

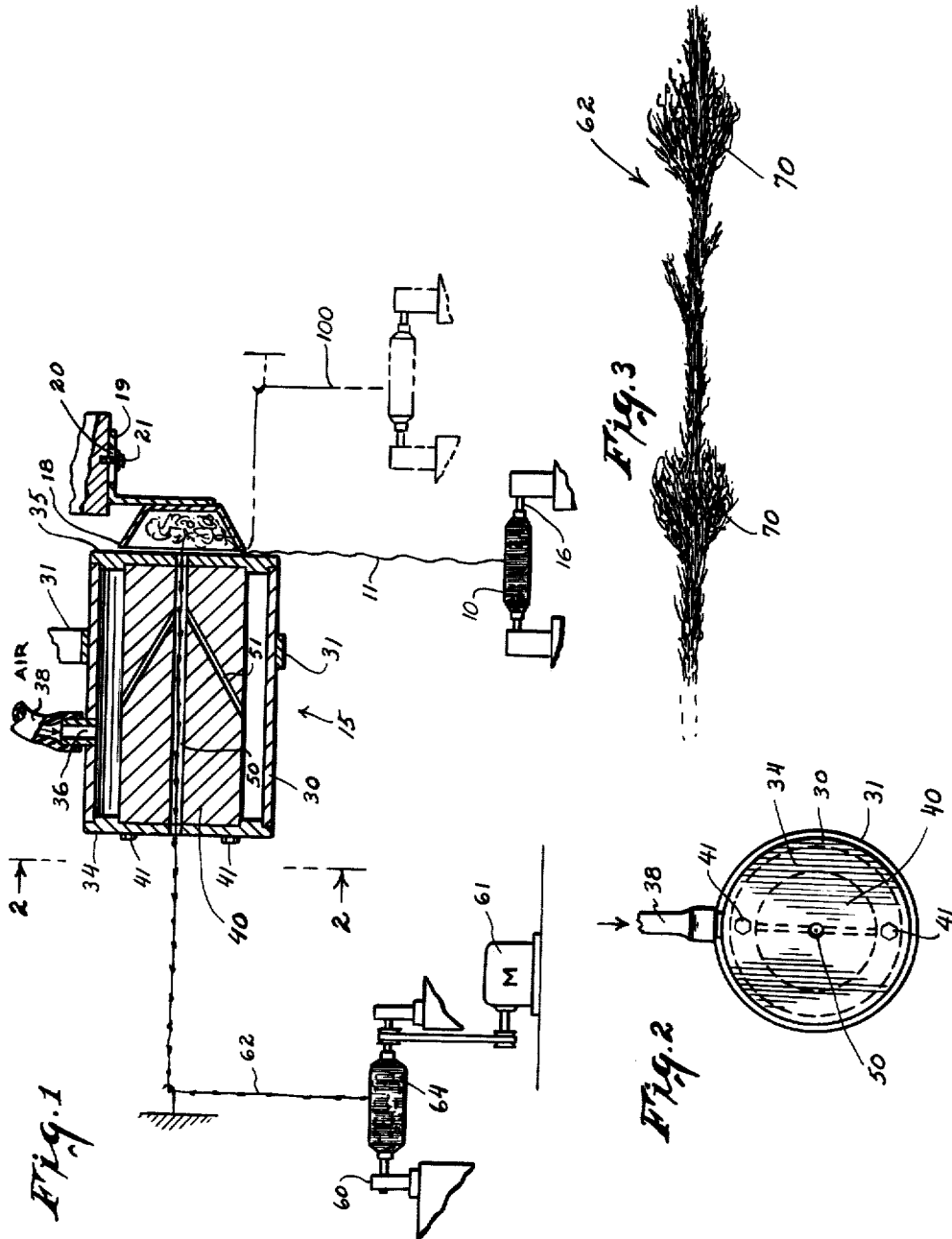
June 18, 1963

A. FIELDMAN

3,093,878

AIR JET FOR PRODUCING BULKED STUB YARN

Filed Oct. 16, 1961



INVENTOR.
ARNOLD FIELDMAN
BY *Kleinberg & Lilling*
ATTORNEYS

United States Patent Office

3,093,878

Patented June 18, 1963

1

3,093,878

AIR JET FOR PRODUCING BULKED STUB YARN

Arnold Fieldman, Brooklyn, N.Y., assignor to
Carl Nuissl, Boston, Mass.

Filed Oct. 16, 1961, Ser. No. 145,197

3 Claims. (Cl. 28—1)

This invention is broadly in the novelty art; more specifically it presents a device and process for producing novelty slub or knob effect yarns.

Many and varied processes of producing a novelty effect in yarns have been attempted in the prior art. These processes are generally expensive and inefficient and not easily adaptable to mass-production techniques.

It is a cardinal object of this invention to set forth a method and apparatus for producing novelty effects in yarns.

Another object and accomplishment of this invention is to describe a method for accomplishing the above that will be suitable for mass-production techniques.

Another purpose of this device is to set forth an apparatus for producing an improved texture yarn.

Still another purpose of this device is to produce a resilient and fluffy knob, slub, or the like, on a yarn, as desired.

An additional purpose hereto is to provide a method of bulking, texturizing or opening up yarns.

With these objects in view, the invention consists of the novel features of construction and arrangement of parts which will appear in the following specification and recited in the appended claims, reference being had to the accompanying drawings in which the same reference numerals indicate the same parts throughout the various figures and in which:

FIG. 1 is an elevational view partly in section illustrating one substantially complete apparatus for carrying out one embodiment of this invention, with an alternate embodiment shown in phantom.

FIG. 2 is an elevational view taken substantially along line 2—2 of FIG. 1.

FIG. 3 is a greatly enlarged view of one embodiment of the finished yarn of this invention illustrated with slubs or knobs thereon.

Referring to the drawings which illustrate what may be for some purposes a preferred embodiment of the invention, there is illustrated generally a roll 10 of a multi-filament yarn 11.

It will be noted that the yarn 11 may be any of the filament yarns, such as regenerated cellulose, nylon, viscose, polyester, polypropylene, silk, acetate, or any of the spun yarns, such as cotton, wool, polyester, rayon, or the like. The said yarn 11 may be suitably fed to the air jet nozzle 15 to be described in detail hereinafter.

It will be noted that in the embodiment illustrated, the roll 10 of yarn 11 is illustrated as being mounted on a bobbin 16 for free rotation and unwinding. A light tensioning member may be provided but will generally not be necessary or desirable.

Spaced immediately ahead of the air jet nozzle 15 will be a hollow turbulence chamber 18. As will be seen, the said hollow turbulence chamber 18 will be rigidly mounted to a firm support as by an angle iron bracket 19. For adjustment purposes, as will be mentioned hereinafter, the angle iron bracket 19 will have an elongated slot 20 to which its fastening bolt 21 passes so that the longitudinal distance between the turbulence chamber 18 and the air jet nozzle 15 may be varied, if desired.

The turbulence chamber 18 illustrated herein, is shown as substantially a truncated cone with the smaller base being filled in. The said chamber 18, however, may as-

2

sume any well known geometric shape, such as cylindrical, etc. It has been found that by varying the shape of the chamber 18, the particular novelty effect produced in the finished yarn may be varied somewhat.

In proximity to the chamber 18 will be the air jet nozzle 15 shown in section in FIG. 1 and in side elevation in FIG. 2. The air jet nozzle 15 is illustrated as having a substantially circular outer shell 30 held in position by a bracket 31. The ends of the shell 30 are substantially covered by flat end plates 34 and 35. The juncture between the end plates 34 and 35 and shell 30 will be air tight and leakproof. A suitable gasket may be provided for this purpose.

The shell 30 will be continuous except for one or more openings 36 to receive a connection with a hose 38 for air or the like under pressure.

Centrally contained within the shell 30 and fastened to the end plates 34 and 35 will be an air jet member 40. The member 40 will be rigidly held in position as by bolts 41 through the end plates 34 and 35. Additionally, the end plates 34 and 35 may be suitably recessed to position the said member 40. Passing longitudinally through the center of the member 40 and through the end plate 34 and 35 will be a cylindrical opening 50 of somewhat larger dimension than the yarn 11.

Additionally, a plurality of relatively small passages 51 will be spaced about the member 40 connecting the center opening 50 to the outer portion of the said member. The openings 51 will be at an extremely sharp angle so that the centermost point thereof will be closer to the chamber 18 than the outermost point thereof.

At the side of the air jet nozzle 15 opposite the chamber 18, and spaced some distance therefrom, will be a take-up device 60. The said take-up device may be driven as by a motor 61 or the like and will wind the finished yarn 62 uniformly on a reel 64.

The operation of this embodiment of the invention may now be explained.

As previously mentioned, the yarn 11 will be fed from reel 10 laterally upward to the chamber 18. Air under high pressure will be fed through hose 38 to the central portion of the shell 30. The air, continuing under high pressure and now at high velocity, will continue through the passage 51 and out the chamber 18 side of the opening 50. This high velocity air will flow outward of the opening 50 and directly into the central portion of the chamber 18, thereby impinging upon the yarn 11. In that the feed roll 10 is mounted for free rotation, the pressure of the air impinging within the chamber 18 will cause a relatively large amount of the yarn 11 to collect therewithin.

It will be realized that the air flowing within the said chamber will result in an extremely high degree of turbulence. This will cause the yarn 11 within the chamber to be agitated in an extremely irregular manner, causing the fibers to move independently of each other. This has been found to produce slubs or knobs 70 thereon. Simultaneously, however, the take-up reel 64 will be turning, causing the yarn 62 now with slubs 70 thereon, to pass through the center opening 50 of the air jet nozzle 15. The air flowing through the opening 50 about the yarn 61 will cause further separation and bulking of the said yarn.

The finished novelty slub yarn 62 will then be wound on the take-up reel 64 for weaving or other uses.

It has been found that the degree or type of slub or knob produced may be varied greatly and by varying the pressure of the incoming air, varying the width of the openings 51 and 50, varying the take-up speed, varying the spaced distance between the chamber 18 and air jet nozzle 15, varying the shape of the chamber 18, etc.

3

It has been found that somewhat improved results may be obtained under certain circumstances by moving the chamber 18 against the plate 35. The yarn 11 will then be fed into the chamber 18 through a suitable opening in the walls thereof. The air exiting from the air jet nozzle 15 may escape from the chamber 18 through the same opening.

Additionally, a resin material may be sprayed within the chamber 18 to produce a special novelty effect. For the same purpose, the chamber 18, or the air entering therewithin, may be heated.

Illustrated in phantom in FIG. 1 is a portion of an additional feature of the invention. A carrier yarn 100, under tension, is fed into the chamber 18 along with the yarn 11 to be bulked. In that the yarn 100 is under tension, it cannot bulk, but will act as a carrier for the bulk yarn 11. Thus, a combination yarn is obtained and almost any characteristics may be imparted thereto.

Furthermore, it has been noted that in addition to slubs or knubs, other novelty effects may be obtained such as pigtail yarns, etc. merely by varying the quantity, in tensi- 20

ty and duration of incoming air. While there are above disclosed but a limited number of embodiments of the structure and product of the invention herein presented, it is possible to produce still other embodiments without departing from the inventive concept herein disclosed, and it is desired, therefore, that only such limitations be imposed on the appended claims as are stated therein, or required by the prior art.

Having thus described my invention and illustrated its use, what I claim as new and desire to secure by Letters Patent is:

1. An apparatus for providing slubs in a yarn comprising:
 - (a) means to free said yarn to a turbulence chamber under a relatively light tension,
 - (b) a nozzle directing a fluid into said turbulence chamber against said yarn,
 - (c) means to withdraw said yarn from said turbulence 40

4

chamber through said nozzle in a direction opposite to said fluid,

- (d) and take-up means for said yarn advancing at a rate substantially less than the rate of said means to feed.

2. An apparatus for providing slubs in a yarn, comprising:

- (a) means to freely feed said yarn to a turbulence chamber under a relatively light tension,
- (b) a nozzle directing a fluid under varying pressure into said turbulence chamber against said yarn,
- (c) means to withdraw said yarn from said turbulence chamber through a nozzle in a direction opposite to the flow of said fluid,
- (d) and take-up means for said yarn advancing at a rate substantially less than the rate of said means to feed.

3. An apparatus for converting a filament yarn into a novelty yarn, comprising:

- (a) an apertured turbulence chamber,
- (b) feed means to conduct said filament yarn into said turbulence chamber through said aperture under relatively low tension,
- (c) a nozzle to direct a fluid medium under pressure into said turbulence chamber thereby causing a quantity of said yarn to collect therewithin,
- (d) and take-up means to withdraw said yarn from said turbulence chamber through a second aperture in said turbulence chamber in alignment with said nozzle, said take-up means being arranged to withdraw said yarn under relatively high tension from said turbulence chamber through said nozzle.

References Cited in the file of this patent

UNITED STATES PATENTS

2,874,445	Griset	Feb. 24, 1959
2,942,402	Palm	June 28, 1960
3,005,251	Hallden et al.	Oct. 24, 1961
3,036,357	Cook et al.	May 29, 1962