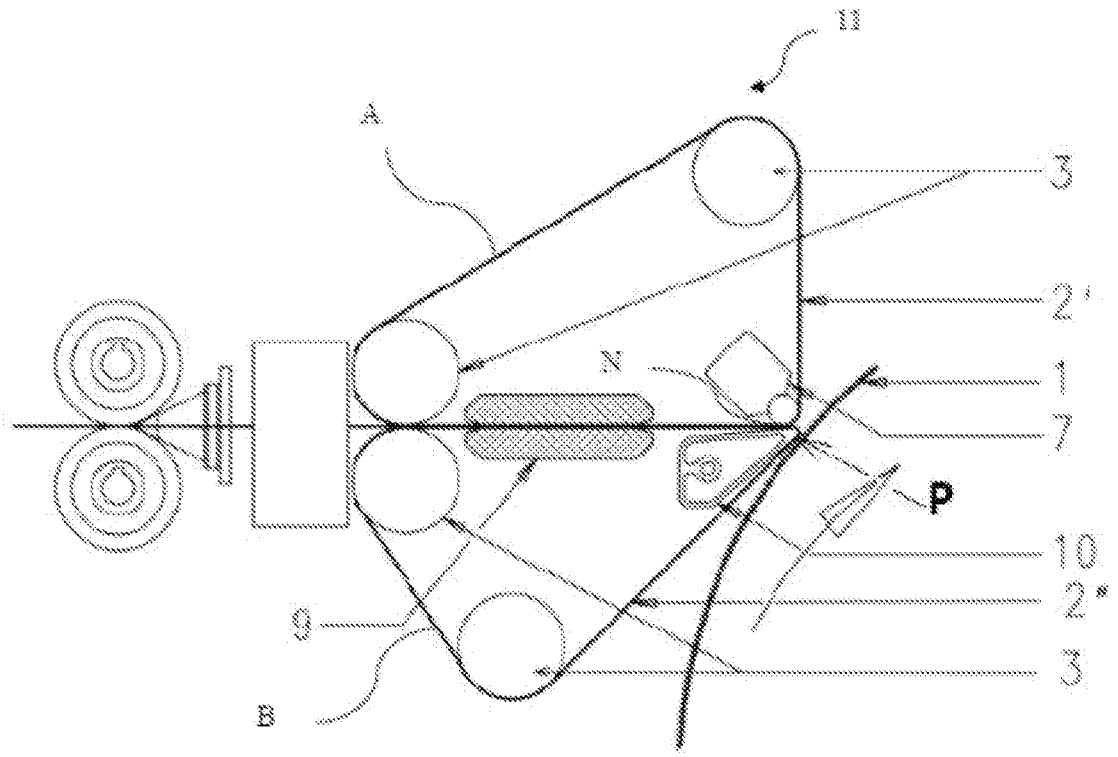


Fig 5

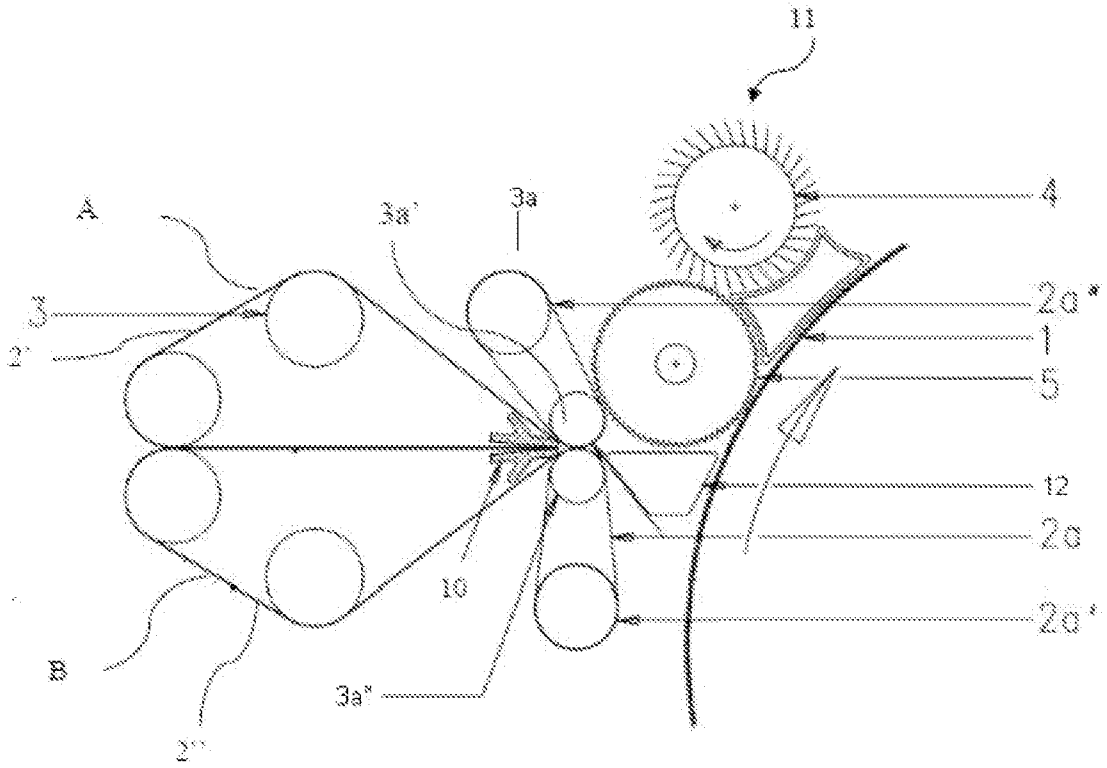


Fig 6

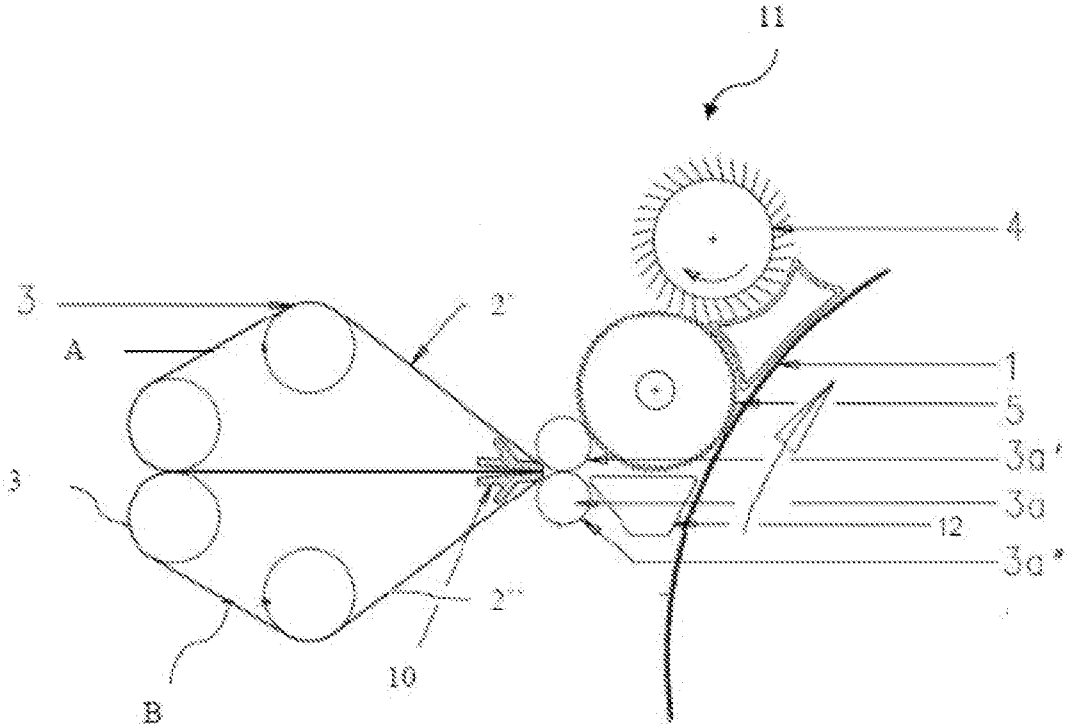


Fig 7

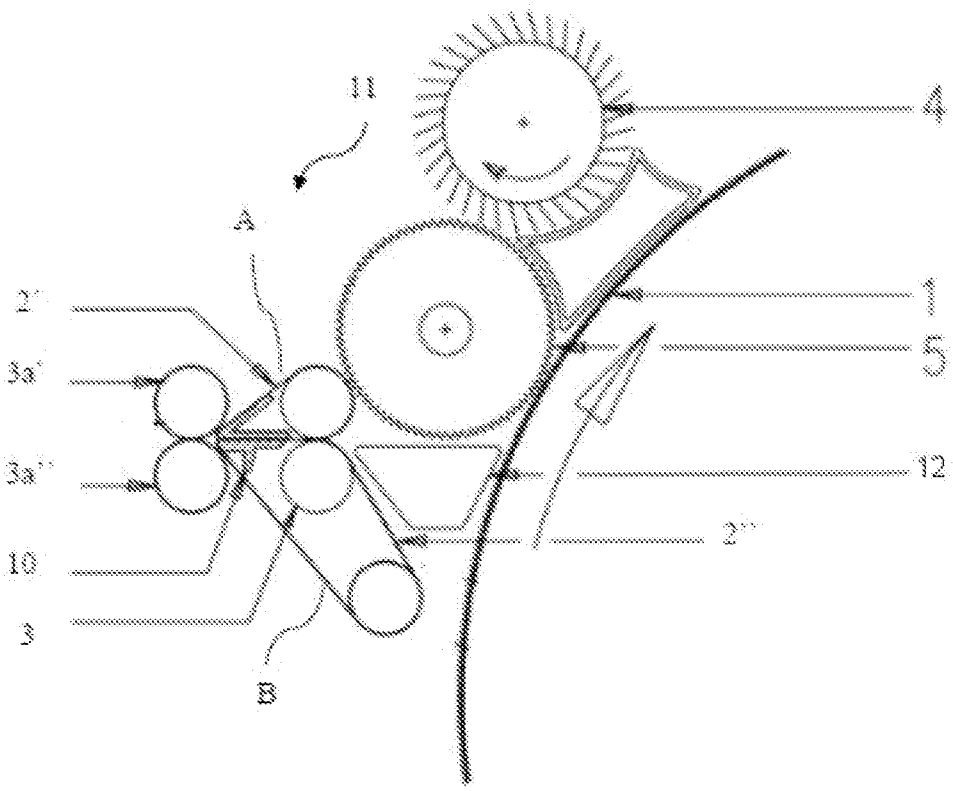


Fig 8

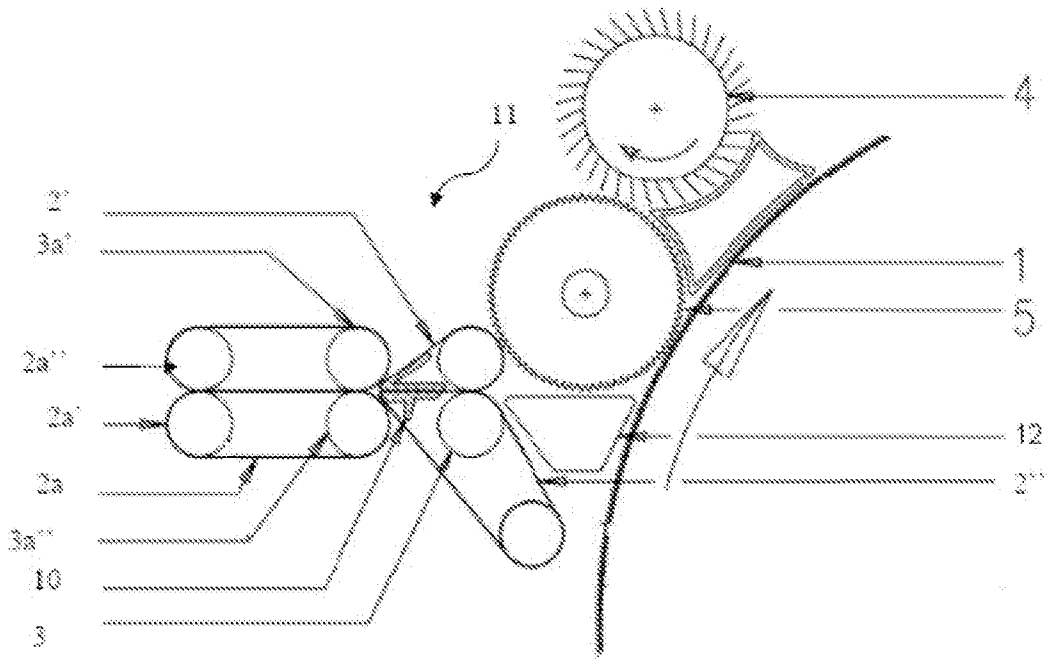


Fig 9

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB2013/051848

A. CLASSIFICATION OF SUBJECT MATTER

D01G 15/64 (2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC:D01G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPODOC,WPI.CNPAT,CNKI:draft,apron,card+,rear,belt,guid+,roller,doff+,web,strip

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US3119152 A (JOHNSON & JOHNSON) 28 January.1964(28.01.1964) Description, columns 10-11 and figures 1-6	1-4,7-10
A	WO2006051294 A1(IYPE C,etc.) 18 May 2006(18.05.2006) the whole document	1-10
A	DE4139067 A1 (SKF TEXTILMASCH KOMPONENTEN) 09.June.1993(09.06.1993) the whole document	1-10
A	EP1900863 A1 (ASSELIN THIBEAU) 19.March 2008(19.03.2008) the whole document	1-10

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim (S) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&"document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
04 Aug. 2013(04.08.2013)	**22 Aug. 2013 (22.08.2013)**
Name and mailing address of the ISA/CN The State Intellectual Property Office, the P.R.China 6 Xitucheng Rd., Jimen Bridge, Haidian District, Beijing, China 100088 Facsimile No. 86-10-62019451	Authorized officer QIAO, Pengjuan Telephone No. (86-10)62085541

Form PCT/ISA /210 (second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/IB2013/051848

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
US 3119152 A	28.01.1964	None	
WO 2006051294 A1	18.05.2006	US 2009094793 A1	16.04.2009
		EP 1809795 A1	25.07.2007
		IN 200501029 I2	27.07.2007
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DE 4139067 A1	09.06.1993	DE 4139067 C2	25.11.1993
EP 1900863 A1	19.03.2008	FR 2905956 A1	21.03.2008