

Jan. 7, 1941.

W. POOL

2,227,911

PRODUCTION OF STAPLE FIBER YARNS AND LIKE PRODUCTS

Filed Oct. 3, 1939

2 Sheets-Sheet 1

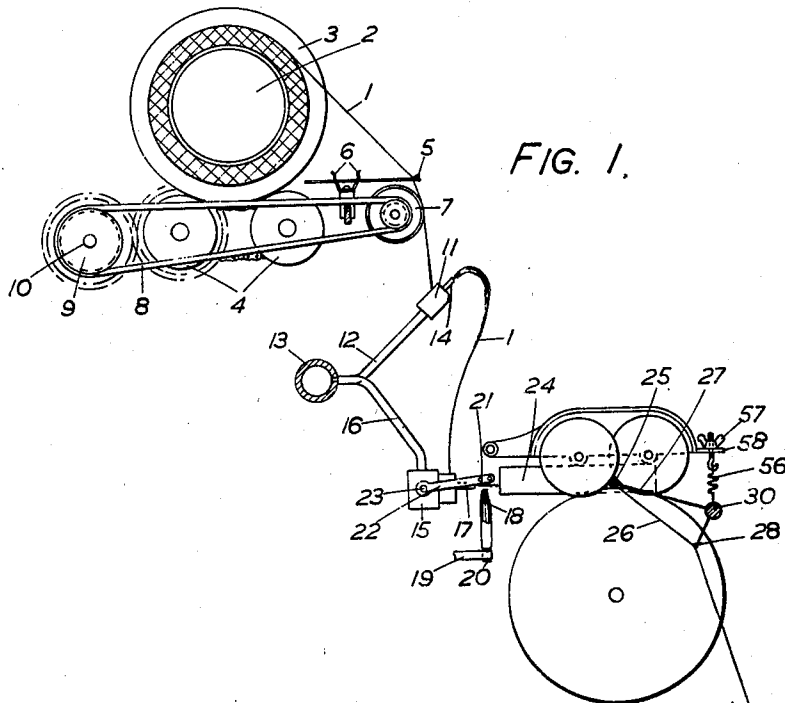
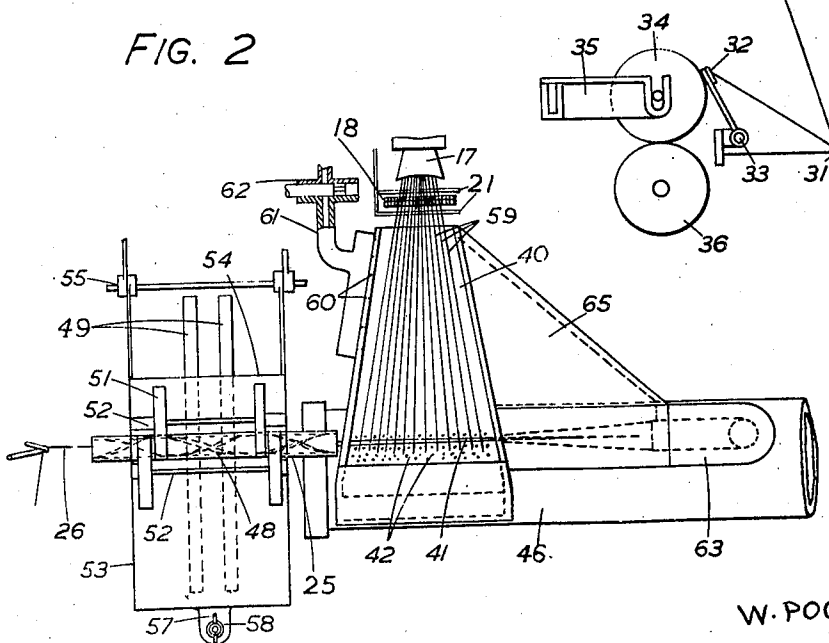


FIG. 1.

FIG. 2



W. POOL
INVENTOR

J. S. G. & C. W. G.
ATTORNEYS

Jan. 7, 1941.

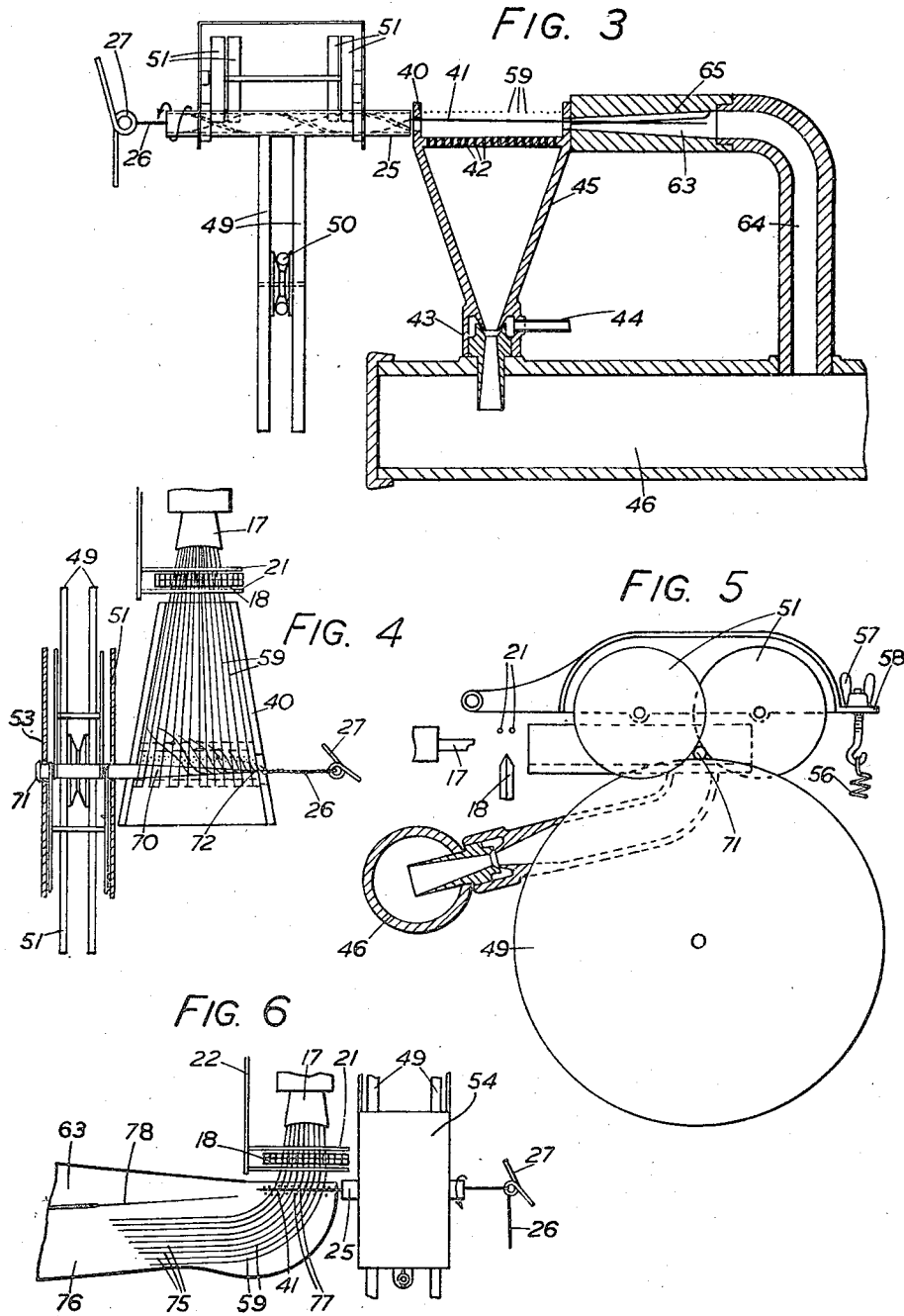
W. POOL

2,227,911

PRODUCTION OF STAPLE FIBER YARNS AND LIKE PRODUCTS

Filed Oct. 3, 1939

2 Sheets-Sheet 2



W. POOL
INVENTOR

W. H. & C. L. Johnson
ATTORNEYS

UNITED STATES PATENT OFFICE

2,227,911

PRODUCTION OF STAPLE FIBER YARNS
AND LIKE PRODUCTS

William Pool, Spondon, near Derby, England, as-
signor to Celanese Corporation of America, a
corporation of Delaware

Application October 3, 1939, Serial No. 297,670
In Great Britain October 10, 1938

25 Claims. (Cl. 57—2)

This invention relates to the production of staple fiber yarns and like products, and is particularly concerned with the manufacture of such staple fiber products from continuous filaments.

It is an object of the present invention to provide an improved method of forming a staple fiber yarn or like product from a succession of groups of staple fibers.

According to the present invention a process for the manufacture of staple fiber yarn or like product (hereinafter referred to as a staple fiber yarn) comprises feeding a succession of flat wide groups of separated fibers to the end of a rapidly rotating support in a direction across the axis of its rotation so that the ends of said fibers are taken up on said support by previously fed fibers and continuously drawing away along said axis of rotation a staple fiber yarn resulting from the twisting together of the successive groups of fibers by the rotation of said support, said support extending axially from said staple fiber yarn beyond any point at which said fibers meet said support. The succession of groups of fibers are preferably provided by cutting them successively from the end of a bundle of continuous filaments that are separated at the end of the bundle from one another.

The support to which the fibers are fed may be constituted by the rapidly rotating tail of the staple fiber yarn being produced, the newly added fibers being drawn away along the axis of rotation to form a new tail, or it may be constituted or augmented by a rapidly rotated fine needle-like spindle. In either case, the feeding of the separated fibers across the axis of rotation, preferably at right angles thereto, ensures that the ends of the different fibers engage the support at different points, and are disposed at different points in the length of the staple fiber yarn produced. Similarly, when the free ends of the fibers taken up are drawn away along the axis of the support, whereby they then constitute the new tail of the staple fiber yarn being produced, they extend to different distances along said axis, and when subsequently formed into the body of the staple fiber yarn, are disposed at different points therein. For this reason it is not essential that the separated filaments should be cut obliquely, for the purpose of staggering the ends of the fibers in the groups of fibers cut and ensuring that the ends of each group do not coincide in the finished product.

The ends of the groups of fibers that are

taken up by the tail of the staple fiber yarn may be the leading ends, the fibers extending from the cutting point to the tail of yarn, or alternatively, they may be the rear ends, the cutting point being disposed close to the tail of yarn, and the fibers extending, prior to being taken up, from the cutting point and beyond the tail of yarn. In either case, the appropriate ends of each group of fibers are brought into contact with the rapidly twisting tail of the staple fiber yarn, and the other, or free ends, then form a new tail thereto. The rapid twisting of the tail of the staple fiber yarn has the double effect of imparting twist to the staple fiber yarn and of taking up the ends of the groups of fibers fed to it so that the staple fiber yarn drawn away is a twisted yarn built up of the bunches of staple fibers successively fed to the end of the product. The twisted yarn may be drawn away and collected in the form of a package by any suitable yarn collecting means, with or without further twist.

For the purpose of drawing away the free ends of the fibers in a direction opposite to that in which the final product is drawn away for collection, suction may be employed, which suction is preferably intermittently applied immediately after each group of fibers is cut from the end of the bundle of continuous filaments. Additional suction may be applied in a direction at right angles both to the direction of feeding of the fibers and the direction of passage of the final product for the purpose of ensuring that the ends of the staple fibers properly engage with the tail of the staple fiber yarn so as to be secured therein. Alternatively, this may be done by means of jets of compressed air, and/or by means of guards adapted to direct the flow of air in the desired manner. When suction is employed for this purpose it is, like that which draws away the free ends of the fibers, of an intermittent character, being applied immediately after the ends of each bunch of fibers to be taken up reach the tail of the staple fiber yarn.

Suction means when employed for the above purposes are particularly convenient as enabling the production of yarn to be stopped, e. g. when a full package of the yarn has been collected and is to be replaced by an empty package, since by means of the suction the staple fibers are drawn away from the point at which the yarn is formed and do not clog the apparatus. For this reason the operation of cutting the staple fibers from the end of the bundle of con-

tinuous filaments need not be stopped when the collection of the final product is stopped and the staple fibers produced at this time may be collected by a trap in the suction means and disposed of as a valuable form of waste. Where the rearward ends of the fibers are taken up, so that the fibers are fed past the tail of staple fiber yarn, the free ends may first be blown into a channel connected with the suction system, so that fibers not taken up for any reason pass directly into the suction system.

The separation of the continuous filaments at the end of the continuous filament bundle, and the successive cutting of groups of fibers therefrom may be effected by causing the continuous filament bundle to be forwarded by means of an air jet, finally emerging from a nozzle of flat divergent section whereby the filaments are spread into a wide flat band. In addition means may be provided for charging the filaments with static electricity to facilitate their separation from one another. Thus the filaments may be passed through a gate tension device adapted to electrify the filaments by rubbing contact, or the filaments may be electrified by being passed in contact with a positively rotated roller having a surplus of material removed in the electrostatic series from the material of the filaments.

The wide flat band of separated filaments thus forwarded may then be intermittently cut by means of a device of the hair-clipper type preferably acting in conjunction with deflecting means which periodically presses the band of filaments into engagement with the cutting device. For this purpose, an intermittently applied air jet may be employed, or a reciprocating member, or, especially where the rearward ends of the fibers are first taken up by the yarn, a rotary member which, after deflecting the filaments into engagement with the cutter, proceeds to deflect the freshly cut fiber ends into engagement with the rapidly rotating tail of the staple fiber yarn.

The rapid twisting of the end of the staple fiber yarn to which the cut fibers are fed may best be effected, where a needle-like supporting spindle is used, by the rotation of said spindle. Where no spindle is used, the tail of the yarn constituting the support may be rapidly rotated by means of a twist tube through which the staple fiber yarn is drawn. By reason of the fact that the product has an end in close proximity to the twisting device, the twist imparted is, in either case, a true twist.

A convenient form of twist tube for the above purpose comprises a short light hollow spindle that has a helical passage along its length and is pressed into engagement with a friction wheel, preferably of large diameter, by suitable anti-friction means such as two pairs of overlapping wheels mounted in anti-friction bearings. A spindle of this character being very light in weight may be rotated at a very high speed so that a substantial degree of twist may be imparted to the final product and a high rate of production may be maintained.

By way of example, some forms of apparatus suitable for carrying out the invention will now be described in greater detail with reference to the accompanying drawings, in which

Fig. 1 is a general side elevation of one form of apparatus employing a twist tube;

Fig. 2 is a plan view of a part of the apparatus of Fig. 1 in which the yarn is formed;

Fig. 3 is a sectional front elevation of the mechanism shown in Fig. 2;

Fig. 4 is a plan view of the operative part of a further form of apparatus employing a needle-like spindle;

Fig. 5 is a side elevation of Fig. 4 and

Fig. 6 is a diagrammatic view of a modification of the apparatus shown in Figs. 1-3.

Referring to Fig. 1, a continuous filament yarn 1 is supplied from a large drum-like package 2 having flanges 3 the package being rotated at a constant angular speed by the constant rotation of driving wheels 4 on which the flanges 3 of the package 2 rest. The package 2 is of the kind in which the yarn varies in denier from the inside of the package to the outside in such a manner that by rotating the package at a constant angular speed the yarn is delivered therefrom at a constant rate in terms of weight per unit time. Leaving the package 2 the yarn passes through a guide 5 adjustably mounted in a holder 6 and over a roller 7 provided with a material, such as rubber, gutta percha or like substance, suitably removed in the electrostatic series from the basic material of the filaments in the yarn 2. The roller 7 is driven with a peripheral speed substantially in excess of the speed of the yarn 1 by means of a belt 8 driven from a pulley 9 on the main driving shaft 10 from which the friction wheels 4 are driven.

On leaving the roller 7 the filaments enter a device 11 supplied with compressed air through a pipe 12 from a header 13, the compressed air emerging from a jet 14 and carrying with it the yarn 1 in the form of separated filaments. The jet 14 is of flat cross-section so as to facilitate the separation of the filaments, the said separation being also assisted by the electrification of the filaments engendered by their rubbing contact with the surface of the roller 7. The filaments 1, loosened and separated in this manner, enter a further device 15 supplied with compressed air through a pipe 16 from the header 13 and emerge with the compressed air from a nozzle 17 of flat cross-section similar to the nozzle 14. Beneath the filaments as they emerge thoroughly separated and in a flat band from the nozzle 17 is disposed a cutter 18 of the hair-clipper type operated by means of a belt 19 and a driving wheel 20. The cutter is operated continuously and the filaments of the yarn 1 as they emerge from the nozzle 17 are pressed periodically into engagement with the cutter by means of two deflector rods 21 mounted on an arm 22 pivoted at 23 to the device 15 and alternately lifted and pressed down at the desired intervals.

The ends of the continuous filaments 1 are blown by the stream of air through the nozzle 17 into a device indicated generally at 24, and to be described in greater detail hereafter with reference to Figs. 2 and 3. They emerge from the device through a twist tube 25 in the form of a continuous twisted yarn 26 consisting of staple fibers. The yarn 26 passes through pigtail guides 27, 28 carried on a bar 30 and thence proceeds downwards through a pigtail guide 31 to a traversing guide 32 mounted on a traversing bar 33 by means of which they are conducted to a package 34 which is carried in a bracket 35 and is driven by surface contact with a rotating drum 36. In this manner the yarn 26 is collected on the package 34.

Referring now to Figs. 2 and 3, the ends of the continuous filaments in the yarn 1 emerging from the nozzle 17 are directed by the blast of air emerging from the nozzle along a diverging channel plate 40, open at the top as shown

in Fig. 3, the divergence of the walls of the channel plate 40 and the consequent divergence of the blast of air emerging from the nozzle 17 serving still further to separate the ends of the filaments from one another. On reaching the end of the channel plate 40 the ends of the filaments encounter the tail 41 of the yarn 26, which extends beyond any point at which the filament ends meet it, so as to provide a sure and adequate support for the ends of the filaments. The ends of the filaments are urged downwards in contact with the said tail by a current of air induced by suction through perforations 42 at the end of the channel plate 40. The suction is induced, as shown in Fig. 3, by means of an injector device 43 to which air is supplied intermittently at the desired intervals by a pipe 44, the injector device 43 lying at the bottom of a funnel shaped member 45 immediately below the perforations 42. The air sucked down the funnel 45 is blown in this manner into a suction conduit 46 and is carried away.

The tail 41 of the yarn 26 is rapidly rotated. This is brought about by means of a twist tube 25 through which the end of the yarn 26 passes. The twist tube is in the form of a short tube 25 having a twisted strip of metal 48 secured in the bore thereof so as to divide the bore into two helical passages along one of which the yarn 26 passes. The short tube 25 contacts with a pair of large friction wheels 49 driven by means of a driving band 50. The tube 25 is held in contact with the wheels 50 by means of two pairs of anti-friction wheels 51 freely mounted on spindles 52 in a pair of side plates 53 provided with a cover 54 and hinged at 55. As is shown in Fig. 1 the spring 56 is provided with a butterfly nut 57 acting over the top of a lug 58 and pressing the side plates 53 and so the friction wheels 51 downwards, the lower end of the spring 56 being secured to the bar 30 carrying the pigtail guides 27, 28. By these means the twist tube 23 is rotated at a very high speed, and, on account of the helical form of the passage therein through which the yarn 26 passes a substantial frictional effect is exerted on the end of the yarn 26 so as to impart a twist to it. Since the tail 41 of the yarn 26 is free the twist thus imparted by the twist tube 25 is a real twist.

Since the yarn 26 is being continuously drawn away to the package 34 the tail of the yarn 41 must be continuously built up and this is brought about by the repeated engagement of the leading ends of the filaments in the yarn 1 with the tail 41. As soon as the leading ends of the filaments in the yarn 1 are brought in contact with the tail 41 by suction induced through the perforations 42 they become entangled therein and at the same time the deflector rods 21 depress the filaments into engagement with the cutting device 18 by means of which they are severed to form staple fibers indicated at 59. Immediately after severance the tail ends of the fibers 59 are subjected to a current of air through perforations 60 in one side of the channel plate 40, the air being supplied through a pipe 61 and valve 62 operated in timed relationship with the depressor rods 21. By these means the fibers 59, which are now secured at their leading ends to the tail 41 of the yarn 26, are blown sideways, being assisted at the same time by suction in a tail pipe 63 connected by a conduit 64 to the suction conduit 46. A flat, covered passage 65 is provided to allow the tail ends of the fibers 59 free access to the tail pipe 63. It will be seen

that the flat passage 65 enters the tail pipe 63 tangentially and by this means a revolving air current or vortex may be set up in the tail pipe 63 in such a direction as to assist the twist tube 25 in twisting together of the fibers 59 newly added to the tail of the yarn 41. If desired, the suction in the tail pipe 65 may be augmented, immediately after the severance of the fibers 59, by means of an ejector, disposed in the conduit 64 and similar to the ejector 43. It will be noted that on account of the separating of the fibers 59 each fiber end contacts with a different point on the tail 41 of the yarn 26. Consequently, when the rear ends of the fibers 59 are drawn down the tail pipe 63 they will extend to different distances along said pipe. In this manner, the different fibers are disposed in staggered relationship along the length of the resulting yarn and it is unnecessary for the cutting device 18 to make an oblique cut across the ends of the flat band of continuous filaments emerging from the jet 17. The fibers 59, when they have become attached to the tail 41 of the yarn 26 and then drawn down the tail pipe 63, are subsequently pulled in the opposite direction by the yarn 26 and so become the new tail 41 of the yarn 26 in readiness for the next group of fibers 59 to be cut by the device 18 and secured in turn to the new tail 41 and so on. In this manner a continuous twisted yarn of staple fibers 26 is formed and drawn away as it is produced.

In the device shown in Figs. 4 and 5 the general layout is the same as that of the device shown in Figs. 1-3. In this case, however, the driving wheels 49 and the friction wheels 51 do not drive a twist tube such as the twist tube 25 but drive a short needle-like spindle 70 having a flange 71 at its butt end engaging outside the side plate 53 carrying the anti-friction wheels 51. The point 72 of the spindle 70 extends across the end of the channel plate 40 and serves as a support for the ends of the fibers 59 cut off by the cutting device 18. No provision, in this case, is made for drawing out the rear ends of the fibers 59 by means such as the means 60-65 described with reference to Fig. 1, since the needle-like spindle 70, extending from the yarn 26 axially beyond any point at which the fibers 59 may engage it, is always present to serve as a support by which the leading ends of the fibers 59 may be taken up. The yarn 26 is drawn off the point 72 of the spindle 70 and collected as described with reference to Fig. 1.

In the forms of apparatus described above, it is the leading ends of the fibers 59 that are engaged by the rapidly rotating support 41 or 70. Alternatively, however, the rear ends may be engaged as shown diagrammatically in Fig. 6. In this figure the leading ends 75 of the fibers 59 are sucked down a conduit 76 the suction in which is intermittent. When a sufficient length of fiber has passed the cutting device 18 the deflector rods 21 act and the fibers are cut off. Immediately, suction is applied through the perforations 77, so that the freshly cut rear ends of the fibers are sucked into engagement with the tail 41 of the yarn 26 being produced. The deflector rods 21 aid in bringing about this engagement. Then the suction is cut off in the conduit 76 and is applied in the tail pipe 63 so that the leading ends 75 of the fibers 59 are swept sideways through a slot indicated at 78 in the tail pipe 63 and constitute the new tail 41 of the yarn 26.

Having described my invention, what I desire to secure by Letters Patent is:

1. Process for the manufacture of staple fiber yarns and like products, said process comprising feeding a succession of flat wide groups of separated fibers in the direction of the length of said fibers to the end of a rapidly rotating support that lies transverse to said direction with its axis close to the plane in which said groups are fed, so that different fibers in each group are taken up at different points on said support by previously fed fibers and continuously drawing away along said axis a staple fiber yarn resulting from the twisting together of the successive groups of fibers by the rotation of said support, said support extending axially from said staple fiber product beyond any point at which said fibers meet said support.

2. Process for the manufacture of staple fiber yarns and like products, said process comprising feeding a bundle of continuous filaments, separating the filaments at the end of said bundle into a flat wide band, cutting a succession of flat wide groups of separated fibers from said end, feeding said groups in the direction of the length of said fibers to the end of a rapidly rotating support that lies transverse to said direction with its axis close to the plane in which said groups are fed, so that different fibers in each group are taken up at different points on said support by previously fed fibers and continuously drawing away along said axis a staple fiber yarn resulting from the twisting together of the successive groups of fibers by the rotation of said support, said support extending axially from said staple fiber product beyond any point at which said fibers meet said support.

3. Process for the manufacture of staple fiber yarns and like products, said process comprising feeding a succession of flat wide groups of separated fibers in the direction of the length of said fibers transversely across the tail of a staple fiber product being produced, said tail lying close to the plane in which said groups are fed, rapidly rotating said tail so as to twist said product, and at the same time to take up at different points on said tail the different fibers of each group, drawing away the free ends of the fibers of each group after said fibers are taken up so that they form a new tail to take up the next group, and continuously drawing away the staple fiber product resulting from the successive addition of new groups of fibers to the tail thereof.

4. Process for the manufacture of staple fiber yarns and like products, said process comprising feeding a succession of flat wide groups of separated fibers in the direction of the length of said fibers transversely across the tail of a staple fiber product being produced, said tail projecting from a twist tube and lying close to the plane in which said fibers are fed, rapidly rotating said twist tube so as to twist said product and at the same time to take up at different points on said tail the different fibers of each group, drawing away the free ends of the fibers of each group after said fibers are taken up so that they form a new tail to take up the next group, and continuously drawing away the staple fiber product resulting from the successive addition of new groups of fibers to the tail thereof.

5. Process for the manufacture of staple fiber yarns and like products, said process comprising feeding a succession of flat wide groups of separated fibers in the direction of the length of said fibers transversely across the tail of a

staple fiber product being produced, said tail lying close to the plane in which said groups are fed, rapidly rotating said tail so as to twist said product and at the same time to take up at different points on said tail the different fibers of each group, applying suction to said tail to hold it across the path of said fibers and to draw away the free ends of said fibers after they have been taken up so that they form a new tail to take up the next group, and continuously drawing away the staple fiber product resulting from the successive addition of new groups of fibers to the tail thereof.

6. Process for the manufacture of staple fiber yarns and like products, said process comprising feeding a succession of flat wide groups of separated fibers in the direction of the length of said fibers transversely across the tail of a staple fiber product being produced, said tail lying close to the plane in which said groups are fed, rapidly rotating said tail so as to twist said product and at the same time to take up at different points on said tail the different fibers of each group, applying suction to said tail to hold it across the path of said fibers, applying a blast of air cooperating with said suction to draw away the free ends of said fibers after they have been taken up so that they form a new tail to take up the next group, and continuously drawing away the staple fiber product resulting from the successive addition of new groups of fibers to the tail thereof.

7. Process for the manufacture of staple fiber yarns and like products, said process comprising feeding a succession of flat wide groups of separated fibers in the direction of the length of said fibers to the end of a needle like support that lies transverse to said direction with its axis close to the plane in which said groups are fed, rotating said support so that different fibers in each group are taken up at different points on said support by previously fed fibers and continuously drawing away off the end of said support a staple fiber yarn resulting from the twisting together of the successive groups of fibers by the rotation of said support, said support extending axially from said staple fiber product beyond any point at which said fibers meet said support.

8. Process for the manufacture of staple fiber yarns and like products, said process comprising feeding a succession of flat wide groups of separated fibers in the direction of the length of said fibers to the end of a rapidly rotating support that lies transverse to said direction with its axis close to the plane in which said groups are fed, so that different fibers in each group are taken up at different points on said support by previously fed fibers intermittently applying suction to the ends of said fibers to be taken up on said support so as to draw said ends into engagement with said support and continuously drawing away along said axis a staple fiber yarn resulting from the twisting together of the successive groups of fibers by the rotation of said support, said support extending axially from said staple fiber product beyond any point at which said fibers meet said support.

9. Process for the manufacture of staple fiber yarns and like products, said process comprising feeding a succession of flat wide groups of separated fibers in the direction of the length of said fibers transversely across the tail of a staple fiber product being produced, said tail lying close to the plane in which said groups are fed,

rapidly rotating said tail so as to twist said product, and at the same time to take up at different points on said tail the different fibers of each group, momentarily applying suction to the ends of said fibers to be taken up on said tail so as to draw them into engagement with said tail, drawing away the free ends of the fibers of each group after said fibers are taken up so that they form a new tail to take up the next group, and continuously drawing away the staple fiber product resulting from the successive addition of new groups of fibers to the tail thereof.

10. Process for the manufacture of staple fiber yarns and like products, said process comprising feeding a succession of flat wide groups of separated fibers in the direction of the length of said fibers to the end of a rapidly rotating support that lies transverse to said direction with its axis close to the plane in which said groups are fed, so that the leading ends of different fibers in each group are taken up at different points on said support by previously fed fibers and continuously drawing away along said axis a staple fiber yarn resulting from the twisting together of the successive groups of fibers by the rotation of said support, said support extending axially from said staple fiber product beyond any point at which the leading ends of said fibers meet said support.

11. Process for the manufacture of staple fiber yarns and like products, said process comprising feeding a succession of flat wide groups of separated fibers in the direction of the length of said fibers to and beyond the end of a rapidly rotating support that lies transverse to said direction with its axis close to the plane in which said groups are fed, so that the trailing ends of different fibers in each group are taken up at different points on said support by previously fed fibers and continuously drawing away along said axis a staple fiber yarn resulting from the twisting together of the successive groups of fibers by the rotation of said support, said support extending axially from said staple fiber product beyond any point at which the trailing ends of said fibers meet said support.

12. Process for the manufacture of staple fiber yarns and like products, said process comprising feeding a bundle of continuous filaments, separating the filaments at the end of said bundle into a flat, wide band, cutting a succession of flat, wide groups of separated fibers from said end, feeding said groups in the direction of the length of said fibers transversely across the tail of a staple fiber product being produced, said tail lying close to the plane in which said groups are fed, applying momentary suction to the leading ends of each group of fibers as said ends reach said tail so as to draw said ends into engagement with said tail, rapidly rotating said tail so as to twist said product and at the same time to take up at different points on said tail the leading ends of the different fibers in each group, applying suction to said tail, to hold it across the path of feeding of said fibers, directing a momentary blast of air on said fibers, cooperating with said last mentioned suction to draw away the rear ends of said fibers after the leading ends thereof have been taken up so that said fibers form a new tail to take up the next group, and continuously drawing away the staple fiber product resulting from the successive addition of new groups of fibers to the tail thereof.

13. Process for the manufacture of staple

fiber yarns and like products, said process comprising feeding a bundle of continuous filaments in the direction of their length transversely across and past the tail of a staple fiber product being produced, separating the filaments at the end of said bundle into a flat, wide band, said tail lying close to the plane in which said filaments are fed, cutting from the end of said bundle in the neighborhood of said tail a succession of flat, wide groups of separated fibers, applying momentary suction to the trailing ends of each group of fibers after it is cut so as to draw said trailing ends into engagement with said tail, rapidly rotating said tail as to twist said product and at the same time to take up at different points on said tail the trailing ends of the different fibers in each group, applying suction to said tail to hold it across path of said filaments and to draw away the leading ends of said fibers after the rear ends thereof have been taken up so that said leading ends form a new tail to take up the next group of fibers, and continuously drawing away the staple fiber product resulting from the successive addition of new groups of fibers to the tail thereof.

14. Apparatus for the production of staple fiber yarns and like products, said apparatus comprising means for rapidly rotating a support, means for feeding successive flat wide groups of fibers to said support in a plane close to the axis of rotation of said support and in the direction of the length of said fibers and across said axis so that the ends of said fibers are taken up on said support by previously fed fibers and means for drawing away the staple fiber product resulting from the twisting together of the successive groups of fibers by the rotation of said support.

15. Apparatus for the production of staple fiber yarns and like products, said apparatus comprising means for feeding a bundle of continuous filaments and for separating the filaments at the end thereof from one another, means for cutting successive flat, wide groups of fibers from said end as the filaments are fed, means for rapidly rotating a support, means for feeding said groups to said support in a plane close to the axis of rotation of said support and in the direction of the length of said fibers and across said axis so that the ends of said fibers are taken up on said support by previously fed fibers and means for drawing away the staple fiber product resulting from the twisting together of the successive groups of fibers by the rotation of said support.

16. Apparatus for the production of staple fiber yarns and like products, said apparatus comprising a twist tube, driving means for rapidly rotating said twist tube, means for drawing away through said twist tube a staple fiber product being formed and twisted by the rotation of said twist tube, and means for feeding successive flat wide groups of fibers in a plane close to the axis of rotation of said twist tube and in a direction across said axis and parallel to the length of said fibers so that the ends of said fibers are taken up on the tail of said staple fiber product so as to constitute a new tail thereto.

17. Apparatus for the production of staple fiber yarns and like products, said apparatus comprising a short hollow spindle adapted to make frictional contact with staple fiber product passing through it, a friction wheel adapted to make external driving contact with said spindle, anti-friction means for holding said spindle in engagement with said friction wheel, driving means for said friction wheel adapted to bring about

rapid rotation of said spindle, means for drawing away through said spindle a staple fiber product being formed and twisted by the rotation of said spindle, and means for feeding successive flat wide groups of fibers in a plane close to the axis of rotation of said spindle and in a direction across said axis and parallel to the length of said fibres so that the ends of said fibers are taken up on the tail of said staple fiber product so as to constitute a new tail thereto.

18. Apparatus for the production of staple fiber yarns and like products, said apparatus comprising a twist tube, driving means for rapidly rotating said twist tube, means for drawing away through said twist tube a staple fiber product being formed, suction means adapted to act on the tail of said product projecting from said twist tube, and to hold it out against said drawing means, and means for feeding successive flat, wide groups of fibers in a plane close to the axis of rotation of said twist tube and in a direction across said axis and parallel to the length of said fibers so that the ends of said fibers are taken up on said tail of said staple fiber product so as to constitute a new tail thereto.

19. Apparatus for the production of staple fiber yarns and like products, said apparatus comprising a twist tube, driving means for rapidly rotating said twist tube, means for drawing away through said twist tube a staple fiber product being formed, suction means adapted to act on the tail of said product projecting from said twist tube and to hold it out against such drawing means, means for feeding successive flat, wide groups of fibers in a plane close to the axis of rotation of said twist tube and in a direction across said axis and parallel to the length of said fibers so that the ends of said fibers are taken up on said tail of said staple fiber product and an intermittently acting air-jet adapted to cooperate with said suction means to bring said fibers into alignment with said staple fiber product after they have been taken up on the tail thereof, so that they constitute a new tail thereto.

20. Apparatus for the production of staple fiber yarns and like products, said apparatus comprising a needle like spindle, means for rapidly rotating said spindle, means for feeding successive flat wide groups of fibers of said spindle in a plane close to the axis of rotation of said spindle and in the direction of the length of said fibers and across said axis so that the ends of said fibers are taken up on said spindle by previously fed fibers and means for drawing away off the end of said spindle the staple fiber product resulting from the twisting together of the successive groups of fibers by the rotation of said spindle.

21. Apparatus for the production of staple fiber yarns and like products, said apparatus comprising means for rapidly rotating a support, means for feeding successive flat wide groups of fibers to said support in a plane close to the axis of rotation of said support and in the direction of the length of said fibers and across said axis, intermittent suction means adapted to draw the ends of said fibers into engagement with said support as said ends reach said support so that the ends of said fibers are taken up on said support by previously fed fibers and means for drawing away the staple fiber product resulting from the twisting together of the successive groups of fibers by the rotation of said support.

22. Apparatus for the production of staple fiber yarns and like products, said apparatus comprising means for rapidly rotating a support,

means for feeding the leading ends of successive flat wide groups of fibers to said support in a plane close to the axis of rotation of said support and in the direction of the length of said fibers and across said axis so that said leading ends are taken up on said support by previously fed fibers, and means for drawing away the staple fiber yarn resulting from the twisting together of the successive groups of fibers by the rotation of said support.

23. Apparatus for the production of staple fiber yarns and like products, said apparatus comprising means for rapidly rotating a support, means for feeding successive flat wide groups of fibers to and across said support in a plane close to the axis of rotation of said support and in the direction of the length of said fibers so that the trailing ends of said fibers are taken up on said support by previously fed fibers and means for drawing away the staple fiber product resulting from the twisting together of the successive groups of fibers by the rotation of said support.

24. Apparatus for the production of staple fiber yarns and like products, said apparatus comprising means for feeding a bundle of continuous filaments and for separating the filaments at the end thereof from one another, means for cutting successive flat, wide groups of fibers from said end as the filaments are fed, a twist tube, driving means for rapidly rotating said twist tube, means for drawing away through said twist tube a staple fiber product being formed and twisted by the rotation of said twist tube, suction means adapted to act on the tail of said product projecting from said twist tube and to hold it out against said drawing means, means for feeding said flat wide groups to said tail in a plane close to the axis of rotation of said tail and in the direction of the length of said fibers and across said axis, intermittent suction means adapted to draw the leading ends of said fibers into engagement with said tail as said ends reach said tail so that the ends of said fibers are taken up on said support by previously fed fibers and an intermittently acting air-jet adapted to cooperate with said first-mentioned suction means to bring the rear ends of said fibers into alignment with said staple fiber product after the leading ends have been taken up on the tail thereof so that said rear ends constitute a new tail thereto.

25. Apparatus for the production of staple fiber yarns and like products, said apparatus comprising a twist tube, driving means for rapidly rotating said twist tube, means for drawing away through said twist tube a staple fiber product being formed and twisted by the rotation of said twist tube, means for feeding a bundle of continuous filaments across said tail and for separating the filaments at the end thereof from one another into a flat, wide band lying in a plane close to said tail, means near said tail for cutting successive flat, wide groups of fibers from said end as the filaments are fed, intermittent suction means adapted to draw the rear ends of said fibers into engagement with said tail as said ends are cut so that said ends are taken up on said tail and suction means adapted to act on said tail, and to bring the leading ends of said fibers into alignment with said staple fiber product after the rear ends have been taken up on the tail thereof so that said leading ends constitute a new tail thereto.