System for preparing highly coherent air jet textured yarn.

Priority: 07.04.88 US 178961
30.01.89 US 302898

Date of publication of application:
11.10.89 Bulletin 89/41

Publication of the grant of the patent:
15.06.94 Bulletin 94/24

Designated Contracting States:
BE CH DE ES FR GB IT LI LU NL

References cited:
DE-A- 3 133 406
FR-A- 2 318 855
US-A- 4 104 770
US-A- 4 507 833

Proprietor: E.I. DU PONT DE NEMOURS AND COMPANY
1007 Market Street
Wilmington Delaware 19898(US)

Inventor: Gorrafa, Adly Abdel-Moniem
614 Loveville Road
Apt. E4F
Hockessin Delaware 19707(US)

Representative: Jones, Alan John et al
CARPMAELS & RANSFORD
43 Bloomsbury Square
London, WC1A 2RA (GB)

Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid (Art. 99(1) European patent convention).
Description

This invention relates to a system for preparing highly coherent textured yarn, and more particularly it relates to a system for preparing such yarns with pressurized fluid in a jet having a deflector arrangement at its outlet end.

It is known to overfeed one, or more, ends of continuous multifilament yarns to a jet, in which pressurized fluid such as air acts on the filaments to splay them, curl them into crumodal loops, entangle the looped filaments into coherent yarn.

Fluid jet processes are also known for texturing or bulking yarn that employ both movable and fixed baffles positioned at various distances from the outlet end of the jet and at various angles to the yarn path to deflect yarn and fluid from a straight path as they leave the jet.

US-A-4104 770 discloses apparatus for treating yarn with a pressurized fluid in a jet. The jet is tube and there is a pressurized gas inlet into the bore of the tube so that the gas contacts yarn passing through the tube. There is a freely rotatable cylinder located a fixed distance from the yarn outlet capable of engaging the yarn and gas leaving the tube. The yarn engages the cylinder moving upwards after passing round the cylinder. There is a deflector to divert gas above the cylinder away from the upward travelling yarn.

In making a yarn having crumodal loops, the texturing jet must forward the overfed yarn under sufficient tension to keep the yarn from wrapping on the feed rolls, and this tension is provided by the drag of the pressurized air which is moving much faster than the yarn. The air opens the yarn, whips the filaments about, forms loops in the filaments, then entangles them together into a structure which can retain the loops under the tensions which such yarns encounter when made into fabrics. The tension must be low at the jet exit to accumulate loops and form the entangled structure. Immediately thereafter, higher tension is desired to tighten the entangled structure and stabilize it.

A baffle against which the air and yarn impinge is often provided at the jet exit to provide a controlled air zone and to change the direction of yarn movement abruptly. Such baffles are especially necessary at high texturing speeds and air pressures. However, with known cylindrical baffle arrangements, the air divides around the baffle, and the portion of the air which follows the yarn continues to exert tension.

In the present invention, the majority or all of the air follows the lower surface of a baffle while the yarn moves around the lower surface of the baffle.

Wind-up tension is a good measure of texturing jet effectiveness in converting filamentary bulking overfeed into loops, which are well consolidated and integrated with each other into a stable and coherent yarn bundle. Good wind-up tension also yields a firm, rather than soft/mushy, textured yarn package. Yarn withdrawal from such firm packages is easy and uniform, without snags and tangles associated with soft, mushy packages.

High wind-up tension in texturing also yields packages with yarn that resists bulk pull-out in subsequent high tension operations, such as warping, tufting or knitting. Poor loop consolidation into the yarn bundle, as evidenced by low wind-up tension, is also undesirable in the finished fabric or carpet. Abrasion on the surface of such fabrics, during use, will generally yield plucked-filaments, scuffing, fuzzing and unattractive appearance in relatively short time. Yarns with well consolidated loops, integrated into a compact yarn bundle, generally resist scuffing and fuzzing longer when converted to fabrics or carpets. Texturing tension is measured post jet, and wind-up tension is measured pre-packaging. There is a parallel relationship between texturing tension and wind-up tension, although the former is generally much lower in magnitude than the latter. Yarns with low texturing tensions show low wind-up tensions, while yarns with high texturing tensions also show wind-up tensions in the high range.

With the present invention, textured yarn wind-up tension increases by a surprising amount, reaching 20 to 100% more than wind-up tension realized under similar conditions with jets of the prior art, such as Ager’s U.S. Patent No. 4,157,605.

SUMMARY OF THE INVENTION

The present invention is a system for texturing one or more yarns that includes a source of supply for said yarns, a yarn texturing jet through which yarn passes positioned between a feed means and a take up means for taking textured yarn toward a windup which can include a package. The jet includes a body having yarn inlet and outlet ends connected by a central bore along a central axis, means for introducing pressurized gas through a gas inlet into said bore between said ends to contact yarn passing through the jet at a location in said bore, said yarn and said gas following a path from said outlet end of said jet. A baffle is located adjacent to the yarn outlet end of the jet, the baffle has a peripheral surface, the portion of the surface nearest said outlet end is a distance of 0.1 to 2.0 times the minimum diameter of the bore of the outlet end and the portion of the baffle surface nearest the central axis is a distance of from 0.1 to 3.0 times said minimum diameter above said central axis. This portion provides a guiding surface for the yarn around which the yarn travels in a path
after it leaves the outlet end of the jet.

The baffle may have a circular, curvilinear or polygon cross section. The outlet end of the jet may comprise a curvilinear trumpet-like configuration.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a schematic illustration of one embodiment of the system of this invention.

Fig. 2 is a schematic illustration of an alternate embodiment of the system of this invention.

Fig. 3 is a perspective view of the jet used in of this invention.

Fig. 4 is a sectioned view of Fig. 3 taken along line 4-4.

Figs. 5 and 6 are partial views similar to Fig. 4 of the jet of this invention with baffles having square cross section, each oriented differently at the outlet end of the jet.

Fig. 7 is an illustration of a further embodiment showing the baffle in the form of a bar with a jet having a trumpet-like exit.

Fig. 8 is a graph of windup tension in grams vs. the position of the bottom surface of baffle from the center line of the jet, expressed in thousandths of an inch (mm) above or below said centerline, for two different paths for yarn exiting the jet.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

In an embodiment chosen for purposes of illustration, in Fig. 1, feed yarns 10 from a plurality of packages 12, are threaded through tensioner 14 and feed roller 16 to a wetting bath 18 to the inlet of texturing jet 20. Jet is supplied by compressed air from air manifold 22. Textured yarn exiting jet 20, around special baffle fitted to jet exit (not shown), is taken to nip roll 24, over traverse guide bar 26, onto wind up package 28. Speed of feed roll 16 is greater than nip roll 24 to effect a yarn bulking overfeed of from about 5 to about 200% or more. Wind up speed is slightly faster than nip roll 24 speed by about 1 to about 10% or perhaps more. Wind up tension is measured, by a suitable tensiometer, at location 25 on textured yarn 27, and an average reading is taken to avoid tension extremes generated by transversing the yarn onto takeup package.

In core-and-effect texturing, effect yarn (not shown) ends are fed to separate feed roll before running through jet 20 without getting wetted. Yarn ends 10 from supply packages 12 taken to feed roll 16 serve as core. Core-and-effect ends are textured together by jet 20 but to different levels of overfeeds. A low overfeed level is applied to core yarn ends 10 by the speed ratio of rolls 16 and 24, e.g. in the range of 1.03 : 1.0 to 1.15 : 1.0. A high overfeed level is applied to effect yarn ends by the speed ratio of their corresponding feed nip rolls and rolls 24, e.g. in the range of 1.1 : 1.0 to 2.5 : 1.0 or more.

Commercial machine of the type shown in Fig. 1 is an Eltex AT, manufactured by Hirschburger GmbH of Reutlingen, West Germany.

A more detailed system is shown in Fig. 2 wherein feed yarn packages 30 (one is shown) supply multifilament yarn ends 32 to feed rolls 35, which in turn overfeed the yarns to jet 37, after passing through water bath 36 both contained in compartment 37a. If feed yarns 32 are polymeric, such as polyester or polyamide, spun without being fully oriented (known in the industry as POY yarn, for being partially oriented yarn), it is common to draw said feed yarn in a drawing zone between rolls 33 and rolls 35. If yarn is polyester POY, it is common to draw it around a hot metallic pin 34 located between rolls 33 and 35. After feeding yarns to jet 37, textured yarn exits the jet around special baffle 38 to rolls 39. A mild cold stretching of 1 to 15% is sometimes applied in the zone between rolls 39 and rolls 40, often called the stabilization zone. High yarn shrinkage, either inherent in the supply feed yarn or generated by the drawing step between rolls 33 and rolls 35, is sometimes reduced by yarn relaxation step between rolls 40 and rolls 42 wherein yarn travels through heated tube 41. After exiting rolls 42, textured yarn is wound around package 44. Windup tension is measured at location 43, as far upstream of textured package 44 as possible, to reduce tension peaks generated by traversing the yarn in winding. An average tension reading is taken. Tension can also be measured in stabilization zone between rolls 39 and rolls 40 to evaluate the effectiveness of the texturing jet 37. Under otherwise identical speed ratios and conditions, the higher the tension in the stabilization zone, the more effective the jet 37 is in converting bulking overfeed to stable, more highly coherent and bulky textured yarn.

For core-and-effect texturing, core ends 32 are fed through rolls 33 and 35 to water bath 36 and texturing jet 37 (Fig. 2). Effect yarn ends 52 from supply packages 51 (only one is shown in Fig. 2) are fed through rolls 53 and rolls 55 for drawing on hot pin 54 before guiding them around bar 56 to inlet of texturing jet 37. Commonly, core ends 32 are wetted in bath 36 but effect ends 52 are not wetted, by bypassing the bath. In other schemes, wetting core ends 32 is done by dripping liquid from a suitable orifice (not shown) onto the yarn directly. A typical machine similar to that schematically shown in Fig. 2 is model FK6-T80 manufactured by Barmag Co. of Remscheid, West Ger-
many.

Texturing jet 37, with special exit baffle is described in Figs. 3 and 4.

In the system of this invention, POY feed yarns are not specifically necessary, but if used, it is common to pre-draw the yarn, with or without heat, before reaching pre-jet feed rolls. Also, a stabilization zone is not specifically necessary but could be used. Also, a heat setting zone, shown between rolls 40 and 42, is not specifically necessary but could be used to modify thermal properties of textured yarn, e.g. boil off shrinkage.

The system of this invention is applicable to all types of filament yarns such as polyester, POY polyester, nylon, POY nylon, polypropylene, POY polypropylene, polyolefin, rayon acetate, glass, and aramid yarns.

The system of this invention is also applicable to yarn manufactured with free-end broken filaments protruding from yarn bundle, in which loops generated by texturing jet 37 are subsequently broken or abraded to single filaments so that yarn produced resembles a hairy spun yarn.

A closer view of the jet 37 in Figs. 3-7 shows either yarn 10, or the combination of yarns 32 and 52 generally designated 100 enter the jet through inlet 60. Compressed air or other pressurized gas enters the jet through pipe 22 and impinges on the yarn in the entrance 62 of yarn outlet orifice block 64. The yarn and high velocity gas travel together through outlet end 66 of the jet and travel around baffle 37a which is fixedly mounted to bracket 68 attached to the outlet end of the jet.

The central axis of baffle 37a is contained in a plane which is perpendicular to the central axis of jet 37 and is located above the central axis of the jet such that the portion of the surface of the baffle nearest the central axis of the jet device is a distance A of from 0.1 to 3.0 minimum diameters of the bore downstream of the location where the pressurized gas contacts the yarn in the bore. More particularly, in the yarn outlet orifice block 64, said minimum diameter is the diameter indicated at location B. Preferably, distance A is from 0.5 to 1.5 minimum diameters. The baffle is also located a fixed distance C from the outlet end 66 of the jet's exhaust. This distance C is preferably in the range of from about 0.2 to about 1.2 of the minimum diameters referred to above. The size of the baffle 37a is selected so that the baffle is large enough to allow the yarn issuing from the jet outlet to travel 3.0 to 10.0, preferably 4.0 to 8.0 minimum diameters around said baffle before separating yarn from the gas flow.

In operation, yarn is passed through jet 37 where it is treated with pressurized gas, then propelled by the gas from the outlet end of the jet to baffle 37a and travels partially around the lower surface of the baffle, then leaves the baffle in an upward direction. Since the surface of the baffle nearest the central axis is above the central axis of the jet, most of the gas is diverted around the lower surface of the baffle.

It is to be understood that the description "above" and "upward" is meant within the context of an upward threadline path from the feed rolls 35 to the take up rolls 39 as seen in Fig. 2. In some machines, threadline path is downward in flow, in which case descriptive terms above and upwards should mean below and downward.

In the preferred embodiment of the jet illustrated in Figs. 3 and 4, the baffle 37a is shown as a cylindrical rod with a circular cross section. Figs. 5 and 6 illustrate alternative embodiments of the baffle in the form of polygons, in particular, square cross-section baffles 37a', 37a". In Figs. 5 and 6 the distances C' and A' are from 0.5 to 1.0, preferably 0.5 to 0.9 minimum diameters from 0.5 to 20, preferably 0.8 to 1.6 minimum diameters, respectively.

In Fig. 7 the relationship of the baffle 37a''' to the trumpet-like outlet end of the device is shown and the distances C'' and A'' are from 0.1 to 2.0, preferably 0.2 to 0.5 minimum diameters and from 0.1 to 3.0, preferably 0.2 to 2.0 minimum diameters respectively.

EXAMPLE

Two ends of 150 denier - 50 filament polyester yarn are fed into an air jet texturing system similar to that shown in Fig. 1. A jet of the type shown in Figs. 3 and 4 is used to texture the yarn. Size of minimum diameter B in Fig. 4 is 0.070 inch (1.78 mm) and needle is size 28B. Yarn overfeed between rolls 16 end 24 in Fig. 1 is +35% and between rolls 16 end windup 26 is +24.5%. Distances A and C were 0.060 and 0.051 inches (1.52 and 1.30 mm) respectively and the diameter of the baffle (37a) is 0.469 inches (11.9 mm). The textured yarn is wound up onto a package at 339 meters per minute and the air pressure to the jet 37 is 130 psi (896 kPa). Two different yarn paths at the outlet end of the jet were tested and windup tension is measured in each case at the same location between the nip roll and the windup. The paths are path 1 upward between the baffle and the outlet end of the jet to the nip roll and path 2 around the baffle then to the nip roll. Paths 1 and 2 are indicated on Fig. 4. The effect of path 1 and path 2 when the baffle is moved with respect to the center line of the jet is shown in Fig. 8. The windup tensions measured when baffle distance A, above jet centerline, was 0.060 inch (1.52 mm) are:

For Path 1, tension = 34 grams
For Path 2, tension = 84 grams (88% greater
than Path 1)

In prior art use of jet described in Fig. 4 with baffle bar, of same 0.469 inch (11.9 mm) size as Fig. 8, located dead center opposite jet exit, windup tension measurements are:

For Path 1, tension = 22.3 grams
For Path 2, tension = 30.2 grams

The special arrangement of the baffle in the system of this invention brought about almost three-fold increase in texturing tension from conventional prior art level of 22.3 grams to excellent 64 gram level. Tension increase is exploited to yield more coherent yarn bundle, or yield same general yarn character but at a much higher, and more economical, texturing speed.

Claims

1. A system for texturing one or more yarns (10) that includes a source (12) of supply for said yarns, a yarn treating jet (20), said jet (37) including a body having inlet (60) and outlet ends (66) connected by a central bore along a central axis, means for introducing pressurized gas through a gas inlet (22) into said bore between said ends to contact yarn passing through the jet at a location in said bore, said yarn and said gas following a path from said outlet end (66) of said jet, the improvement comprising: a baffle (37a) located adjacent to the yarn outlet end (66) of the jet, said baffle providing a guiding surface for said yarn around which said yarn travels in a path after it leaves the outlet end (66) of the jet, characterised in that the jet (20) is positioned between a feed roll and a nip roll (24) through which yarn passes for treating with pressurized fluid and means (14) for taking yarn toward a windup (28) under tension and that the baffle (37a) has a peripheral surface, the portion of said surface nearest said outlet end being a distance (C) of 0.1 to 2.0 times the minimum diameters (B) of the bore of the outlet end, the portion of said surface nearest said central axis being a distance (A) of from 0.1 to 3.0 times said minimum diameter (B) above said central axis.

2. The system of claim 1 wherein said baffle (37a) has a curvilinear surface, the portion of said surface nearest said outlet end being a distance (C) from the exit end in the range of 0.1 to 1.5 times said minimum diameter and the portion of said surface nearest said central axis being a distance (A) of from 0.1 to 2.0 times said minimum diameter above said central axis.

3. The system of claim 1 wherein said baffle (37a) is a bar having a square cross section oriented with adjacent flat surface portions facing said outlet end of the jet and said central axis, the flat surface portion nearest said outlet end being a distance (C') from the outlet end of 0.5 to 1.0 times said minimum diameter and said flat surface portion nearest said central axis being a distance (A') from said central axis of from 0.5 to 2.0 times said minimum diameter.

4. The system as defined in claim 1, said baffle (37a") being a bar having a square cross section oriented with adjacent corners facing said outlet end and said central axis, the corner adjacent said outlet end being a distance (C") from said outlet end of from 0.5 to 1.0 times said minimum diameter and the corners adjacent, said central axis being a distance from said central axis of from 0.5 to 2.0 times said minimum diameter.

5. The system of claim 1 wherein said outlet end comprises curvilinear trumpet-like geometry, said baffle (37a"') having a curvilinear surface.

6. The system of claim 5 wherein the portion of said surface nearest trumpet-like outlet end being a distance (C"') from the exit end in the range of 0.2 to 0.5 times said minimum diameter and the portion of said surface nearest said central axis being a distance (A"') of from 0.2 to 2.0 times said minimum diameter above said central axis.

7. The system of claims 1, 2, 3, 4, 5 or 6 including means (18) for applying liquid to said yarn between said feed roll and the yarn inlet (60) of the jet body.

8. The system of claim 7, wherein said means for applying liquid is a water bath (18), said yarn being immersed in said water prior to passing to the jet.

9. The system of claim 7 or claim 8, including means (34) for drawing said yarn located between said source of supply (30) for said yarns and said means (36) for feeding yarn to applying liquid to said yarn, and means for stabilizing said yarn, by stretching said yarn in a stabilization zone from about 1 to about 15 percent said zone being located between said nip rolls (39) and said means (40) for taking yarn up onto a package.
10. The system of claim 9 including means (41) for post heating said yarn in a zone downstream of said stabilization zone.

**Patentansprüche**

1. Vorrichtung zum Texturieren eines oder mehrerer Garne (10), welche einen Vorrat (12) zur Zuführung für die Garne, eine Garnbehandlungsdüse (20), wobei die Düse (20) einen Körper mit Einlauf (80) und Auslaßenden (66) umfaßt, die über eine Mittelbohrung entlang einer Mittelachse verbunden sind, eine Einrichtung zum Einleiten von Druckgas durch einen Gaseinlauf (22) in die Bohrung zwischen den beiden zur Kontaktierung durch die Düse an einer Stelle in der Bohrung gehenden Gärnern umfaßt, wobei das Gas und das Gas einen Weg vom Auslaßenden (66) der Düse zurücklegen, wobei die Weiterentwicklung folgendes aufweist: eine Ablenkeinrichtung (37a), welche in der Nähe des Garnauslaßenden (66) der Düse liegt, die Ablenkeinrichtung eine Führungsfläche für das Garn bildet, um die sich das Garn auf einer Bahn bewegt, nachdem es aus dem Auslaßenden (66) der Düse verlassen hat, dadurch gekennzeichnet, daß die Düse (20) zwischen einer Zuführwalze und einer Quetschwalze (24) angeordnet ist, durch die das Garn zur Behandlung mit dem unter Druck stehenden Fluid geht, und eine Einrichtung (14) zum Weitertransport des Garne zu einer Aufspuleinrichtung (28) unter Spannung vorgesehen ist, und daß die Ablenkeinrichtung (37a) eine Umfangsfäche hat, wobei der Teil der dem Auslaßenden am nächsten liegenden Fläche einen Abstand (C) von dem 0,1 bis 2,0fachen der kleinsten Durchmesser (B) der Bohrung des Auslaßenden hat und der Teil der Mittelachse am nächsten liegenden Fläche einen Abstand (A) von dem 0,1 bis 2,0fachen des kleinsten Durchmessers (B) oberhalb der Mittelachse hat.

2. Vorrichtung nach Anspruch 1, bei der die Ablenkeinrichtung (37a) eine krummlinige Fläche hat, der dem Auslaßenden am nächsten liegende Teil der Fläche einen Abstand (C) vom Austrittsende in einem Bereich von dem 0,1 bis 1,5fachen des kleinsten Durchmessers hat, und der der Mittelachse am nächsten liegende Teil der Oberfläche einen Abstand (A) von dem 0,1 bis 2,0fachen des kleinsten Durchmessers oberhalb der Mittelachse hat.

3. Vorrichtung nach Anspruch 1, bei der die Ablenkeinrichtung (37a) ein Teil ist, welches einen viereckigen bzw. quadratischen Querschnitt hat, welcher derart angeordnet ist, daß benachbarte, ebene Flächenteile dem Auslaßenden der Düse und der Mittelachse zugewandt sind, der dem Auslaßenden am nächsten liegende ebene Flächenteil einen Abstand (C') von dem Auslaßenden von dem 0,5 bis 1,0fachen des kleinsten Durchmessers hat, und der der Mittelachse am nächsten liegende Teil der Fläche einen Abstand (A') von der Mittelachse von dem 0,5 bis 2,0fachen des kleinsten Durchmessers hat.

4. Vorrichtung nach Anspruch 1, bei der die Ablenkeinrichtung (37a) ein Teil ist, welches einen viereckigen bzw. quadratischen Querschnitt hat, welcher derart angeordnet ist, daß benachbarte Ecken dem Auslaßende und der Mittelachse zugewandt sind, die dem Auslaßende benachbarte Ende einen Abstand (C') von dem Auslaßenden von dem 0,5 bis 1,0fachen des kleinsten Durchmessers und den benachbarten Ecken hat, und die Mittelachse einen Abstand von der Mittelachse von dem 0,5 bis 2,0fachen des kleinsten Durchmessers hat.

5. Vorrichtung nach Anspruch 1, bei der das Auslaßende eine groblinige, trompetenförmige Geometrie aufweist, und die Ablenkeinrichtung (37a) eine krummlinige Oberfläche hat.

6. Vorrichtung nach Anspruch 5, bei der der dem trompetenförmigen Auslaßende am nächsten liegende Teil der Fläche einen Abstand (C') von dem Austrittsende in einem Bereich von dem 0,2 bis 0,5fachen des kleinsten Durchmessers hat, und der der Mittelachse am nächsten liegende Teil der Fläche einen Abstand (A') von dem 0,2 bis 2,0fachen des kleinsten Durchmessers oberhalb der Mittelachse hat.

7. Vorrichtung nach den Ansprüchen 1, 2, 3, 4, 5 oder 6, welche eine Einrichtung (18) zum Aufbringen einer Flüssigkeit auf das Garn zwischen der Zuführwalze und dem Garneinlauf (60) des Düsenkörpers umfaßt.

8. Vorrichtung nach Anspruch 7, bei der die Einrichtung zum Aufbringen der Flüssigkeit ein Wasserbad (18) ist und das Garn in das Wasserbad (18) vor dem Durchgang durch die Düse eingetaucht wird.

9. Vorrichtung nach Anspruch 7 oder Anspruch 8, welche eine Einrichtung (34) zum Ziehen des Garne zwischen dem Vorrat für die Zuführung (30) für die Garne und der Einrichtung (36) für das Zufuhrarm umfaßt, um Flüssigkeit auf das
Garn aufzubringen, und eine Einrichtung zum Stabilisieren des Garns aufweist, mittels der das Garn in einer Stabilisierungszone von etwa 1 bis etwa 15 Prozent gestreckt wird, wobei die Zone zwischen den Quetschwalzen (39) und der Einrichtung (40) zum Aufspulen des Garns zu einer Spule liegt.

10. Vorrichtung nach Anspruch 9, welche eine Einrichtung (41) zum nachträglichen Erwärmen des Garns in einer Zone stromab von der Stabilisierungszone umfaßt.

Revendications

1. Un système de texturation d'un ou de plusieurs fils (10) qui comprend une source (12) de fourniture desdits fils, un appareil à jet (20) de traitement du fil, ledit appareil à jet (37) comprenant un corps comportant des extrémités d'entrée (60) et de sortie (66) reliées par un alésage central le long d'un axe central, des moyens d'introduction de gaz sous pression à travers une entrée de gaz (22) dans ledit alésage entre lesdites extrémités pour venir au contact du fil passant à travers l'appareil à jet en un emplacement dans ledit alésage, ledit fil et ledit gaz suivant un trajet à partir de ladite extrémité de sortie (66) dudit jet, le perfectionnement comprenant: un moyen déflecteur (37a) occupant une position adjacente à l'extrémité (66) par laquelle le fil sort du jet, ledit moyen déflecteur constituant une surface de guidage pour ledit fil autour de laquelle ledit fil se déplace suivant un trajet après avoir quitté l'extrémité de sortie (66) de l'appareil à jet, caractérisé en ce que l'appareil à jet (20) est disposé entre un rouleau d'alimentation et un rouleau exprimeur (24) à travers lequel passe le fil pour être traité du fluidé sous pression et des moyens (14) pour reproduire le fil vers un renvideur (28) sous tension et en ce que le moyen déflecteur (37a) comporte une surface périphérique, la partie de ladite surface la plus proche de ladite extrémité de sortie étant à une distance (C) de 0,1 à 2,0 fois les diamètres minimum (B) de l'alésage de l'extrémité de sortie, la partie de ladite surface la plus proche dudit axe central étant à une distance (A) de 0,1 à 3,0 fois ledit diamètre minimum (a) au-dessus dudit axe central.

2. Le système selon la revendication 1 dans lequel ledit moyen déflecteur (37a) comporte une surface curvilinéaire, la partie de ladite surface la plus proche de ladite extrémité de sortie étant à une distance (C) de l'extrémité de sortie comprise entre 0,1 et 1,5 fois ledit diamètre minimum et la partie de ladite surface la plus proche dudit axe central étant à une distance (A) de 0,1 à 2,0 fois ledit diamètre minimum au-dessus dudit axe central.

3. Le système selon la revendication 1 dans lequel ledit moyen déflecteur (37a') est un barreau à section transversale carrée orientée avec des parties superficielles plates adjacentes situées en face de ladite extrémité de sortie du jet et ledit axe central, la partie de surface plate la plus proche de ladite extrémité de sortie étant à une distance (C') de l'extrémité de sortie de 0,5 à 1,0 fois ledit diamètre minimum et ladite partie de surface plate la plus proche dudit axe central étant à une distance (A') dudit axe central de 0,5 à 2,0 fois ledit diamètre minimum.

4. Le système selon la revendication 1 dans lequel ledit moyen déflecteur (37a'') étant un barreau à section transversale carrée orientée avec des coins adjacents situés en face de ladite extrémité de sortie et dudit axe central, le coin adjacent à ladite extrémité de sortie étant à une distance (C'') de ladite extrémité de sortie de 0,5 à 1,0 fois ledit diamètre minimum et les coins adjacents audit axe central étant à une distance dudit axe central de 0,5 à 2,0 fois ledit diamètre minimum.

5. Le système selon la revendication 1 dans lequel ladite extrémité de sortie présente une géométrie curvilinéaire en forme de trompette, ledit moyen déflecteur (37a''') ayant une surface curvilinéaire.

6. Le système selon la revendication 5 dans lequel la partie de ladite surface la plus proche de ladite extrémité en forme de trompette est à une distance (C''') de l'extrémité de sortie comprise entre 0,2 et 0,5 fois ledit diamètre minimum et la partie de ladite surface la plus proche dudit axe central est à une distance (A''') de 0,2 à 2,0 fois ledit diamètre minimum au-dessus dudit axe central.

7. Le système selon les revendications 1, 2, 3, 4, 5 ou 6 comprenant des moyens (18) d'application de liquide audit fil entre ledit rouleau d'alimentation et l'entrée (60) de fil dans le corps de l'appareil à jet.

8. Le système selon la revendication 7 dans lequel lesdits moyens d'application de liquide sont constitués par un bain d'eau, ledit fil étant immergé dans ladite eau avant de passer dans l'appareil à jet.
9. Le système selon les revendications 7 ou 8 comprenant des moyens d’étirage (34) dudit fil situés entre ladite source d’alimentation (30) pour lesdits fils et lesdits moyens (36) d’alimentation du fil pour appliquer du liquide sur ledit fil et des moyens de stabilisation dudit fil par étirage dudit fil dans une zone de stabilisation d’une quantité d’environ 1 à environ 15%, ladite zone étant située entre lesdits rouleaux exprimeurs (39) et lesdits moyens (40) de reprise du fil sur un conditionnement.

10. Le système selon la revendication 9 comprenant des moyens (41) de chauffage ultérieur dudit fil dans une zone située en aval de ladite zone de stabilisation.