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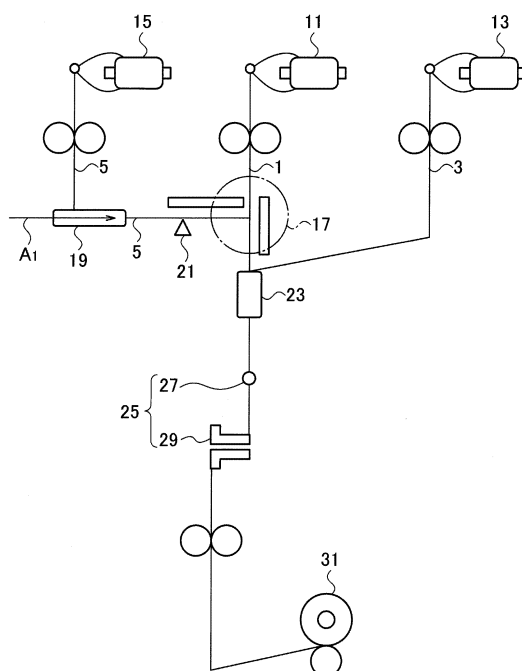
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(54) **FANCY YARN PRODUCTION APPARATUS**

(57) A production device for a fancy yarn including a main yarn and a decorative yarn intermittently cut and tangled in the main yarn is provided with a confluence region to put the decorative yarn along the main yarn; a main feeding creel for feeding the main yarn to the con-

fluence region; a jet nozzle for feeding the decorative yarn along with air flow to the confluence region; a cutter to intermittently cut the decorative yarn; and a twisting device to create a real twist or a false twist in the main yarn with the decorative yarn.

FIG. 1



Description

TECHNICAL FIELD

[0001] The following disclosure relates to a device for producing a fancy yarn constituted of a main yarn and decorative fibers, into which a raw fiber is intermittently cut, tangled in the main yarn.

BACKGROUND ART

[0002] For the purpose of causing decorative effects on fabrics or knits, or for any other purposes, changes formed at regular or irregular intervals are often given to yarns. A yarn with such changes is often referred to as a fancy yarn. A variety of yarns had been proposed in the past.

[0003] As no definite production method for fancy yarns exists, one is produced by giving changes during a spinning process and another is produced by further processing a yarn once produced through a spinning process. Even in cases where once produced yarns are further processed to produce fancy yarns, one is produced by processing a single yarn and another is produced through a process where one yarn is tangled with another yarn.

[0004] PTL 1 discloses a related art.

Citation List

Patent Literature

[0005] PTL 1: Japanese Patent Application Laid-open No. 2004-270124

SUMMARY

[0006] The following disclosure provides a new option for the art of fancy yarns.

[0007] According to an aspect, a production device for a fancy yarn including a main yarn and a decorative yarn intermittently cut and tangled in the main yarn is provided with a confluence region to put the decorative yarn along the main yarn; a main feeding creel for feeding the main yarn to the confluence region; a jet nozzle for feeding the decorative yarn along with air flow to the confluence region; a cutter to intermittently cut the decorative yarn; and a twisting device to create a real twist or a false twist in the main yarn with the decorative yarn.

BRIEF DESCRIPTION OF DRAWINGS

[0008]

FIG. 1 is a schematic elevational view of a device for producing a fancy yarn according to an embodiment.

FIG. 2 is a schematic elevational view of a device

for producing a fancy yarn according to another embodiment.

FIG. 3 is a schematic elevational view for detailing a relation between a confluence region for putting decorative fibers along a main yarn and a jet nozzle. FIG. 4 is a schematic elevational view of a jet nozzle according to another example.

FIG. 5 is an elevational sectional view illustrating an air nozzle as an example of a twisting device and a yarn under processing.

FIG. 6A is a schematic drawing showing an aspect of the main yarn and the decorative fibers after passing the confluence region.

FIG. 6B is a schematic drawing showing an aspect of the main yarn, a sub yarn and the decorative fibers after passing the air nozzle.

FIG. 6C is a schematic drawing showing a fancy yarn after passing the twisting device.

DESCRIPTION OF EMBODIMENTS

[0009] Exemplary embodiments will be described hereinafter with reference to the appended drawings. Throughout the following description and the appended claims, terms "upstream" and "downstream" are defined and used with respect to a direction where yarns run unless otherwise described.

[0010] A device according to the present embodiment is preferably applicable to production of a fancy yarn at least including a main yarn 1 and decorative fibers 5c, into which a raw fiber is intermittently cut, tangled in the main yarn 1, and capable of including a sub yarn 3 as well, as shown in FIGs. 6A through 6C. The fancy yarn 10 may be used in fabrics or knits for example to cause decorative effects thereon.

[0011] Referring mainly to FIG. 1, the device is in general provided with a main feeding creel 11 for feeding the main yarn 1, a decorative yarn creel 15 for feeding a decorative yarn 5, a twisting device 23 and a winder 31. The main yarn 1 runs from the main feeding creel 11 through a confluence region 17 to the twisting device 23. To guide the main yarn 1 in this course, any yarn guides such as rings and rollers may be disposed properly.

[0012] The device is further provided with a jet nozzle 19 for guiding air flow A1. The decorative yarn 5 is made to pass through the jet nozzle 19, intermittently cut by means of a cutter 21 into the decorative fibers 5c, and fed by means of the air flow A1 to the confluence region 17 to start flowing together with the main yarn 1 there.

[0013] The device may further include a sub yarn creel 13 for feeding a sub yarn 3. The sub yarn 3, at an area downstream from the confluence region, starts flowing together with the main yarn 1.

[0014] The twisting device 23 is disposed downstream from the confluence region 17 or, in a case where the sub yarn 3 flows together, disposed downstream from the area at issue. The twisting device 23 is for example a false twister and the whole of the yarns 1, 3 and the

decorative fibers 5c is thereby given a false twist to form the fancy yarn 10 and then taken up by the winder 31. Alternatively, a real twist may be given thereto as described later.

[0015] While three feeding creels respectively feed the main yarn in the example shown in FIG. 1, the sub yarn and the decorative yarn, additional feeding creels may be further added in order to feed two or more main yarns or sub yarns. As well, two or more decorative yarns may be available and, in such a case, a set of a decorative yarn creel, a jet nozzle, a cutter and a confluence region should be added. Two or more decorative yarns may vary in color and/or in thickness.

[0016] Referring to FIG. 3 in combination with FIG. 1, the jet nozzle 19 is for example an elongated hollow tube, one end of which is connected to an air-blast device such as a blower and the other end of which is opened toward the confluence region 17. When the device is in operation, generally the air flow A1 by the air-blast device steadily flows through the jet nozzle 19 from the one end to the other. The decorative yarn 5 is drawn out of the decorative yarn creel 15, led through around the one end into the jet nozzle 19, and expelled out of the other end along with the air flow A1.

[0017] The cutter 21 is disposed for example between the jet nozzle 19 and the confluence region 17. The cutter 21 is for example an edged hook. The decorative yarn 5 expelled from the jet nozzle 19 steadily flutters and then touches the cutter 21, thereby being cut. Alternatively, in place of the hook, scissors or clippers are applicable to the cutter 21 and a driver device such as a motor mechanism or a solenoid mechanism may be provided in order to drive the scissors or the clippers. Still alternatively, any thermal means or a laser may be used to cut the decorative yarn 5.

[0018] The main yarn 1 steadily keeps running and vibrating, and is as well in complex, for example swirling, motion, and creates an air flow A2 accompanying its motion. The air flow A1 expelled from the jet nozzle 19 mixes with the air flow A2 to create an air flow A3 that makes complex movements including stagnation and swirling. The cut decorative fibers 5c are, as maybe being blown in the air flow A3, put along the main yarn 1 and into confluent motion therewith, and is further carried to the twisting device 23. The decorative fibers 5c may, as its state relative to the main yarn 1 is illustrated in FIG. 6A, run simply along the main yarn 1 or lightly tangle therein.

[0019] Referring to FIG. 3, the device may be provided with one or more walls 33 in order to rectify the air flow at the confluence region 17. At least one of the walls 33 may be disposed in a direction and at a position adapted to rectify the air flow A1 toward the main yarn 1. As well, another of the walls 33 may be disposed to rectify the air flow in a direction where the main yarn 1 runs for example. These walls are beneficial in tangling the decorative fibers 5c into the main yarn 1.

[0020] To promote cutting, the decorative yarn 5 may be intermittently fed and, for this purpose, the decorative

yarn creel 15 for example may be provided with a servomotor. Alternatively any of the rollers that guide the decorative yarn 5 may be provided with a servomotor. As the servomotor is intermittently put into operation, the decorative yarn 5 is intermittently fed. When a tip of the fed decorative yarn 5 touches the main yarn 1 and also the servomotor temporarily stalls, tension instantaneously created in the decorative yarn 5 promotes cutting by the cutter 21. Or, possibly, the decorative yarn 5 may be cut without touching the cutter. Still alternatively, prior to the touch of the tip with the main yarn 1, the decorative yarn 5 may be intendedly cut and the cut decorative fibers 5c may be made to fly with the air flow A1 toward the main yarn 1 and tangle therein.

[0021] Alternatively, instead of, or in addition to, the intermittent operation of the servomotor, possibly applicable is a clamp 19A capable of intermittently operating as shown in FIG. 4. To operate the clamp 19A, a driver device such as a solenoid mechanism may be used. As the clamp 19A is put intermittently into operation by means of a solenoid or such to pinch the decorative yarn 5, the decorative yarn 5 is instantaneously set at rest and then cut by the cutter 21. The clamp 19A may be disposed, contrary to FIG. 4, outside the jet nozzle 19.

[0022] The cutter 21 may be, besides, outside the jet nozzle 19 as shown in FIG. 21 but may be disposed inside the jet nozzle 19 as shown in FIG. 4. Moreover, downstream from the cutter 21, the device may be provided with a second clamp 19B. According to this construction, the decorative fibers 5c cut in advance get ready there and are, as the second clamp 19B releases them, fed to the confluence region 17 in sequence.

[0023] Still alternatively, it is also possible that the decorative yarn 5 is cut in advance outside the jet nozzle 19 and the already cut decorative fibers 5c are in sequence fed to the jet nozzle 19.

[0024] Referring again to FIG. 1, while the main yarn 1 along with the decorative fibers 5c runs toward the twisting device 23, the device is so structured as to make them flow together with the sub yarn 3 at any area downstream from the confluence region 17 and upstream from the twisting device 23. As the sub yarn 3 is, along with the main yarn 1 and the decorative fibers 5c, twisted, the decorative fibers 5c tangle into the main yarn 1. Or, by applying any yarn having distinct characteristics from those of the main yarn 1 to the sub yarn 3, it is possible to give artful or functional properties to the fancy yarn 10.

[0025] For convenience of such confluence and twisting, a swirling nozzle such as an air nozzle 23 may be used, which swirls the air flow to give a false twist to a yarn. The swirling nozzle swirls the main and sub yarns 1, 3 to promote incorporation of the decorative fibers 5c into the main and sub yarns 1, 3. This is beneficial in preventing the decorative fibers 5c from falling off. In place of the swirling nozzle, a hollow spindle for example may be used. Further in place thereof or in addition thereto, heat or such may be made to act thereon.

[0026] The decorative fibers 5c along with the main

and sub yarns 1, 3 pass through the air nozzle 23 and then, as maybe the former turn around the latter, become tangled together. The air nozzle 23 is used mainly for preventing the decorative fibers 5c from falling off and is thus unnecessary for bundling the yarns 1, 3. The yarns 1, 3 and the decorative fibers 5c after passing through the air nozzle 23 fall into a state illustrated in FIG. 6B for example.

[0027] Referring again to FIG. 1, the yarns 1, 3 and the decorative fibers 5c made to flow together are guided to an interlacing device 25. The interlacing device 25 may include a water-application guide 27. The water-application guide 27 is a yarn guide having a nozzle capable of ejecting a small amount of water onto a yarn. Alternatively, instead of using the water-application guide 27, a tangling nozzle 29 as described later may be provided with a water nozzle. By applying a small amount of water to the yarns, it is enabled to strengthen entanglement among the yarns 1, 3 and the decorative fibers 5c.

[0028] The interlacing device 25 is provided with an air nozzle such as the tangling nozzle 29. Referring to FIG. 5, any publicly known tangling nozzle is applicable to the tangling nozzle 29. The tangling nozzle 29 is provided with a guiding hole 41 through which the yarn passes and an air duct 43 in communication with the guiding hole 41. The air duct 43 is connected to an external air-blast device such as a blower and is made thinner at least at its end toward the guiding hole 41, thereby ejecting relatively high-speed air flow A4 into the guiding hole 41. The air flow A4 ejected in the guiding hole 41 creates relatively high-speed turbulent flow around its outlet, which gives entanglement to the yarns passing through the guiding hole 41.

[0029] As the yarns 1, 3 and the decorative fibers 5c given water pass through the tangling nozzle 29, the yarns 1, 3 are bundled together and are, along with the decorative fibers 5c, given the entanglement to be tangled together, thereby the fancy yarn 10 as shown in FIG. 6C is provided.

[0030] While the descriptions above are given in regard to an example where the tangling nozzle is used, an interlace nozzle may be instead used. Or, a yarn processing device such as a combination of a hollow spindle or a friction-type twisting device and a heater may be used. Still alternatively, in place of or in addition to use of these yarn processing means, heating and adhesion are applicable. As heating means, a heater, a laser oscillator and an ultra-sonic generator may be exemplified.

[0031] In addition, while the descriptions above are given in regard to an example where a false twist is given to the yarns, a real twist may be given in place of the false twist. FIG. 2 illustrates an example of the real twist and a twisting device 23b is a device for the real twist, which is constituted of a combination of a twister and a spindle for example. In this case, the spindle fills a role as a winder as well. Even by the real twist, the decorative fibers 5c of course securely tangle in the yarns 1, 3 and also the yarns 1, 3 are more tightly bundled together. The

interlacing device 25 may be omitted as the decorative fibers 5c are securely tangled in the main yarn 1 at the time of the real twisting.

[0032] Further, in this case, a yarn guide 23a may be provided downstream from the confluence region 17 and upstream from the twisting device 23b. While the yarn guide 23a has a function mainly for guiding the yarns and the fibers so as to make the sub yarn 3 flow together with the main yarn 1 and the decorative yarn 5, it may be accompanied by a structure for twisting and processing the yarns.

[0033] Referring again to FIG. 6C, the fancy yarn 10 according to the present embodiment has structures with relatively long naps constituted of shortly cut decorative fibers. Although each structure resembles naps, they less likely fall off as real naps do because they firmly tangle in the main and sub yarns.

[0034] The magnitude of this structure can be arbitrarily changed depending on the length of cutting the decorative yarn and intervals between adjacent structures can be arbitrarily changed by changing intervals of cutting the decorative yarn. Moreover, needless to say, as two or more decorative yarns can be used, distinct colors could be given to the respective structures.

[0035] In methods for producing fancy yarns of the prior art, in many cases, continuous long fibers are processed to form structures such as loops or slubs. Therefore tip ends of fibers must not spread outward to form the structures like as naps of the present embodiment. Moreover, the production methods of the prior art cannot sufficiently arbitrarily regulate intervals between the structures and magnitudes of the structures. According to the present embodiment, these factors are readily regulated. Further, the present embodiment enables distinct colors for the respective structures.

[0036] Although certain embodiments have been described above, modifications and variations of the embodiments described above will occur to those skilled in the art, in light of the above teachings.

INDUSTRIAL APPLICABILITY

[0037] A production device is provided, which provides a new option for the art of fancy yarns.

Claims

1. A production device for a fancy yarn including a main yarn and a decorative yarn intermittently cut and tangled in the main yarn, the device comprising:

- a confluence region to put the decorative yarn along the main yarn;
- a main feeding creel for feeding the main yarn to the confluence region;
- a jet nozzle for feeding the decorative yarn along with air flow to the confluence region;

a cutter to intermittently cut the decorative yarn;
and
a twisting device to create a real twist or a false
twist in the main yarn with the decorative yarn.

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2. The production device of claim 1, wherein the twisting device is disposed downstream from the confluence region in a direction where the main yarn runs.

3. The production device of claim 1, further comprising: 10

a sub feeding creel for feeding a sub yarn,
wherein the twisting device is disposed downstream from an area where the sub yarn starts
flowing together with the main yarn with the decorative yarn. 15

4. The production device of claim 3, further comprising:
a yarn guide to make the main yarn having passed the confluence region and flowing together with the decorative yarn flow together with the sub yarn, the yarn guide being disposed downstream from the confluence region and upstream from the twisting device in the direction where the main yarn runs. 20

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5. The production device of any one of claims 1 through 4, wherein the twisting device comprises one or more selected from the group consisting of a swirling nozzle, a hollow spindle, and a real twister. 30

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6. The production device of claim 1, wherein the cutter is disposed in the jet nozzle or between the jet nozzle and the confluence region.

7. The production device of claim 1, further comprising: 35
a wall for rectifying the air flow so as to stagnate or swirl the air flow fed through the jet nozzle in the confluence region.

8. The production device of claim 1, further comprising: 40

a decorative yarn creel for feeding the decorative yarn into the jet nozzle; and
a servomotor to set the decorative yarn creel in an intermittent motion. 45

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FIG. 1

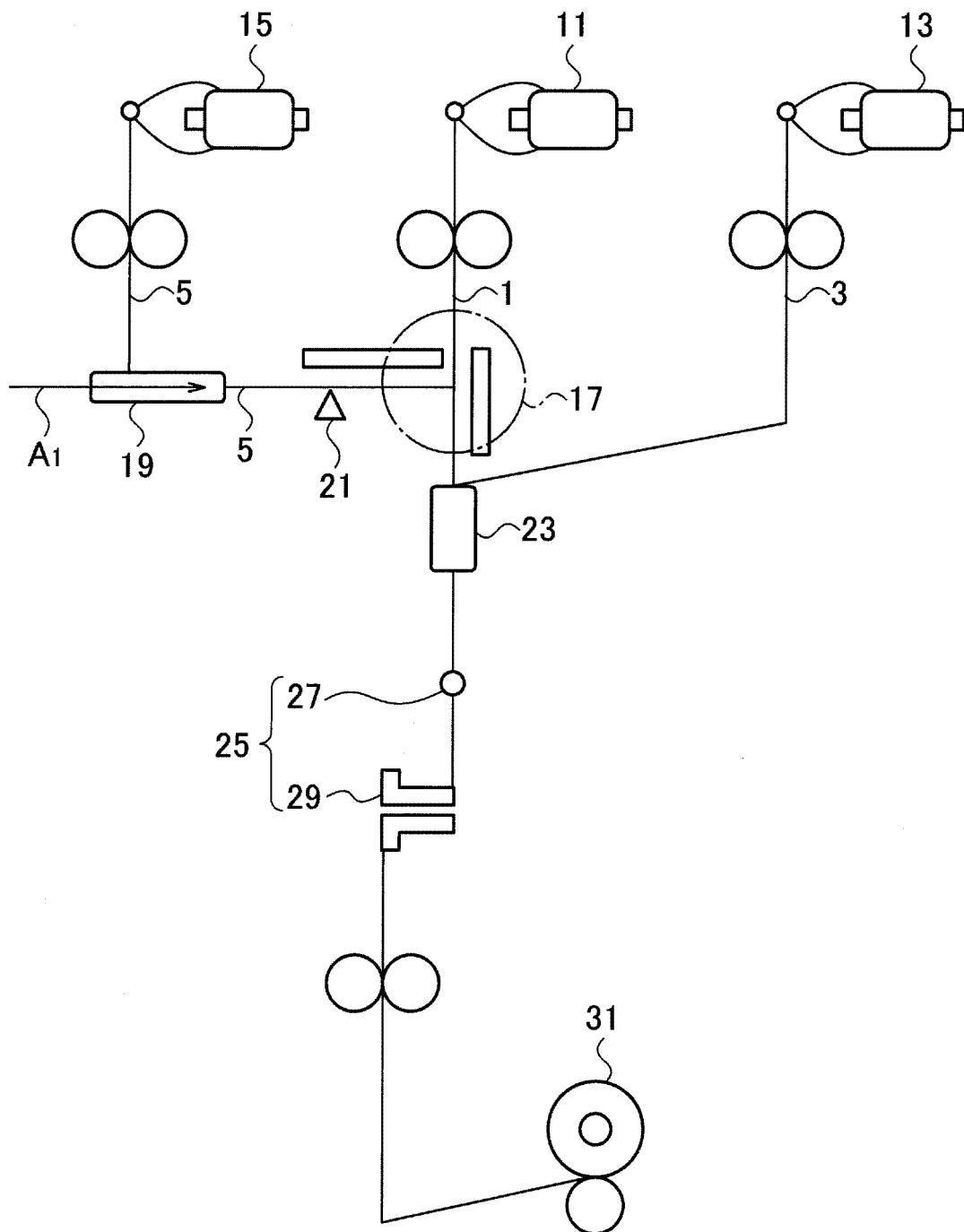


FIG. 2

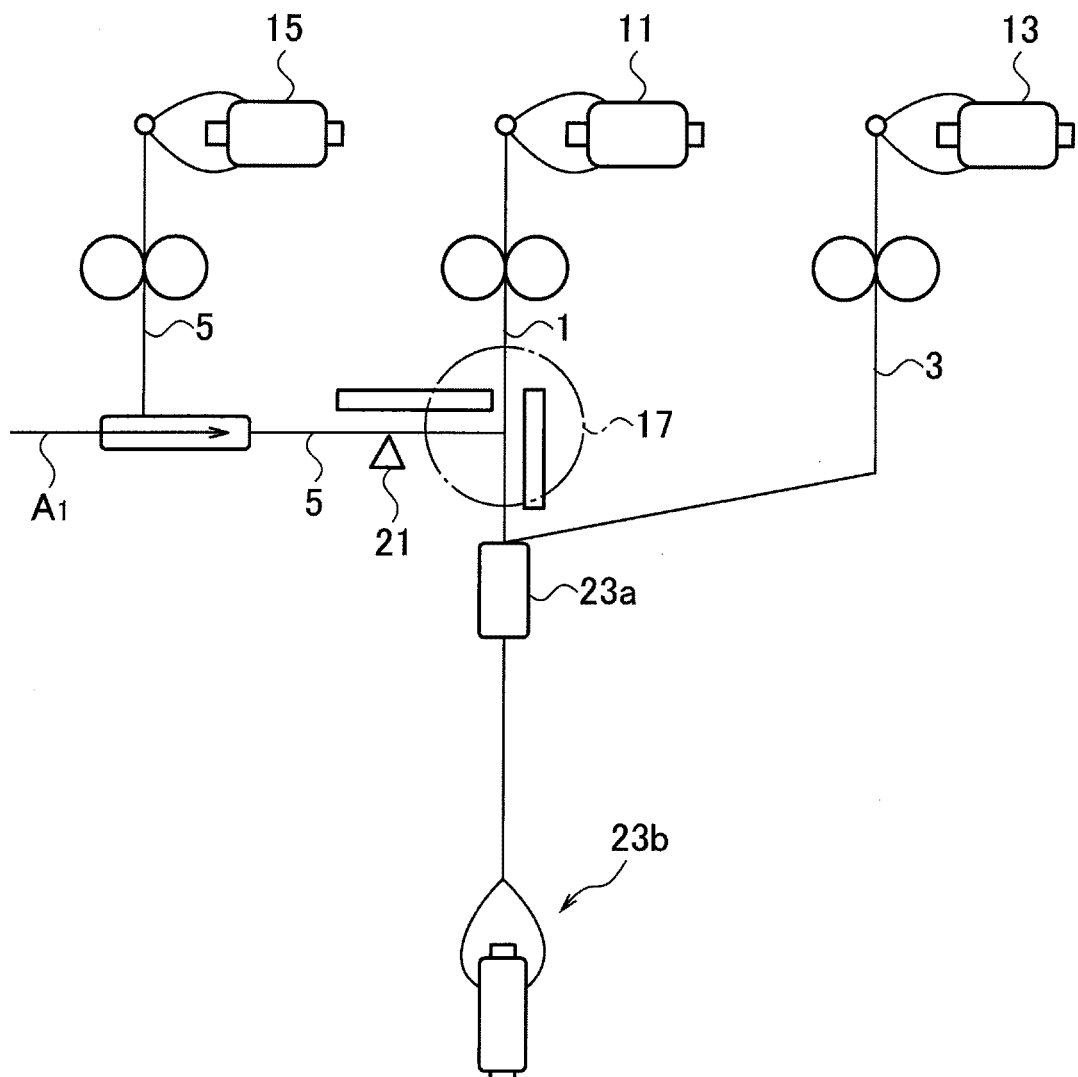


FIG. 3

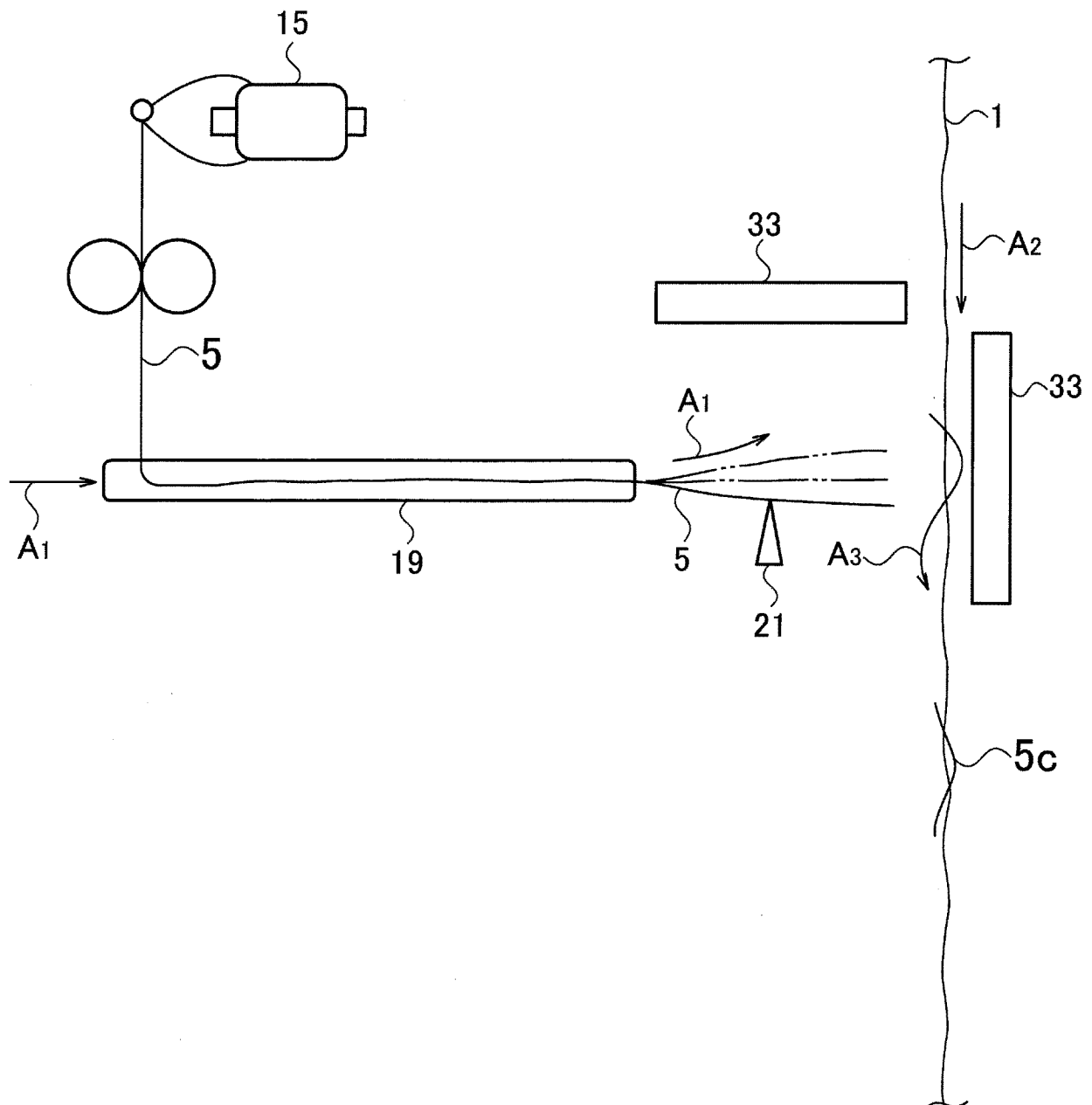


FIG. 4

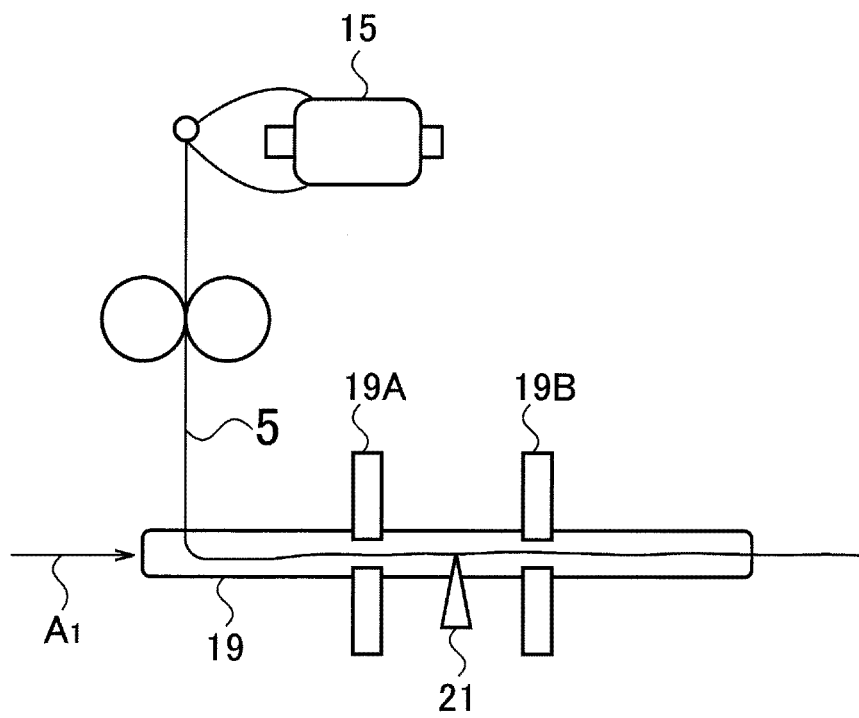


FIG. 5

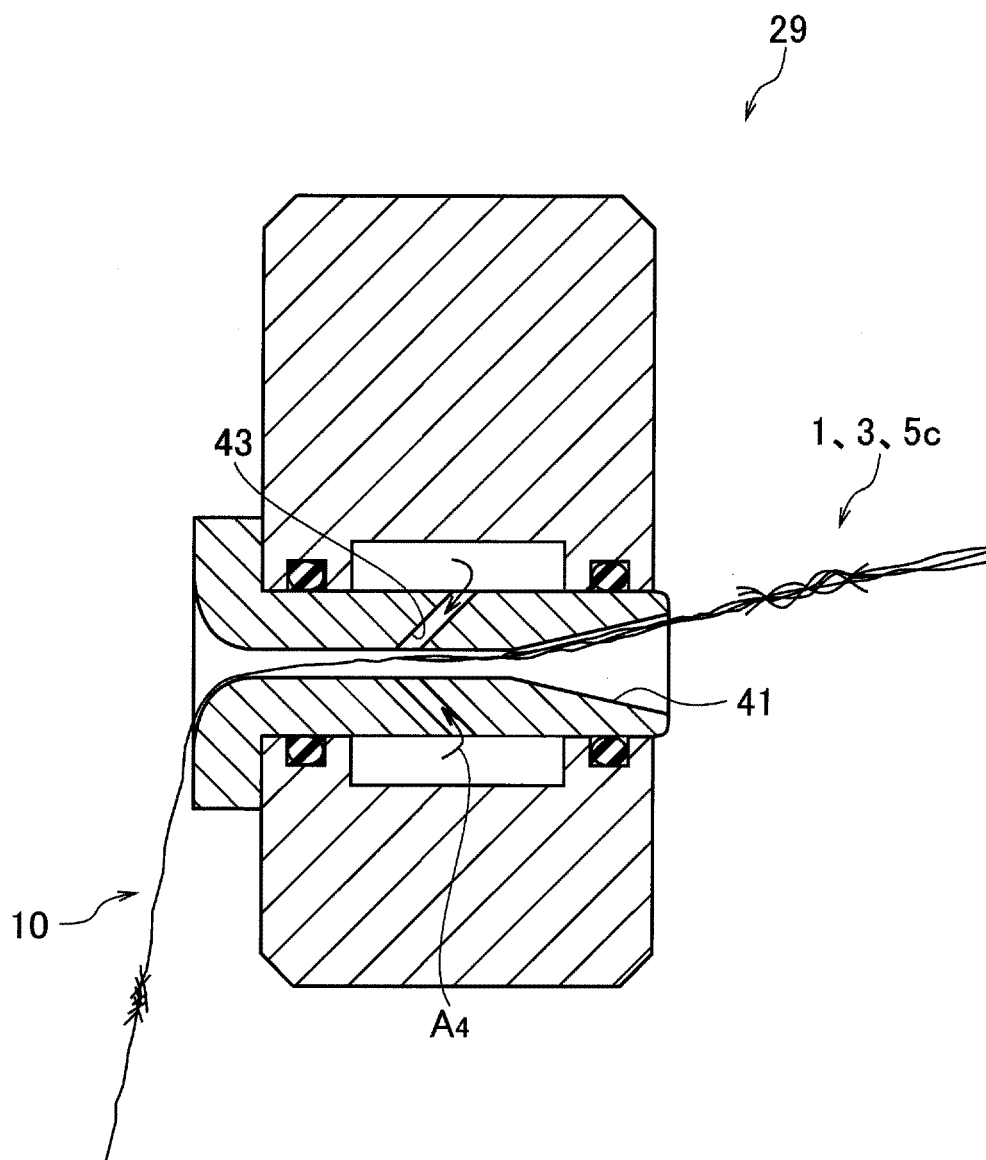


FIG. 6A

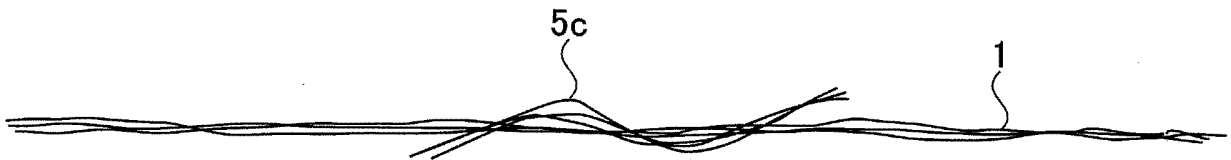


FIG. 6B

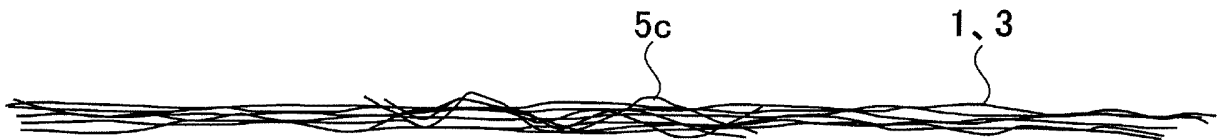


FIG. 6C



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2018/032121

A. CLASSIFICATION OF SUBJECT MATTER

Int.Cl. D02G3/34 (2006.01) i, D02G1/04 (2006.01) i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Int.Cl. D02G1/00-3/48, D02J1/00-13/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Published examined utility model applications of Japan 1922-1996

Published unexamined utility model applications of Japan 1971-2018

Registered utility model specifications of Japan 1996-2018

Published registered utility model applications of Japan 1994-2018

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 166886/1976 (Laid-open No. 98829/1978) (ASAI, Nobunari) 10 August 1978, claims, drawings (Family: none)	1-8
A	JP 1-156558 A (PAOLO, Ballerini) 20 June 1989, claims, drawings & US 5027594 A (claims, figures) & EP 317523 A1	1-8



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:

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Date of the actual completion of the international search

02 October 2018 (02.10.2018)

Date of mailing of the international search report

30 October 2018 (30.10.2018)

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Form PCT/ISA/210 (second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2018/032121

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 56-134226 A (UNITIKA LTD.) 20 October 1981, claims, drawings (Family: none)	1-8
A	JP 4-108128 A (TORAY TEXTILES INC.) 09 April 1992, claims, drawings (Family: none)	1-8
A	EP 0184277 A2 (MORRISON) 11 June 1986, claims, figures & JP 61-138734 A & JP 61-275435 A & US 4713931 A & US 4719744 A & US 4507913 A & US 4635435 A & US 5103626 A & US 5392588 A & US 4928464 A & US 4507913 A & EP 184277 A2 & EP 201357 A2	1-8

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 2004270124 A [0005]