# United States Patent [19]

**Bartnicki et al.**

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[54] **VARIABLE FEED MEANS FOR JET TEXTURING APPARATUS**


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[52] **U.S. Cl.** ..... **28/1.4,** 57/34 B, 226/108

[51] **Int. Cl.** ..... **D02g 1/16**

[58] **Field of Search** ..... 28/1.4; 57/34 B; 226/108



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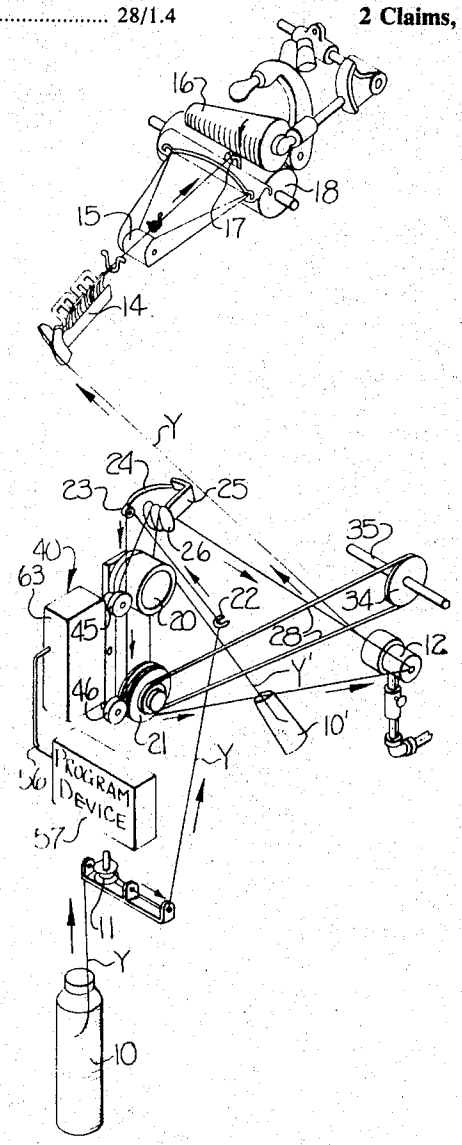
[57] **ABSTRACT**

The present variable feed means operates to produce variations in the bulkiness along the length of fluid jet textured yarns. The apparatus includes spaced apart first and second yarn feed rolls positioned between the yarn supply source and the fluid jet with the first yarn feed roll being operable to feed the yarn at a relatively slow speed and the second yarn feed roll being operable to feed the yarn at a second relatively fast speed. Feed control means is provided for alternately moving the yarn into driving engagement with the first and second feed rolls to thereby vary the speed at which the yarn is fed to the jet and to produce variations in the bulkiness along the length of the yarn.


**2 Claims, 6 Drawing Figures**



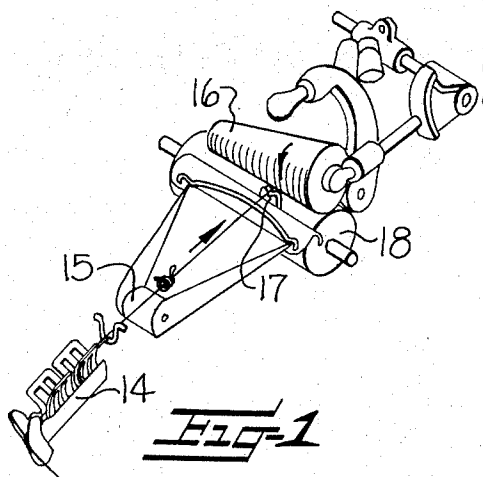



Fig-1

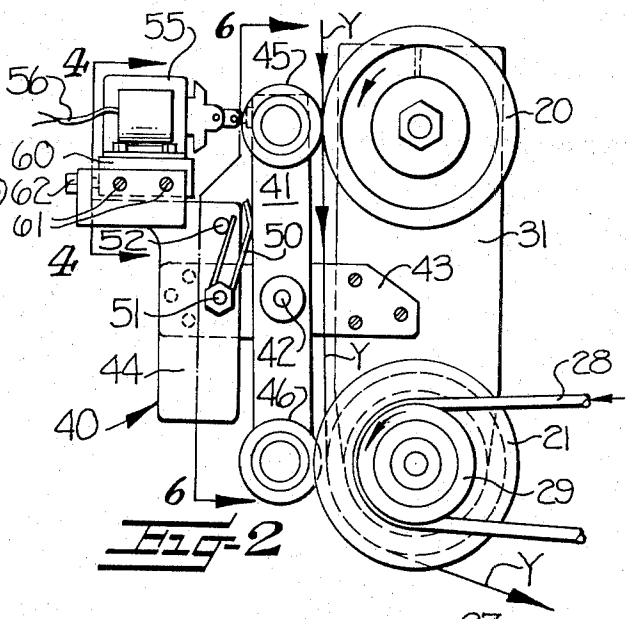
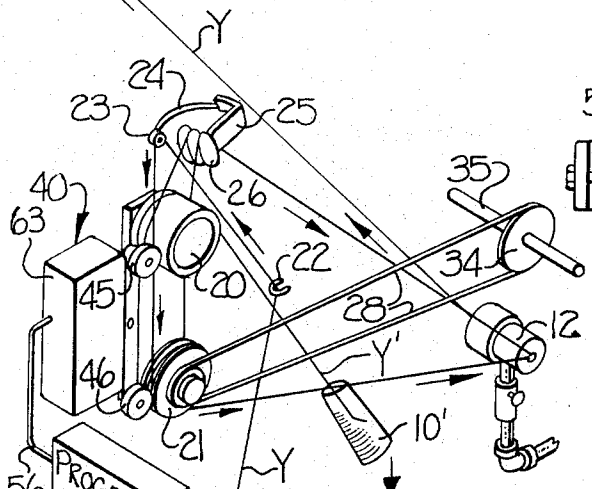



Fig-2



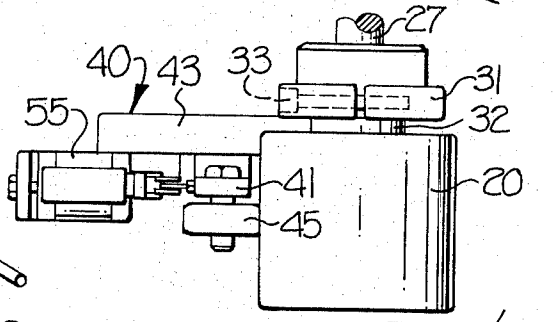




Fig-3

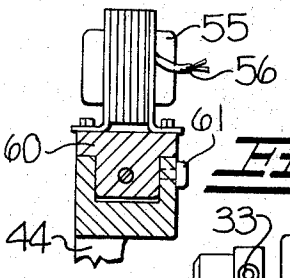



Fig-4

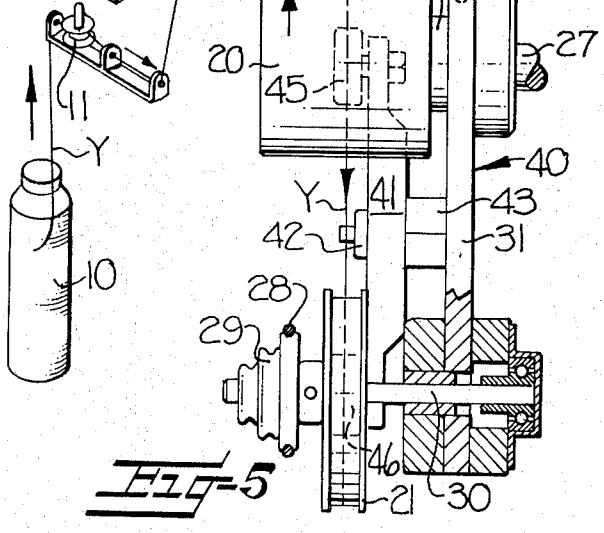



Fig-5

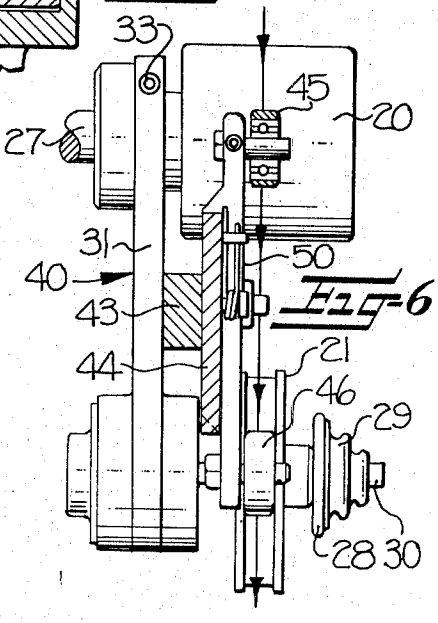



Fig-6

# VARIABLE FEED MEANS FOR JET TEXTURING APPARATUS

This invention relates generally to a variable feed device for a jet texturing apparatus for producing variations in the bulkiness along the length of fluid jet textured yarns.

Several different types of devices have been proposed for varying the input speed of yarn as it is fed to a fluid jet texturing device to form nep or slub types of novelty yarns having intermittent amounts of bulkiness along their lengths. For example, it has been proposed to vary the amount of fluid supplied to the air jet to thereby vary the bulkiness of the yarn. It has also been proposed that feed rolls be utilized which have cut away portions on their mating faces. Various devices have also been employed for varying the tension on the yarn as it approaches the fluid jet. However, these devices have not been entirely satisfactory because they are either complicated and difficult to control in an accurate manner or they require considerable modifications of the yarn texturing apparatus.

With the foregoing in mind, it is an object of the present invention to provide an apparatus for producing variations in the bulkiness along the length of fluid jet textured yarn which is simple in construction, easily applied to the usual jet texturing apparatus, and requires very little attention over long periods of operation.

The present variable feed includes spaced apart first and second yarn feed rolls positioned between the yarn supply source and the fluid jet with the first feed roll being operable to feed the yarn to the jet at a first relatively slow speed and the second yarn feed roll being operable to feed the yarn to the jet at a second relatively fast speed. Feed control means is provided for alternately moving the yarn into driving engagement with the first and second feed rolls to thereby vary the speed at which the yarn is fed to the jet and to produce variations in the bulkiness along the length of the yarn. The difference in relative speeds of the first and second feed rolls may be varied as desired to produce any desired degree of intermittent bulkiness or thick and thin places along the length of the yarn and to form neps or slubs in the yarn at variously spaced intervals.

Other objects and advantages of the invention will appear as the description proceeds, when taken in connection with the accompanying drawings, in which

FIG. **1** is a somewhat schematic isometric view of one station of a jet texturing apparatus and illustrating the variable feed means of the present invention associated therewith;

FIG. **2** is an enlarged side elevational view of the variable feed means of the present invention; with the cover housing removed;

FIG. **3** is a plan view of the variable feed means shown in FIG. **2**;

FIG. **4** is a vertical sectional view taken along line **4—4** in FIG. **2**;

FIG. **5** is an end elevation view looking at the right-hand end of FIG. **2** and with parts in section; and

FIG. **6** is a vertical sectional view taken along line **6—6** in FIG. **2**.

The variable feed means of the present invention is illustrated in FIG. **1** as being associated with a particular type of jet texturing apparatus, however, it is to be understood that the variable feed means may be associated with other types of jet texturing devices and machines. The jet texturing apparatus includes a yarn supply source in the form of a yarn supply package or bobbin **10** from which the yarn Y is withdrawn. The yarn Y passes through a conventional type of tension device in the form of a tension disc **11**, passes through the variable feed means of the present invention and in a manner to be presently described, and is fed thereby into a fluid jet **12**. From the jet **12**, the yarn Y passes through a tension device in the form of a tension fork **14**, passes over a roll **15** where a suitable lubricant is applied to the yarn. The yarn Y is then wound onto a suitable take-up package, indicated at **16**, and is guided onto the yarn take-up package **16** by a yarn traversing guide **17**. The yarn take-up package **16** is rotated by a suitable drive roll **18**.



The variable feed means of the present invention includes a first yarn feed roll **20** and a second yarn feed roll **21**, both of which are positioned between the yarn supply package **10** and the jet **12**. The yarn Y is directed above the upper peripheral surface of feed roll **20** by suitable yarn guide means in the form of yarn guide eye **22** and a guide roller **23** supported on the outer end of a spring wire **24**. The inner end of the spring wire **24** is fixed on a bracket **25** which supports a separator roll **26**. The resiliently supported guide roller **23** may be referred to as a yarn inventory roller as it is lowered to immediately provide yarn when the yarn is driven at the fast speed by the feed roll **21**, in a manner to be presently described.

The first feed roll **20** is fixed on the end of a drive shaft **27** which is rotated at a relatively slow speed to feed the yarn to the jet **12** at a first relatively slow speed when the yarn is drivingly engaged by the roll **20**. The second yarn feed roll **21** is operable to feed the yarn to the jet **12** at a second relatively fast speed and in a manner to be presently described.

As illustrated in FIG. **1**, the feed roll **21** may be driven at different peripheral speeds by means of a drive belt **28**, which may engage different diameters of a drive pulley **29** fixed on the feed roll **21**. The feed roll **21** and pulley **29** are fixed on a shaft **30** (FIG. **5**) suitably supported for rotation in the lower end of a support plate **31**. The upper end of the plate **31** is clamped in position on a non-rotating collar **32** by a screw **33**. The drive belt **28** is driven by a pulley **34** fixed on a drive shaft **35** (FIG. **1**).

The differential in speed between the feed roll **20** and the feed roll **21** may be varied by changing the position of the drive belt **28** on the pulley **29**. Also, the speed differential may be changed by changing the relative speeds of the drive shafts **27** and **35**. Thus, the variation in speed of the yarn feed rolls **20, 21** may be varied as desired. It has been found that a satisfactory slub yarn can be produced by driving the first feed roll **20** at a speed to move the yarn at a rate of 100 yards per minute while the second feed roll **21** is rotated at a speed sufficient to move the yarn at a speed of 500 yards per minute.

Feed control means, broadly indicated at **40**, is provided for alternately moving the yarn into driving engagement with the first and second feed rolls **20, 21** to thereby vary the speed at which the yarn is fed to the jet **12** and to produce variations in the bulkiness along the length of the yarn. The feed control means **40** includes actuator means in the form of a rocker bracket **41** which is pivotally supported intermediate its ends as at **42** on the medial portion of a support arm **43**. The

support arm **43** is fixed at one end to the support plate **31** and its other end supports a bracket **44.**

First and second idler rolls **45, 46** are rotatably supported on the respective upper and lower ends of the rocker bracket **41.** The rocker bracket **41** is normally urged to the position shown in FIG. **2** by resilient means in the form of a torsion spring **50,** one end of which bears against the rocker bracket **41.** The medial portion of the spring **50** extends around a screw **51** and the other end is supported against a pin **52.** Thus, the rocker bracket **41** is normally urged in a clockwise direction in FIG. **2** so that the idler roller **45** engages the yarn Y and moves the same into driving engagement with the first feed roll **20** so that the yarn is fed to the jet **12** at the relatively slow rate and the jet **12** thus imparts a predetermined bulkiness to the yarn. The idler roller **46** is normally maintained out of engagement with the feed roll **21** and the yarn Y.

A solenoid **55** is adjustably connected to the upper end of the rocker bracket **41** and an electric wire **56** connects the solenoid **55** to a suitable program device, indicated at **57** in FIG. **1.** The program device **57** operates at the desired intervals to energize the solenoid **55** and move the rocker bracket **41** in a counterclockwise direction so that the idler roller **46** engages and moves the yarn Y into driven engagement with the lower feed roll **21** to drive the yarn at the faster rate. When the yarn is fed to the jet **12** at the faster rate an increased amount of bulk is imparted to the yarn. This sudden increase in the rate at which the yarn is fed to the jet **12** causes a greatly increased bulking of the yarn to form a nep or slub in the yarn. Normally, the yarn is driven by the fast feed roll **21** for a very short time and the spring **50** then moves the rocker bracket **41** so that the yarn Y is then fed to the jet **12** by the first feed roll **20** and at the relatively slow speed. With the feed device of the present invention the spacing between the neps or slubs may be varied as desired and the length of the slubs may be controlled as desired. The length of the slubs may be very short and they may be formed very close together.

As best shown in FIGS. **2** and **4,** the solenoid **55** is supported for longitudinal adjustment on the upper end of the bracket **44** by means of a base **60** to which the solenoid **55** is fixed. The lower end of the base **60** is supported for sliding adjustment in a groove in the upper end of the bracket **44** and is held in adjusted position by set screws **61.** The position of the solenoid may be adjusted by a screw **62** extending through the upper portion of the bracket **44** (FIG. **2**). If desired, a cover housing **63** (FIG. **1**) may be provided to extend over and protect the solenoid **55.**

It is to be understood that the relative speed between the first and second feed rolls **20, 21** may be varied as desired. In certain cases, it may be desirable that the speed of the first feed roll **20** be coordinated with the speed of the take-up package **16** so that the yarn is under sufficient tension that no texturing takes place as the yarn Y is passed through the jet **12** and then when the yarn is fed by the fast feed roll **21,** texturing will take place in selected sections of the yarn. This type of yarn would thus have no texturing in certain sections which are interrupted by sections of textured yarn.

Also, it may be desirable, in certain cases, to feed one or more additional yarns with the yarn Y. In the production of so-called "core" yarn, it is the general practice to feed two or more yarns to the jet while feeding the core yarn at a slower rate than the effect yarn. The effect yarn is textured by the air jet and entangled with the core yarn to produce the desired type of novelty effect. The core yarn, as indicated at Y' in FIG. **1,** is withdrawn from a separate supply package **10'** and is passed around only the first feed roll **20** and the separator roll **26** before it passes into the jet **12.** This core yarn will thus be fed at a constant rate to be textured to the desired degree throughout its length and will be devoid of neps or slubs. The additional or effect yarn Y follows the path shown in FIG. **1** and the idler roller **46** may be maintained against the yarn and the fast feed roll **21** so that it is constantly fed at a faster rate than the core yarn. Also, the effect yarn Y may be alternately fed at fast and slow rates while the core yarn Y' is fed at a constant slow rate. In either case, both the core and effect yarns will leave the jet **12** together and will be wound onto the take-up package **16.**

In the drawings and specification, there has been set forth a preferred embodiment of the invention, and although specific terms are employed, they are used in a generic and descriptive sense only and not for purposes of limitation.

That which is claimed is:

**1.** In an apparatus for producing variations in the bulkiness along the length of fluid jet textured yarn, said apparatus comprising a yarn supply source, a fluid jet spaced from said supply source, and yarn take-up means for collecting the textured yarn; the combination therewith of

a. a first yarn feed roll positioned between said yarn supply source and said fluid jet and being operable to feed the yarn to said jet at a first relatively slow speed,

b. a second yarn feed roll spaced from said first yarn feed roll and positioned between said yarn supply source and said fluid jet, said second yarn feed roll being operable to feed the yarn to said jet at a second relatively fast speed,

c. a rocker bracket pivotally supported intermediate its ends and including opposed ends positioned adjacent the peripheral surfaces of said first and second yarn feed rolls,

d. first and second idler rolls supported on said opposed ends of said rocker bracket, said first and second idler rolls being axially aligned with said corresponding first and second yarn feed rolls and with the spacing between the rotational centers of said idler rolls being the same as the spacing between the rotational centers of said yarn feed rolls, and

e. actuator means for moving said rocker bracket to selectively move said first and second idler rolls into engagement with the yarn to press the same directly into driving engagement with the corresponding feed roll and to thereby vary the speed at which the yarn is fed to said jet so as to produce sharp variations in the bulkiness along the length of the yarn.

**2.** In an apparatus according to claim **1** including resilient means normally urging said rocker bracket to a first position where said first idler roll moves said yarn into driving engagement with said first yarn feed roll and to thereby normally feed said yarn to said jet at said first relatively slow speed.

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