

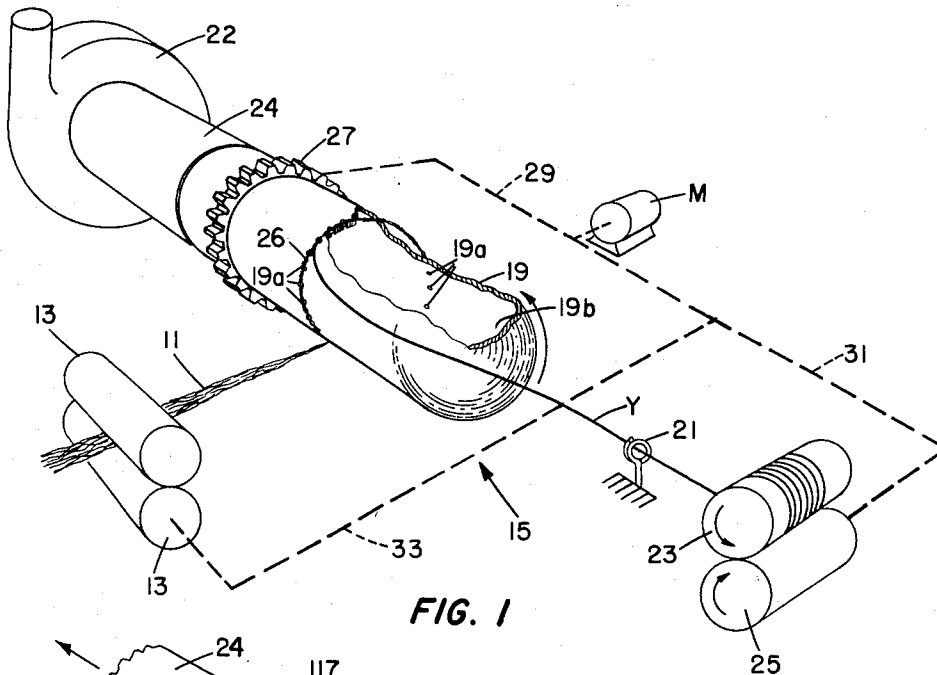
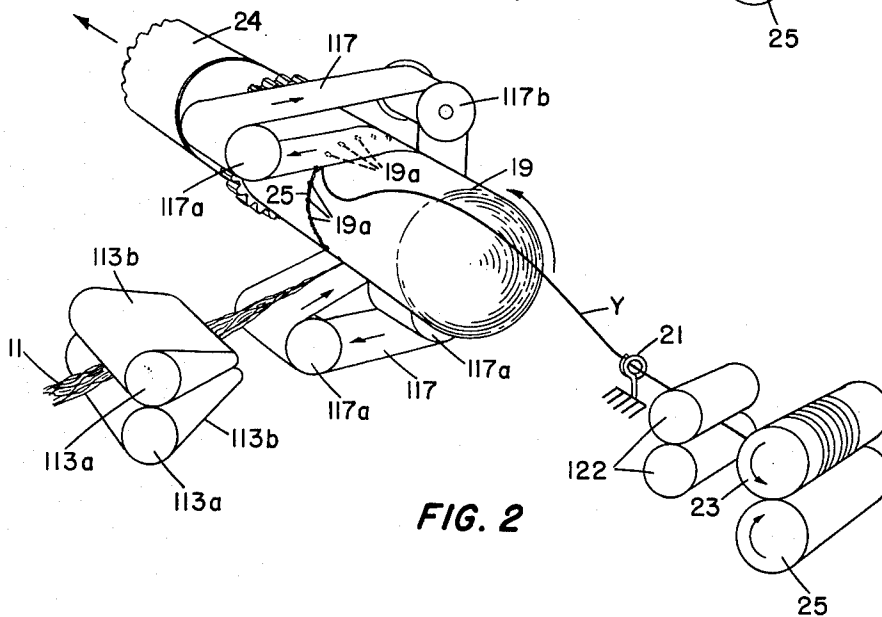
May 12, 1964

R. V. PUTNAM
TEXTILE PROCESSING ARRANGEMENT AND METHOD
FOR SPINNING FIBERS INTO YARN

3,132,465

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5 Sheets-Sheet 1



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5 Sheets-Sheet 2

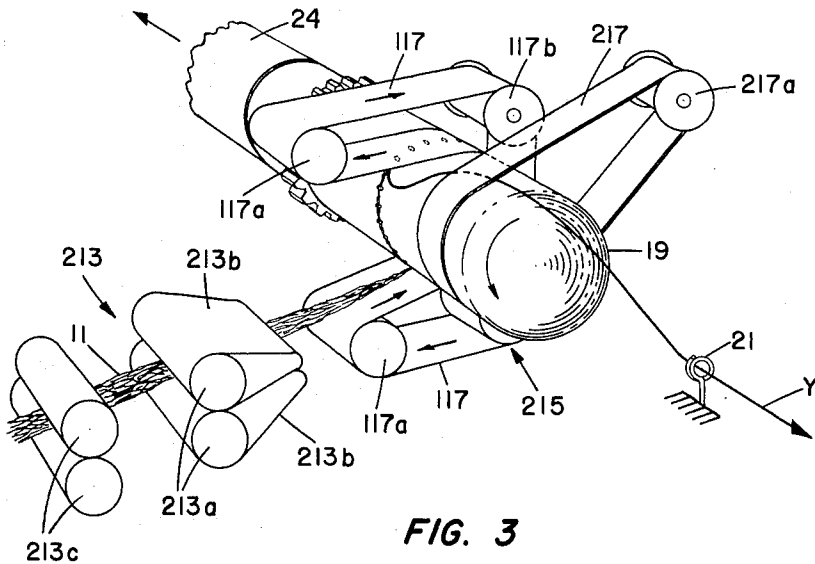


FIG. 3

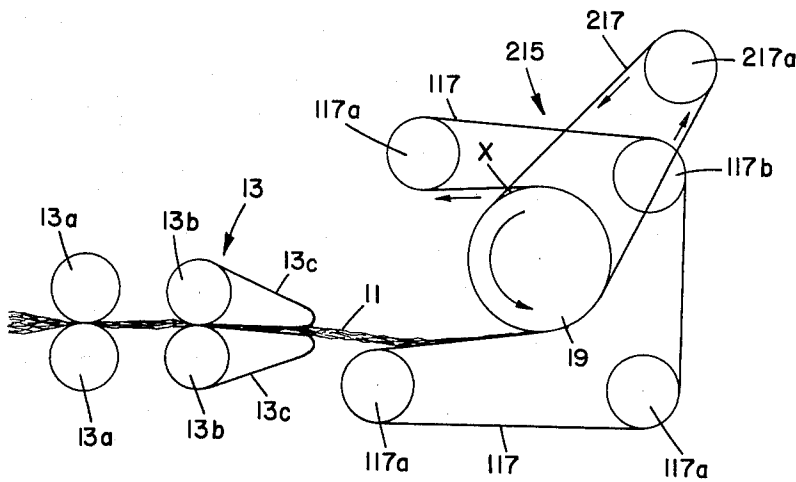


FIG. 4

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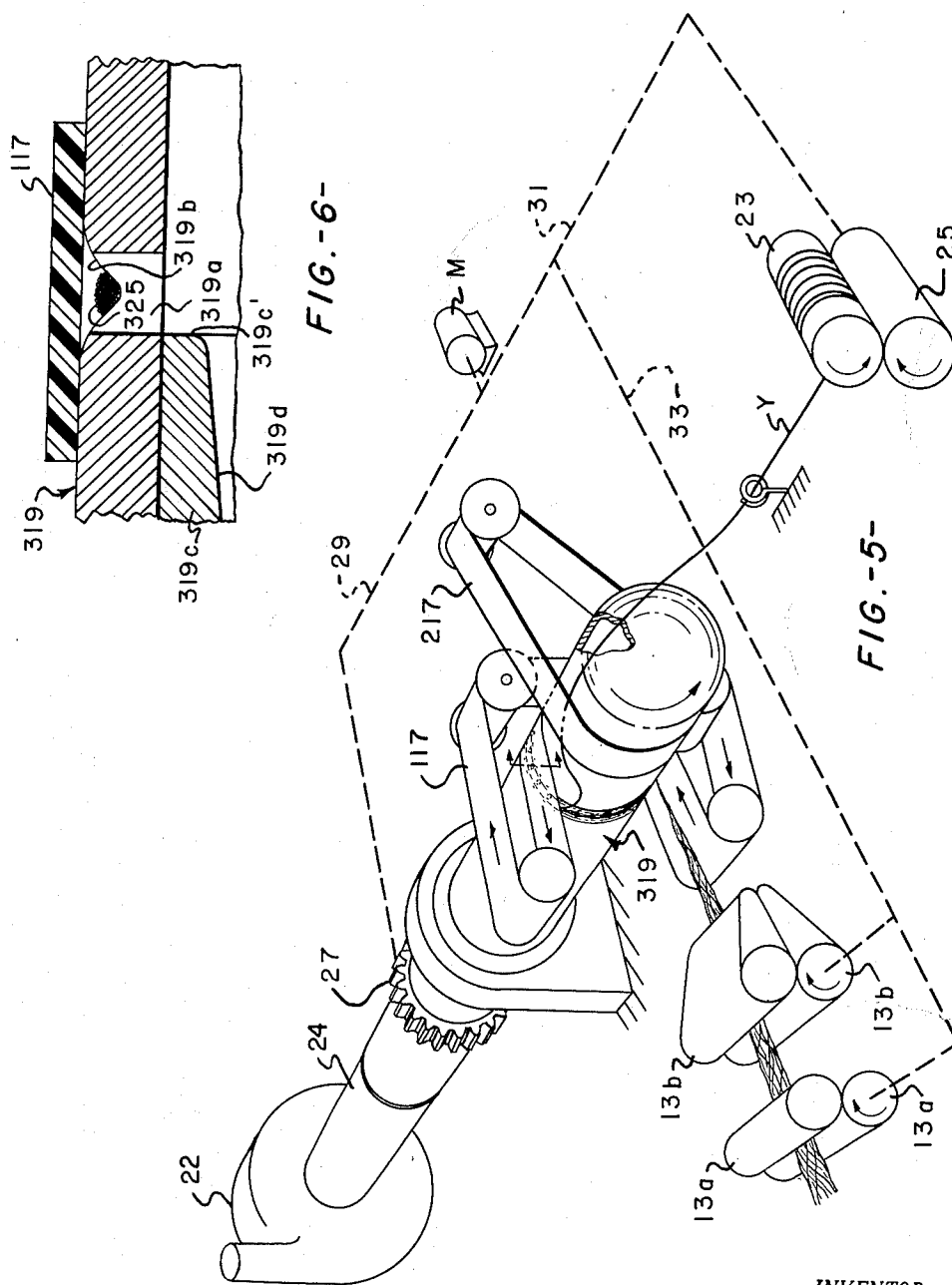
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5 Sheets-Sheet 3



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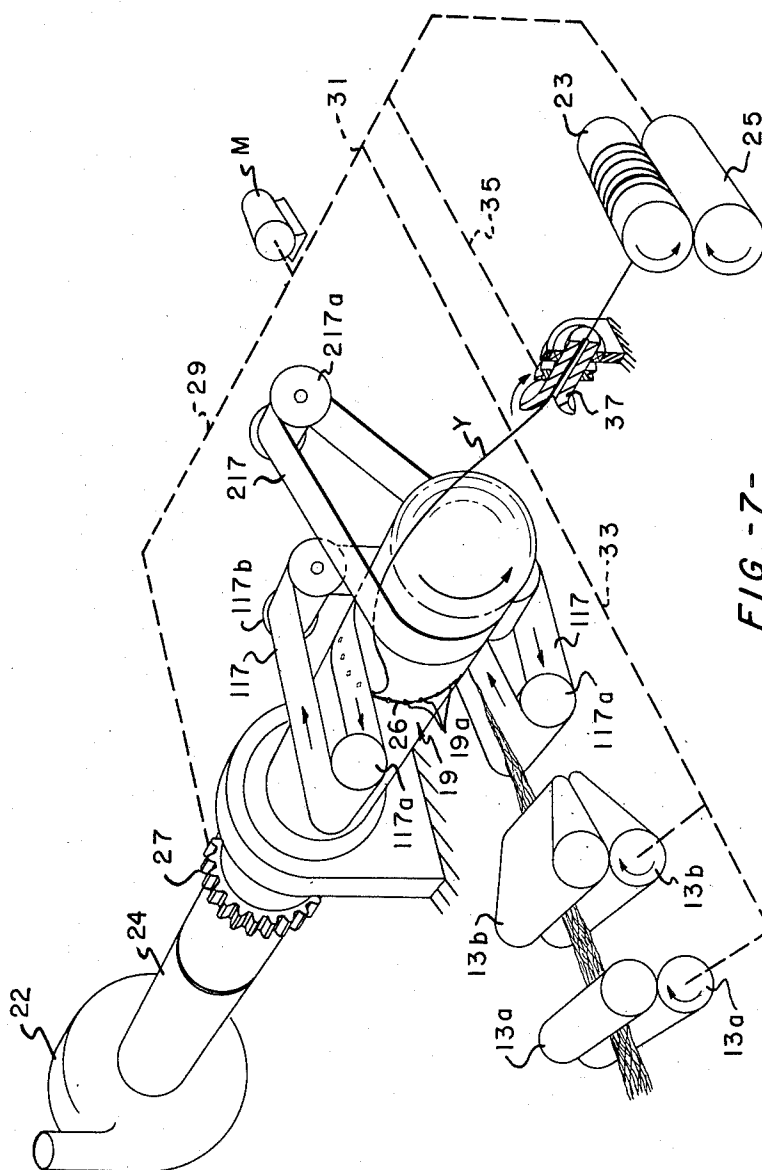


FIG. -7-

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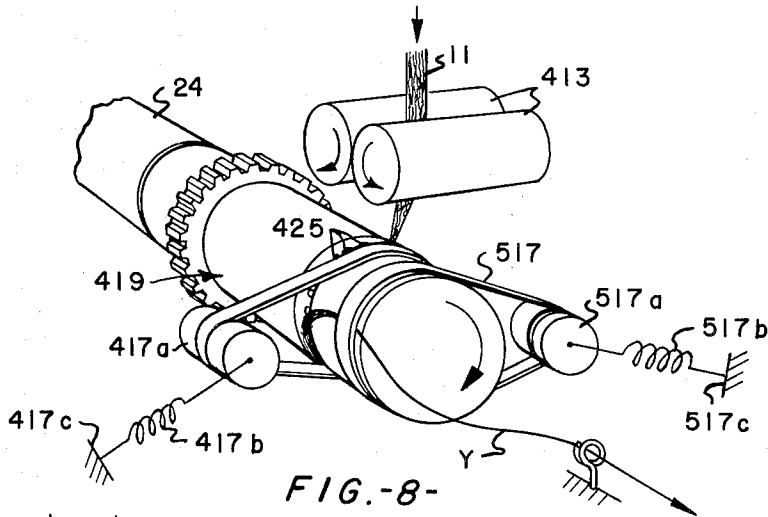
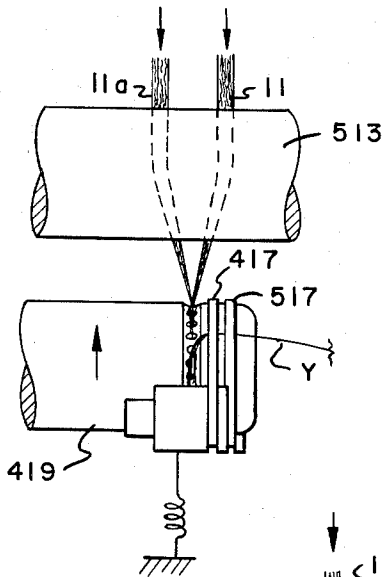
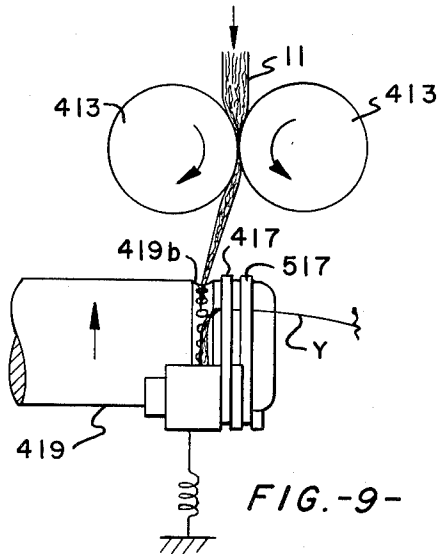
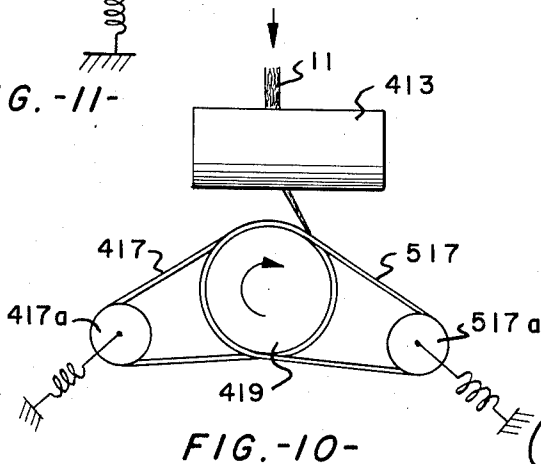
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5 Sheets-Sheet 5



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3,132,465

TEXTILE PROCESSING ARRANGEMENT AND METHOD FOR SPINNING FIBERS INTO YARN

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Filed Feb. 4, 1963, Ser. No. 256,166
34 Claims. (Cl. 57—53.89)

This application is a continuation-in-part of application Serial No. 221,722, filed September 6, 1962, and now abandoned.

This invention relates to an improved textile processing arrangement and method, and more particularly to an improved method and apparatus for spinning textile staple fibers into a yarn or the like.

It has long been recognized as desirable to provide for spinning of textile fibers without the requirement for a twister type take-up, such as a ring and traveler device. Various mechanisms and methods have been attempted in the past for achieving this end; however, for various reasons none of these prior art systems has to my knowledge been entirely satisfactory.

It is an object and feature of the present invention to provide an improved yarn spinning system which does not require the employment of a twister type take-up to spin the yarn, and which will provide a yarn of satisfactory quality and uniformity having a particular characteristic of a substantially smooth surface with little hairiness compared to normal yarn and substantial uniformity. Also, the yarns produced according to this invention are characterized by substantial parallel orientation of fibers in the major central body portion of the yarn.

Still other features and attendant advantages will become apparent to those skilled in the art from the following detailed description of several physical embodiments constructed according to the invention, taken in conjunction with the accompanying drawing wherein:

FIGURE 1 is a schematic view in perspective of the physical embodiment constructed according to the invention.

FIGURE 2 is a view in perspective of a modification according to the invention.

FIGURE 3 is a further modification incorporating the preferred mode of practice of the invention.

FIGURE 4 is a schematic illustration as viewed from the end of the spinning roll, and illustrating particularly the arrangement of the fiber and yarn control bands with respect to the periphery of the spinning roll.

FIGURE 5 illustrates a further modification in which the rotor is provided with an annular collection groove.

FIGURE 6 is a partial longitudinal section of a wall portion of the rotor of FIGURE 5 in the zone of the collection ring.

FIGURE 7 is a schematic perspective of a further modification incorporating a false twister.

FIGURES 8-11 illustrate a further modification, in which FIGURE 8 is a schematic view in perspective, FIGURE 9 is a schematic partial side elevation, and FIGURE 10 is a schematic end view of the rotor assembly of FIGURE 8.

FIGURE 11 is a schematic side elevation of a further modification according to the invention.

Referring now in detail to the figures of the drawings, the illustrative embodiment shown in FIGURE 1 includes fiber metering and feeding means in the form of nip rolls 13, 13 which feed a running mass of staple fibers 11, as in the form of roving or sliver or the like, in metered relation to a fiber spinning device 15 in the form of a rotor 19 which is somewhat smoothly rounded and closed at one end and connected at the opposite open end to a suitable source of negative pressure, in the form of a blower

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22, by an intermediate stationary vacuum conduit 24 disposed in close adjacency to the opposite open end of the rotor. The rotor 19 has a hollow cavity 19b formed therein which connects through the open end of the rotor to the stationary vacuum conduit 24. If desired, as for the purpose of reducing vacuum losses, a rotary fluid connecting joint may be employed between the conduit 24 and the rotor 19, although such has not been found necessary in practice.

The rotor 19 has an annular series of holes 19a formed therein and connecting between its outer annular periphery and the inner vacuum cavity 19b. The annular zone formed on the periphery of the rotor 19 along the circumferential line of the series of holes 19a serves as an annular fiber storage and transfer zone for the fibers 11 which are fed to the rotor from the metering feed rolls 13.

The rotor 19 and feed rolls 13 may be suitably driven in synchronous relation with one another as by a motor M, which may likewise be employed for driving a suitable take-up device, which may suitably take the form of a peripheral surface drive roll 25 which may surface drive at constant take-up rate a take-up bobbin, tube, or the like, 23. The motor M may be connected to the feed rolls 13, rotor 19 and take-up 25 in suitable manner, as through mechanical or other suitable connections generally indicated at 29, 31, 33, and speed ratio adjustment means as in the form of conventional change gears or other suitable means, may be provided for changing the ratio of drive to each of the nip rolls 13, rotor 19 and take-up drive 25, in order to provide the desired yarn count and twist for a given size of input fiber mass 11 passing to the nip rolls 13. The rotor 19 will, of course, be supported by one or more bearings, not shown, of conventional and suitable construction, which bearing or bearings may suitably be disposed on one or both sides of an annular series of gear or sprocket teeth 27 formed or secured on the periphery of the rotor 19 between the series of holes 19a and the open end of the rotor, which gear teeth may suitably be employed for positive drive of the rotor 19 from the mechanical drive connection 29.

In operation of the illustrative arrangement of FIGURE 1, a running length of staple fibers 11 in the form of roving, sliver or the like is fed in metered relation by the feed rolls 13 which are preferably parallel to the axis of the rotor 19 in order to dispose the rolls at a suitably close position to the rotor 19, to minimize windage problems, and to aid in vacuum utilization in fiber transfer to the rotor 19 from the feed means 13 thereto. As the cavity 19b of the rotor 19 is under vacuum through the operation of the blower 22, the staple fibers 11 will be attracted to the fiber storage and transfer zone formed along the line of the annular series of holes 19a on the rotor 19, and the rotation of the rotor will cause the buildup of a ring 26 of substantially circumferentially aligned and overlapping staple fibers along this series of holes 19a. The fibers in the storage and transfer ring 26 cling to the peripheral surface of the rotor 19 along the line of apertures or holes 19a under the influence of the pneumatic differential pressure action on the fibers in the zone of the holes 19a, with some of the fibers having one or more of the ends extending to some degree into the holes 19a, but not to such an extent that the fibers cannot be removed from the rotor surface during the formation of the yarn Y therefrom.

The fiber storage and transfer ring 26 is continuously changing in fiber content by the removal of fibers therefrom in the form of yarn Y and the feeding of fiber stock 11 thereto from feed rolls 13, the feed rates of input and removal being correlated so as to maintain a substantially constant balance in the storage and transfer ring during

operation. A yarn Y is formed from the storage and transfer ring 26 and is passed over the free end of the rotor 19 in an orbiting balloon generatrix path, through a yarn guide 21 which is coaxial with rotor 19, and is subsequently taken up on the take-up roll 23 which is driven at a constant surface velocity by the take-up drive roll 25.

In the initial starting up of the apparatus of the embodiment of FIGURE 1, either of two methods may be employed. According to one method, the rotor 19 and feed rolls 13 may be briefly operated to form a suitable small ring of fibers 26 along the line of holes 19a on the rotor 19, after which a previously formed yarn Y, or other filament, is then connected to the storage and transfer ring of fibers 26 by lightly rubbing the free end of the yarn in a twisting manner against the ring of fibers 26. Thereupon the motor M may again be restarted to synchronously drive the feed rolls 13, rotor 19 and take-up 25, 23, whereupon the yarn Y will be drawn onto the take-up roll 23, and will be continuously formed through a parasitic twisting and pulling action at the moving take-off point along the annular length of the storage and transfer ring of fibers 26 extending along the line of apertures 19a. Alternatively, in lieu of forming the initial small ring of fibers 26 along the line of the holes 19a on the rotor 19, one may take a previously formed length of yarn Y or other filament and wrap such for one or two turns or so about the line of holes 19a, leading the free end of the yarn over the outer free closed end of the rotor and through the guide 21 to the take-up 25, 23, and thereupon starting the motor M to synchronously drive each of the feed rolls 13, rotor 19 and take-up 25, 23, whereupon the seed yarn Y will be drawn forward by the take-up 23, and will parasitically pick up, twist and form into yarn the discrete fibers which will immediately begin to be pulled onto and formed into a ring 25 along the line of holes 19a on the rotor.

The rotary motion of the rotor 19 imparts a rotation or orbiting movement to the yarn Y, which is at a lesser rate than the rate of rotation of the rotor 19 due to the travel of the yarn take-off point along the ring 26 during yarn formation. The precise rate of rotation of the balloon formed by the yarn Y will be a function of both the rate of rotation of the rotor 19, the diameter of the rotor 19 along the line of holes 19a, and the rate of take-up of the roll 23. The point of formation and take-off of the yarn Y at the storage and transfer line of fibers 26 is not fixed, but moves continuously along the length of the storage and transfer ring 26 at a rate equal to the difference between the balloon rotation rate and the rate of rotation of the rotor 19. Thus, the orbiting of the yarn Y by and about the rotor 19 imparts a twist between the first twist stop at the output end of the yarn balloon and the origination point of the yarn at the take-off point on the storage ring 26, and this twist which is present at the take-off point on the storage ring 26 causes a twisting of the fibers at the point of contract of the yarn with the storage ring 26. The continuing progression of this take-off or contact point of the yarn Y along the storage ring 25 effects the continual formation of additional yarn in a running or traveling take-off fashion about the entire length of the storage ring, whereby the storage ring is continually in a state of flux with the fibers being twisted and removed in the form of yarn Y and added thereto in the form of substantially discrete fibers from the nip rolls 13. The rate of rotation of the rotor 19 with respect to the nip rolls 13 may be and is preferably such as to effect a very substantial degree of drafting of the fibers between the nip rolls and the storage and transfer ring 26 on the rotor 19, or if desired, particularly if comparatively low rotor velocity is tolerable for a given instance, the entire drafting of the staple fibers 11 may be effected prior to passage through the nip rolls 13, or a combination of drafting may be effected both prior to and subsequent to passage through the nip rolls 13. In any event

a discrete fiber delivery should be effected onto the rotor along the storage and transfer ring 26. If prior drafting is desired, any suitable conventional drafting arrangement may be employed.

While the embodiment of FIGURE 1 is entirely operative and suitable for some operations, the angular velocity of the rotor 19 is substantially limited due to action of centrifugal force on the yarn Y tending to break the yarn at the point of connection with the storage and transfer ring 26. However, rotor velocity of up to approximately 2,000 or 3,000 r.p.m. has been obtained with this system.

In the illustrative embodiment of FIGURE 2 a rotor 19 is employed as in the embodiment of FIGURE 1, with the addition of a fiber control band 117 which serves to aid in overcoming the centrifugal force action on the yarn Y during orbiting thereof, and thereby permitting the employment of substantially greater rotor velocity, with consequent greater yarn feed rate and/or yarn twist. In this embodiment the fiber control band 117 passes about a plurality of guide rolls 117a, 117b, at least one of which guide rolls 117b is preferably flanged in order to provide for lateral stability of the fiber control band along the length of the rotor 19.

According to this embodiment the fiber control band 117 engages approximately one-half, more or less, of the peripheral surface of the rotor 19, along the line of holes 19a forming the storage and transfer zone about which the storage and transfer ring 26 is formed. By disposing the fiber control band 117 in this position such may serve not only the function of containing the ballooning yarn against centrifugal force action thereon, but may also aid in supporting the fibers between the rotor 19 and the fiber feed rolls and aprons 113a, 113b. It will also be noted that the fiber control band 117 in this illustrative embodiment extends on both sides of the annular row of holes 19a forming the fiber storage and transfer zone. The portion of the fiber control band 117 which extends between the annular row of apertures 19a and the free closed end of the rotor 19 is of substantial importance in this action of containing the orbiting yarn Y against centrifugal forces thereon and preventing severance of the yarn from the storage and transfer ring of fibers 26, and while it is considered most desirable to engage the band also along the ring 26, it may in some instances be feasible and desirable to dispose a fiber control band solely in the zone between the row of holes 19a and the free outer closed end of the rotor, in which instance the fiber control band serves primarily the role of opposing the centrifugal forces exerted on, and containing, the yarn during its orbiting and yarn formation by and about the rotating rotor 19.

It will be noted that in the illustrative embodiment of FIGURE 2, in addition to the fiber control band 117, this embodiment is also illustrated with feed rolls 122 between the coaxial guide 21 and take-up 23, 25, in order to aid in positive control of the feed rate of the yarn to the take-up, it being understood that the motor M may likewise drive these feed rolls at a desired synchronized rate. Additionally, as mentioned above this embodiment is also illustrated as employing feed rolls 113a with fiber control aprons 113b associated therewith for metered fiber feed. The feed roll and fiber control apron arrangement 113a, 113b, may be of any suitable conventional construction as is employed in conventional spinning frames. While the employment of a single fiber control band 117 is of material aid in permitting the increase of rotor and yarn balloon velocity, I have found that in order to achieve maximum rotor and balloon velocities it is desirable to employ two fiber control bands in order to encompass a larger portion of the rotor periphery, and preferably all or almost all of the rotor periphery. Such an embodiment is illustrated in FIGURES 3 and 4, wherein a second fiber control band 217 is disposed between the fiber control band 117 and the free outer closed end of the rotor 19. This second fiber control band is prefer-

ably spaced from the control band 117, and may be suitably guided about a guide pulley 217a spaced from the rotor 19. Also, for illustrative purposes, this embodiment is illustrated as including a conventional pre-drafting arrangement 213 having drafting rolls 213c additional to the rolls 213a and aprons 213b as shown in the embodiment of FIGURE 2. It will, of course, be appreciated that any suitable input feed, or take-up, arrangement may be employed with this or any of the other illustrative embodiments or such other embodiments as are constructed according to the invention. However, as in the instance of input feeding of an originally very heavy mass of staple fibers such as sliver, it may be most advantageous to rely upon a substantial degree of pre-drafting or perhaps entire drafting prior to passage from the feed rolls immediately preceding the rotor assembly.

According to this latter embodiment of FIGURES 3 and 4, the yarn balloon is contained by each of the fiber control bands 117 and 217 against centrifugal force action thereon, the two fiber control bands serving to complement one another in their peripheral balloon control functions in this respect. While by employing a smooth light tension on the fiber control bands 117 and 217 it is possible to encompass the entire periphery of the rotor 19 by the control bands and still effectively form yarn with this apparatus, I have found that when employing a fairly tight tension, (e.g., 75 to 100 grams or more static tension for 20s count cotton yarn) on the fiber control bands it is desirable to leave a space as indicated at X in FIGURE 4 which is not covered by either of the bands 117 or 217 in order to achieve sufficiently high yarn feed and rotor velocity. The exact reason for this phenomenon and requirement is not known. However, it is believed that the yarn is pulled forward through the zone X during each revolution of the yarn through this zone, whereas with substantially loose bands (e.g., static tension of approximately 50-75 grams or the like as for 20s count cotton yarn) the yarn can be pulled beneath the control bands about the entire path of angular travel of the yarn balloon.

While various materials may be employed for the construction of the fiber control bands, I have found it most desirable to employ a flexible smooth surfaced band material, such as rubber, synthetic rubber, and various plastics such as polyethylene, Mylar, etc. Also, while it is feasible to use both elastically extensible and nonextensible fiber control bands, I have found it most advantageous to employ highly flexible substantially nonextensible band constructions, such as for instance may be found in the conventional constructions employed in textile drafting aprons of synthetic material construction.

The previously described embodiments of FIGURES 1-4 are quite adequate for low speed operation, i.e., below approximately 2000 r.p.m. of the rotor 319; however, for higher speed operation I have found it desirable to employ some modification of the rotor arrangement. A modification of the rotor for this purpose is illustrated in FIGURES 5 and 6, wherein the rotor is provided with an annular groove 319b which is preferably generally V-shaped with inclined side walls and having a slightly rounded inner apex and rounded outer terminal side wall portions, in which groove 319b the series of holes 319a are formed, as shown particularly in FIGURE 6. These grooves may be radially straight, as shown, or inclined to the axis if desired. Primarily, the groove 319b serves to recess the ring of fibers 325 beneath the outermost surface of the rotor 319, thereby spacing the fiber ring beneath the surface of the fiber control band 117, as at higher speeds the fibers tend to stick to the fiber control band 117 and be retained thereon if they are in direct pressure engagement with the band, which sticking hampers the formation of the yarn Y to some degree. Additionally, the groove 319b serves the important function of cam biasing the ring of fibers 325 into a more compact bundle, this cam biasing being a function of the differential pressure exerted on the fibers through differential air pressure

and air passage through the holes 319a, as well as the angle of slope of the side walls of the groove. The recessing of the ring of collected fibers 325 beneath the outermost surface of the rotor 319, as is effected by collecting the fibers in the groove 319b, also reduces the effect of windage on the fibers, which windage tends to disrupt the fiber ring, particularly during high speed operations. This combination effect of the groove 319b and holes 319a is of considerable value in aiding the operation of the apparatus at higher speeds.

FIGURE 6 also illustrates the preferred manner of formation of the zone adjacent the groove 319b and series of holes 319a, it being preferred to provide a smooth annular shoulder 319c' adjacent the series of grooves in order to minimize any tendency of stray fiber ends which may protrude inwardly through holes 319a to become entangled with one another due to air turbulence resulting from air flow through the holes 319a. This shoulder 319c' may be formed either as an integral part of the rotor body or as an annular sleeve 319c pressed or otherwise secured into engagement with the main wall of the rotor of 319, in which latter instance the sleeve is preferably pressed to a position with its end forming the shoulder 319c' in substantial alignment with the respective wall portion of the hole 319a, as shown particularly in FIGURE 6. The thickness of this shoulder 319c will vary with varying differential pressures and size and shape of holes 319a, it having been found suitable to employ a sleeve 319c with a shoulder 319c' of approximately $\frac{3}{32}$ - $\frac{1}{8}$ inch thickness for a differential pressure of approximately 1 to 4 inches of mercury and a relative hole size and shape as shown in FIGURE 6. The sleeve 319c is preferably slightly rounded at the inner annular edge of the shoulder 319c', and is tapered inwardly along the surface extending back toward the suction device 22, as indicated at 319d. This inward tapering of the effective inside diameter of the rotor is desirable in order to accelerate the air flow as the air proceeds rearwardly from the intake zone and thereby sweep and maintain as clean as possible the interior side walls 319d of the rotor. This sleeve 319c may and preferably does extend back to the zone of intersection of the rotor 319 with the stationary vacuum conduit 24.

In order to facilitate the formation of a yarn at some desired lower twist multiple or twist construction, it may be desirable to incorporate a false twist device in the overall arrangement, as shown in FIGURE 7. In this modification, a false twister 37, which may be of any conventional or suitable construction, is disposed between the closed end of the rotor 19 and the take-up device 25, the false twister being preferably disposed on the axis of the rotor 19. The false twister may be suitably driven from the same motive source M as the remaining components of the system, as through a drive connection 35, and is driven in a direction opposite to the direction of rotation of the rotor 19. Thus, the yarn Y will have an apparent twist at the zone of formation of the yarn adjacent the ring of fibers 26 which is greater than the twist in the yarn as the yarn is taken up at the take-up device 23, 25, and this permits the yarn which is taken up on the roll 23 to have a lesser twist construction than might otherwise be necessary in order to effect twisting in of the fibers at the ring 26.

FIGURES 8-10 illustrate a further embodiment according to the invention, in which both of the fiber control bands 417 and 517 are disposed between the annular groove 419b and series of holes 425 on the one hand and the closed outer end of the rotor 419 on the other hand. It will thus be seen that there is no fiber control band provided about the groove 419b in this embodiment, and this facilitates the feeding of the fibers by a set of feed rolls 413 which may be disposed with their axes transverse to the axis of rotation of the rotor 19. The provision of these fiber control bands in this spaced manner between the zone of the holes 425 and the free outer

closed end of the rotor 419 also facilitates the threading up of the yarn Y on the rotor 419. In this embodiment each of the control bands 417 and 517 pass about a respective single idler pulley 417a, which is preferably grooved to provide for spatial positioning of the respective control band on the rotor 419. In order to provide a desired tension on the fiber control bands 417 and 517, the groove pulleys 417a and 517a are resiliently biased in a direction away from the axis of the rotor 419 as by the employment of springs 417b and 517b which may be of any suitable type and construction, and may be suitably anchored to a supporting surface 417c, 517c, respectively. The supporting surfaces 417c and 517c may be movable for adjustment of the spring forces if desired.

It has been found in this type of feed arrangement of the fibers 11 to the rotor 419b that it is desirable to have the fibers feed in at an angle to the axis of the rotor, as viewed from the side as in FIGURE 9. To this end, it is desirable to position the feed rolls 413, or some other guide means for the fibers 11, between the plane of the annular groove 419b and holes 425 on the one hand and the outer closed end of the rotor 419 on the other hand. The angled feeding of the fibers to the rotors 419 in this manner serves to aid in preventing ends down of yarn Y. In the embodiments of FIGURES 1-7, in which the fibers 11 are fed in a substantially flat band with its side portions extending along the length of the rotor it has been found that this factor is not critical, inasmuch as fibers are inherently fed from both sides of the plane of the series of holes so long as the fiber flow path to the rotor is substantially perpendicular to the length of the rotor.

FIGURE 11 illustrates a further embodiment similar to that of FIGURES 8-10 with the feed rolls 513 disposed in alignment with the axis of the rotor 419, in order to permit the feeding of two streams of fibers 11 and 11a to the rotor 419. This arrangement is particularly advantageous for blending of two or more separate fiber quantities. Otherwise, the operation is substantially similar to that previously disclosed.

While the invention has been shown and described with respect to several illustrative physical embodiments thereof, it will be readily apparent to those skilled in the art that various modifications and improvements may be made without departing from the scope and spirit of the invention. Accordingly, it is to be understood that the invention is not to be limited by the specific illustrative embodiments shown and described herein, but only by the scope of the appended claims.

That which is claimed is:

1. A textile spinning apparatus comprising a rotor closed at one end and having an internal vacuum chamber, means forming an annular series of holes in the peripheral surface of said rotor adjacent said one end and in fluid connection with said vacuum chamber, the zone of said series of holes forming a narrow annular fiber storage and transfer zone on the periphery of said rotor, and vacuum conduit means connecting at the opposite end of said rotor with the said vacuum chamber.

2. Apparatus according to claim 1 wherein said vacuum conduit means is stationary.

3. Apparatus according to claim 1 further comprising a pair of fiber feed rolls disposed to one lateral side of and in fiber feeding relation to said series of holes.

4. Apparatus according to claim 1 further comprising means for withdrawing fibers from the periphery of said rotor axially over said one end of said rotor.

5. Apparatus according to claim 1 further comprising a fiber control band extending around and in engagement with a portion of the periphery of said rotor.

6. Apparatus according to claim 5 wherein said fiber control band is disposed at least in part between said series of holes and said closed end of said roll.

7. Apparatus according to claim 5 wherein said fiber control band extends about and encompasses a portion of said series of holes.

8. Apparatus according to claim 5 wherein said fiber control band is disposed in spaced relation between said series of holes and said one closed end.

9. A textile spinning apparatus comprising a rotor closed at one end and having an internal vacuum chamber, means forming an annular series of holes in the peripheral surface of said rotor adjacent said one end and in fluid connection with said vacuum chamber, the zone of said series of holes forming an annular fiber storage and transfer zone on the periphery of said rotor, a fiber control band extending around and in engagement with a portion of the periphery of said rotor, a second fiber control band disposed about and in engagement with a further portion of the periphery of said rotor and between said first mentioned band and said one closed end, and vacuum conduit means connecting at the opposite end of said rotor with the said vacuum chamber.

10. Apparatus according to claim 9 wherein said bands are each in partial encompassing relation with the periphery of said rotor such as to form a peripheral gap in the path of travel of said rotor which gap is devoid of rotor engagement by said bands.

11. Apparatus according to claim 10 further comprising means for withdrawing fibers from the external periphery of said rotor over said one closed end of said rotor.

12. A spinning arrangement comprising a rotatable cylinder having an annular band of perforations forming a narrow external annular fiber storage and transfer zone, a hollow chamber formed within said cylinder and connecting with said perforations, means for connecting said cylindrical chamber to a source of negative pressure as compared to ambient atmospheric pressure surrounding said cylinder, said cylinder being closed at one end, means for rotating said cylinder, and means for withdrawing fibers from said fiber storage and transfer zone over said one end while rotating said cylinder.

13. An arrangement according to claim 12, further comprising a fiber control band extending around and in engagement with a portion of the periphery of said cylinder between said band of perforations and said one end of said cylinder.

14. An arrangement according to claim 13, including an idler roll spaced from said cylinder, said fiber control band extending about said cylinder and said idler roll.

15. An arrangement according to claim 14 including a second fiber control band extending around and in engagement with a further portion of the periphery of said cylinder and being at least in part peripherally complementary to the peripheral engagement of said first mentioned band about said cylinder, and further idler roll means spaced from said cylinder and in guiding relation to said second fiber control band.

16. The method of spinning a textile yarn from staple fibers comprising drafting a mass of staple fibers and depositing said staple fibers in annular relation on a narrow external annular fiber storage and transfer zone of an external rotating annular peripheral surface while exerting a differential fluid pressure thereon tending to hold said fibers on said surface, and withdrawing said fibers from said storage and transfer zone axially over one end of said surface, and collecting said fibers as a twisted yarn externally of said surface.

17. The method of spinning the textile yarn from staple fibers comprising dissociating a mass of staple fibers, depositing said dissociated fibers on a narrow annularly apertured fiber storage and transfer surface while rotating said surface about an axis extending transverse to the direction of feed of said fibers onto said surface and while exerting a differential fluid pressure force on said fibers opposing the centrifugal force exerted thereon by rotation of said surface, continuously withdrawing said fibers from said surface by sequential pickup thereof in running relation about the entire annular periphery of

said surface, said withdrawn fibers being twisted and withdrawn from said surface in an annular orbiting path extending axially of and away from the end of said surface.

18. The method according to claim 17 including exerting a radially inwardly mechanically confining force on said fibers after collection thereof on said external annular fiber storage and transfer surface and during twisting and withdrawal of said fibers from said surface.

19. The method according to claim 18 wherein said mechanical confining force is exerted by a continuously moving element engaging with the periphery of said surface while passing said fibers between said confining force exerting element and said surface.

20. The method according to claim 18 including exerting said radially inward confining force over a major portion of the periphery of said surface.

21. The method according to claim 17 including collecting said fibers as a twisted yarn at a position spaced from said surface, and false twisting said fibers between said surface and the zone of take-up in a direction opposite to the direction of rotation of said surface.

22. The method according to claim 17 including exerting a laterally compressive camming force on said fibers during application of and as a function of said differential fluid pressure force.

23. Apparatus according to claim 1 further comprising yarn take-up means, and a false twister disposed in yarn flow relation between said rotor and said yarn take-up means.

24. A textile spinning apparatus comprising a rotor closed at one end and having an internal vacuum chamber, means forming an annular series of holes in the peripheral surface of said rotor adjacent said one end and in fluid connection with said vacuum chamber, the zone of said series of holes forming an annular fiber storage and transfer zone on the periphery of said rotor, said annular series of holes being disposed in an annular groove formed on the outer peripheral surface of said rotor, and vacuum conduit means connecting at the opposite end of said rotor with the said vacuum chamber.

25. Apparatus according to claim 24 wherein said groove is V-shaped with converging side walls which exert a laterally compressive force on fibers held therein by differential fluid pressure action thereon through said holes.

26. A textile spinning apparatus comprising a rotor closed at one end and having an internal vacuum chamber, means forming an annular series of holes in the peripheral surface of said rotor adjacent said one end and in fluid connection with said vacuum chamber, the zone of said series of holes forming an annular fiber storage and transfer zone on the periphery of said rotor, two spaced apart fiber control bands each extending about and in engagement with a portion of the periphery of said rotor, each of said bands being disposed in spaced relation between said series of holes and said one closed end, and vacuum conduit means connecting at the opposite end of said rotor with the said vacuum chamber.

27. An arrangement according to claim 26 wherein said bands encompass mutually complementing portions of the path of travel of the engaged periphery of said rotor.

28. An arrangement according to claim 27 wherein said bands are each in partial encompassing relation with the periphery of said rotor such as to form a peripheral gap in the path of travel of the periphery of said rotor, which gap is devoid of rotor engagement by said bands.

29. An arrangement according to claim 1 further comprising fiber feed means laterally spaced from said rotor and arranged for feeding of a portion of the fibers toward said series of holes from a position spaced between said series of holes and said one closed end of said rotor.

30. An arrangement according to claim 29 wherein said fiber feed means includes a pair of feed rolls having their axes extending in substantially the same general direction as the axis of rotation of said rotor.

31. An arrangement according to claim 29 wherein said fiber feed means includes a pair of feed rolls having their axes extending transverse to the axis of rotation of said rotor.

32. An arrangement according to claim 29 wherein said fiber feed means is adapted to feed fibers in a band extending on both sides of said series of holes.

33. An arrangement according to claim 29 including means for feeding fibers along two separate lines to said series of holes, said two separate lines of feed each extending at an angle to the plane of said series of holes and from opposite sides of said plane.

34. A spinning arrangement comprising a rotatable cylinder having an annular band of perforations forming an external annular fiber storage and transfer zone, a hollow chamber formed within said cylinder and connecting with said perforations, means for connecting said cylindrical chamber to a source of negative pressure as compared to ambient atmospheric pressure surrounding said cylinder, said cylinder being closed at one end, means for rotating said cylinder, a fiber control band extending around and in engagement with a portion of the periphery of said cylinder between said band of perforations and said one end of said cylinder, an idler roll spaced from said cylinder, said fiber control band extending about said cylinder and said idler roll, a second fiber control band extending around and in engagement with a further portion of the periphery of said cylinder and being at least in part peripherally complementary to the peripheral engagement of said first mentioned band about said cylinder, a second idler roll means spaced from said cylinder and in guiding relation to said second fiber control band, and means for withdrawing fibers from said fiber storage and transfer zone over said one end while rotating said cylinder.

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