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Takai et al.

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[45] **Sept. 18, 1973**

[54] **FALSE TWISTER DEVICE FOR PRODUCING CRIMPS IN FILAMENT YARN**

[75] Inventors: **Isao Takai,** Komatsu-shi, Ishikawa-ken; **Junshiro Ogura,** Ota-ku, Tokyo, both of Japan

[73] Assignees: **Oda Gosen Kogyo Kabushiki Kaisha,** Ishikawa-ken; **Ogura Hoseki Seiki Kogyo Kabushiki Kaisha,** Tokyo, both of Japan

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[52] **U.S. Cl.** **57/77.3,** 57/77.45

[51] **Int. Cl.** **D01h 7/92,** D03g 1/04

[58] **Field of Search** ...57/77.3–77.45, 34 R, 34 HS, 1 R, 157 TS, 157 R, 92–94

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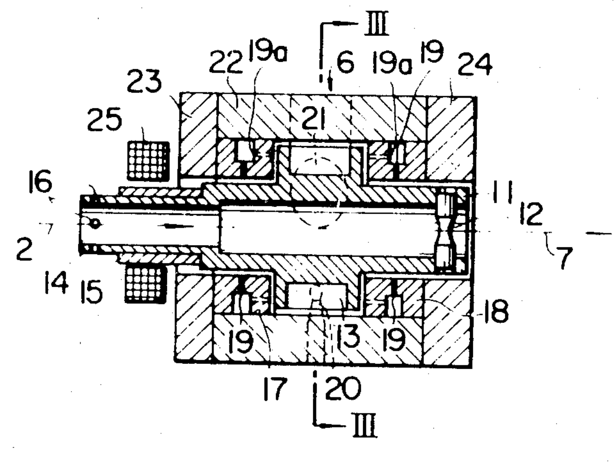
Primary Examiner—Donald E. Watkins
Attorney—Woodhams, Blanchard & Flynn

[57] **ABSTRACT**

An improved, efficient false twister device for producing crimps in a filament yarn, which device can be rotated at the speed of at least 750,000 r.p.m. This device comprises a turbine-blade type high speed rotary member having blades formed on its outer periphery and having a filament yarn passageway formed axially therethrough, and a twister pin provided in the said passageway, the said rotary member being supported by gas-bearings within a casing, the said rotary member further comprising means for jetting a pressurized fluid onto the blades of the said rotary member. During the operation, the twister pin is cooled indirectly by the said pressurized fluid to prevent an elevation of the temperature of the said twister pin. By the use of this apparatus, the productivity of crimped yarn can be almost doubled as compared with that of the prior art.

6 Claims, 10 Drawing Figures



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4 Sheets-Sheet 1

FIG. 1

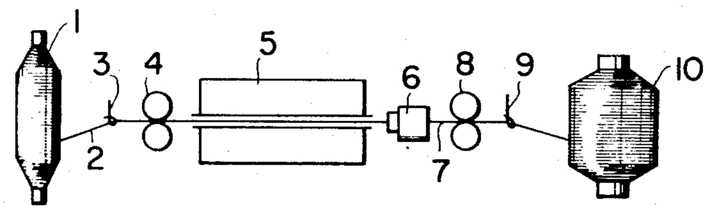


FIG. 2

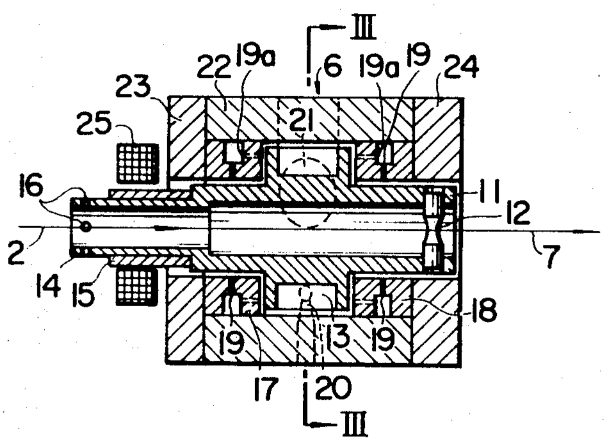
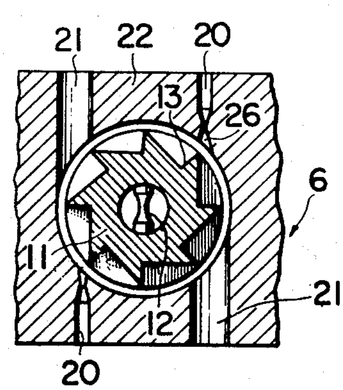


FIG. 3



INVENTORS
ISAO TAKAI
JUNSHIRO OGURA
BY
Wodhams, Blanchard & Flynn
ATTORNEYS

FIG. 4

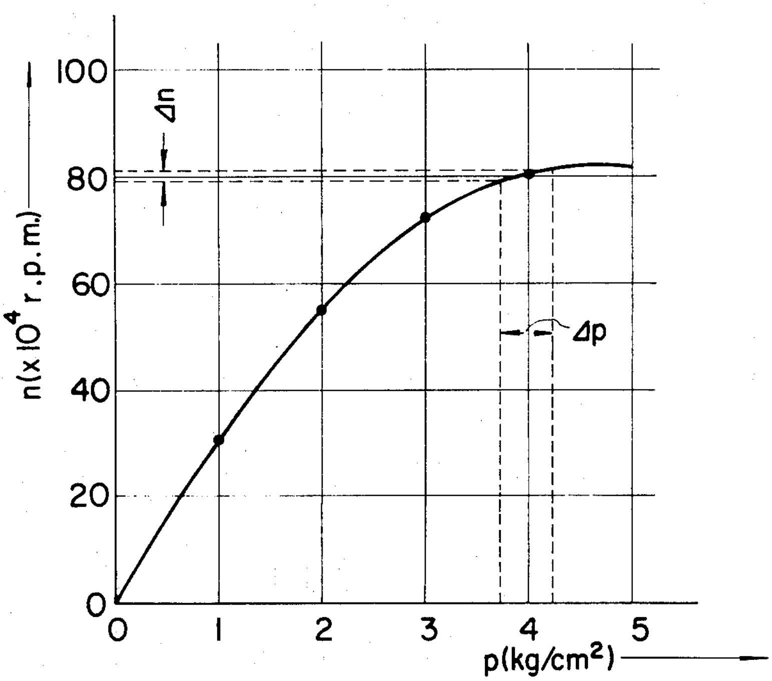
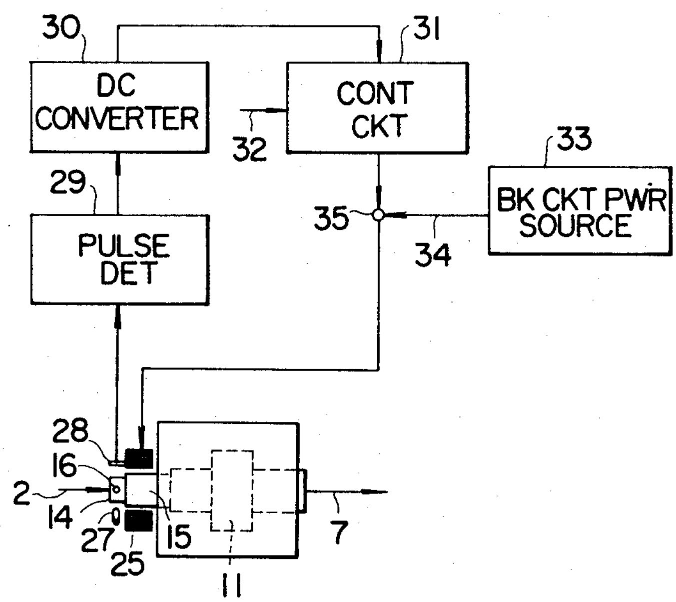


FIG. 5



INVENTORS
ISAO TAKAI
JUNSHIRO OGURA
BY
Wodhams, Blanchard & Flynn
ATTORNEYS

FIG. 6

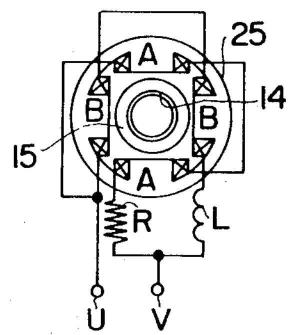
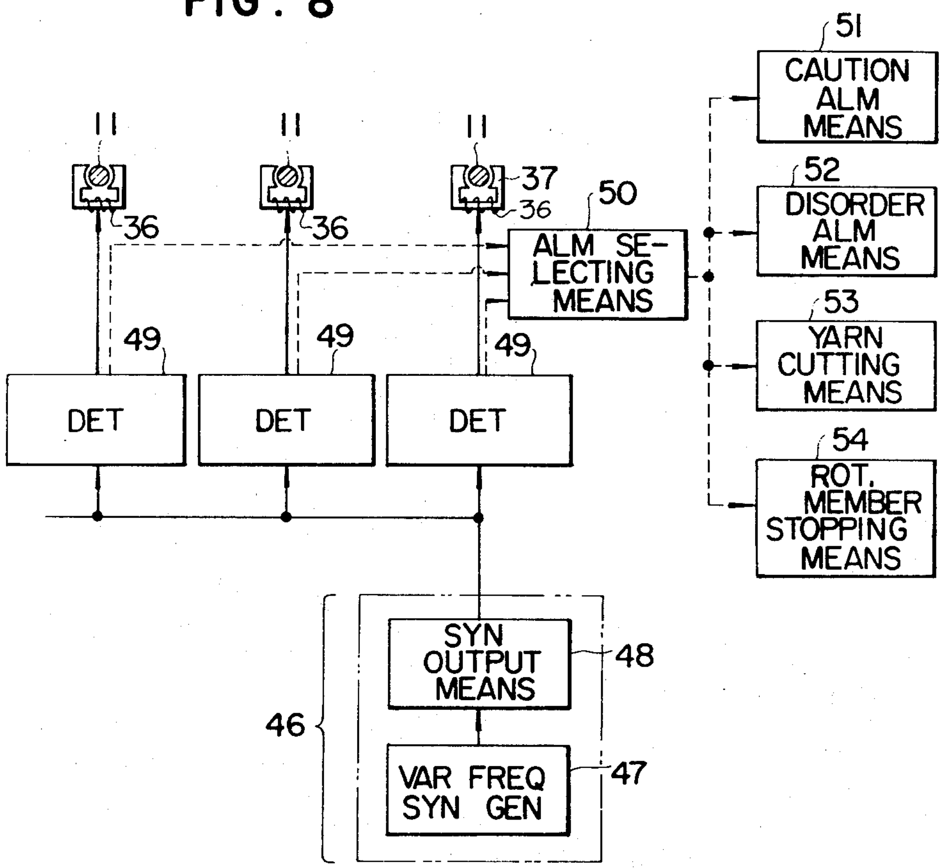


FIG. 8



INVENTORS
ISAO TAKAI
JUNSHIRO OGURA
BY
Woodhams, Blanchard and Flynn
ATTORNEYS

FIG. 7

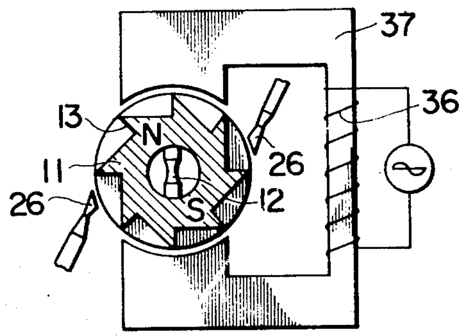


FIG. 9

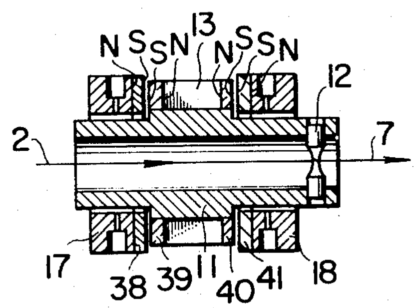
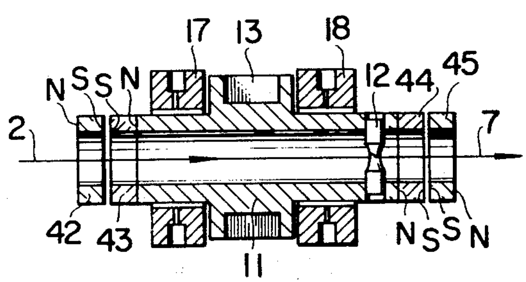


FIG. 10



INVENTORS
ISAO TAKAI
JUNSHIRO OGURA
BY
Woodhams, Blanchard & Flynn
ATTORNEYS

FALSE TWISTER DEVICE FOR PRODUCING CRIMPS IN FILAMENT YARN

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention is concerned with a false twister device for producing crimps in filament yarn.

2. Description of the Prior Art

In a conventional false twister, the spindle thereof was contact-driven by a driving roller made of a rubber. In actual operation, therefore, the spindle was rotated usually at the rate of the order of 350,000–450,000 r.p.m. at the most.

In view of the fact that the velocity of travel of the yarn which was being treated was determined in proportion to the rotation speed of the spindle, the productivity of crimped yarn, accordingly, was determined by the rotation speed of the spindle, and no further improvement in the productivity could be expected beyond this level unless the rotation speed of the spindle was increased. Moreover, those spindles which are employed in the conventional false twisters were such that their twister pins were heated due to the frictions produced by the driving rollers.

In addition, the filament yarn which was heated to produce crimps therein was passed therethrough while being rotated axially. Therefore, the twister pin was subjected to further heating and the temperature thereof inconveniently increased higher to a level above the secondary transfer point of the original filament yarn.

SUMMARY OF THE INVENTION

It is, therefore, a primary object of the present invention to provide a false twister device for producing crimps in filament yarn, which can enhance the productivity of crimped yarn to about twice as high as that obtained by the prior art by providing a twister pin in a turbine-blade type high speed rotary member and by rotating this twister pin at the rate of at least 750,000 r.p.m. while supporting the said rotary member with gas-bearings.

Another object of the present invention is to provide a device of the type described, which permits the production of desired crimped filament yarn to be obtained always without causing the wearing-out of the bearings of the high speed rotary member.

Still another object of the present invention is to provide a device of the type described, in which the pressurized fluid for rotating the high speed rotary member concurrently serves to cool not only this rotary member alone but also the twister pin to impart a cooling effect to the filament yarn in its stage prior to its being detwisted, to thereby enhance the durability of the crimps of the processed yarn.

A further object of the present invention is to provide a device of the type described, which further contains control means for maintaining the predetermined rotation speed of the high speed rotary member and for controlling the possible variance of this rotation speed to positively lie within the range of ±1 percent.

A still further object of the present invention is to provide a device of the type described, which further contains an electric control means for maintaining the predetermined rotation speed of the high speed rotary member so that substantial dimensional errors produced during the manufacture of the parts of the high speed rotary member will not cause any practical trouble in actual operation of the device.

A yet further object of the present invention is to provide a device of the type described, which further contains at least one or a combination of means for producing alarm, for stopping the rotation of the high speed rotary member, and/or for cutting the filament yarn being processed, whenever the rotation speed exceeds the permissible range thereof.

DESCRIPTION OF THE DRAWINGS

FIG. **1** is a schematic plan view of an apparatus as a whole for manufacturing a crimped filament yarn, including the device of the present invention for effecting false twisting of the said yarn, which is shown in block.

FIG. **2** is a somewhat diagrammatic longitudinal sectional view, showing a detailed structure of an example of the said device.

FIG. **3** is a sectional view taken along the line III-III in FIG. **2**.

FIG. **4** is an explanatory chart showing an example of the relationship between the pressure of the compressed fluid supplied to the blade-type rotary member of the device and the rotation speed (r.p.m.) of this rotary member.

FIG. **5** is an explanatory block diagram of an example of the brake-type electric control circuitry for regulating the rotation speed of the turbine-blade type rotary member to have the predetermined value.

FIG. **6** is a fragmentary explanatory illustration, showing the detail of a part of the electric control circuitry of FIG. **5**.

FIG. **7** is a fragmentary explanatory illustration, showing an example of the control system designed to control the rotation speed of the rotary member by applying a synchronous magnetic field thereto.

FIG. **8** is an explanatory block diagram, showing an example of synchronous alarm circuit.

FIG. **9** is a somewhat diagrammatic longitudinal sectional view, showing an example of an arrangement in which magnetizable member are mounted on the opposing faces of the rotary member and the gas bearings so as to act to repel each other in order to noncontactingly receive the thrust force applied to the rotary member in the direction of advancement of the filament yarn.

FIG. **10** is a somewhat diagrammatic longitudinal sectional view, showing an example of an arrangement in which similar magnetizable members are mounted on the opposing faces of the end portion of the rotary member and the casing, so as to act to repel each other.

DETAILED DESCRIPTION

The present invention contemplates an enhancement of the productivity of crimped yarn to about twice as great as that attained by the prior art from high speed revolutions of the twister pin which is rotated at the rate of about 750,000–800,000 r.p.m. by providing this twister pin or peg in a turbine-blade type rotary member and by supporting this rotary member on gas bearings within a casing. The driving source of the turbine-blade type high speed rotary member of the present invention and the fluid for the gas bearings which are employed in the present invention need not be any special fluid, but the use of a mere compressed air is sufficient.

The rotation speed (r.p.m.) error of the spindle in the crimp-producing process is required to lie within ±1 percent of the predetermined speed. Accordingly, the rotation speed error of the turbine-blade type rotary member must be within the same range. According to the present invention, the regulation of the rotation speed of the said rotary member is accomplished by altering the pressure and/or the supply rate of the compressed air which serves as the driving source.

In order to have a number of spindles operated at the same time in actual operation, however, it is desirable that the turbine-blade type rotary members of these respective spindles be operated by a common compressed air having an identical pressure. However, even in case an identically pressurized common compressed air is supplied, the speeds of the rotary members for the respective spindles may not necessarily lie within the predetermined range owing to the dimensional errors of these rotary members and the bearings, caused at the time of their manufacture. In order that the rotation speeds of these plural number of rotary members lie within the predetermined range, it would be necessary that the precision of processing at the time these rotary members and the bearings are manufactured be enhanced to minimize such errors and also that a regulating valve be provided for the rotary member of each spindle at attain this purpose. These requirements are sufficient if the device is designed exclusively for the operation of rotary members only at a certain designated speed. However, if the device is designed for operations which may be performed on the same device at different speeds depending on the yarns to be treated, then it becomes necessary that each spindle be rotated at the same altered speed simultaneously, to comply with the need. However, in such an instance, if the twisters employed are of the type having an adjusting valve for each spindle, it will be difficult to obtain a simultaneous alteration of the rotation speed of the respective spindles to a certain same speed only by changing the pressure at the compressed air supply source, because there is a very slight physical difference between the respective spindles caused at the time of their manufacture. Thus, it becomes necessary to adjust the rotation speed of each spindle. Also, in such an arrangement where an adjustment valve is provided for each spindle, there is required precision in processing the spindles, resulting in an undesirable increase in the manufacturing cost. According to the present invention, however, such manufactural errors of the spindles are allowed to a certain degree. Instead, the differences in the rotation speed of the respective spindles resulting from the aforesaid manufactural errors are regulated by electric control of the rotary members. There may be considered various ways of effecting this control. However, the inventors have worked out the most desirable and effective two such means. One of which comprises supplying a compressed air so that the rotary members for the respective spindles are rotated at a speed somewhat greater than the predetermined speed, and applying an electric braking action to these rotary members, thereby adjusting their speeds to equally agree with the initial predetermined rotation speed. The other of the means comprises application of a synchronous magnetic field to the rotary members to thereby maintain the same constant speed. According to one aspect of the present invention, the thrust which is applied to the filament yarn in the direction of its advancement is supported by gas bearings. According to another aspect, such a thrust is supported by utilizing the repelling force produced between two magnetized members of the same polarity.

Description will hereunder be directed to an embodiment of the present invention by referring to the drawings.

As shown in FIG. **1**, the entire apparatus for manufacturing a crimped filament yarn is arranged in general so that an unprocessed filament **2** wound around a bobbin **1** is fed, through a guide **3**, by feed rolls **4** and it is passed through a heater **5** and is subjected to a false twisting by a false-twister device **6** of the present invention to be processed into a crimped yarn **7**, and it is wound around a take-up bobbin **10** via delivery rolls **8** and a guide **9**.

Description will hereunder be made on an example of the false twister device **6** of the present invention by referring to FIGS. **2** and **3**.

A turbine-blade type high speed rotary member **11** has a twister pin **12** in the passageway of a filament yarn which is to be subjected to a crimping treatment. This rotary member **11** has a plurality of uniformly configurated blades formed around its circumference about the middle portion thereof. As seen in FIG. **2**, a sleeve **15** made of aluminum is tightly mounted on a tubular end portion **14** of the rotary member **11.** At a position close to the end edge of this tubular end portion **14** are provided light passing slits **16** which are formed through the walls of this tubular end portion **14.** This rotary member is housed in a casing **22**, and is supported therein by a left side gas bearing **17** and a right side gas bearing **18** in FIG. **2.** To these two gas bearings **17** and **18** are applied appropriate compressed air streams which are jetted out from radial and axial nozzles **19** and **19***a* onto the rotary member **11** thereby forming both radial and axial air bearings, to support this rotary member **11** in the state of floating on the compressed air streams. By jetting out, through nozzles **26**, the compressed air introduced through channels **20** provide in the casing **22** onto blades **13**, the rotary member **11** is rotated at a high speed as the jet streams of the compressed air are applied to the blades of the rotary member **11.** The streams of compressed air which have imparted a motive power to the rotary member **11** are then allowed to pass through discharge channels **21** and escape outside the casing **22.** The aforesaid left-and right-side bearings **17** and **18** are fixed respectively to the left side and right side end-cover members **23** and **24** by screws (not shown).

The false twister device **6** having the foregoing arrangement is operative in such a way that a compressed air is introduced from the channels **20** and jetted out through nozzles **26** onto the blades **13** of the rotary member **11.** Whereupon, the rotary member **11** is rotated at a high speed. As a consequence, the unprocessed filament yarn **2** is subjected to crimping treatment by the twister pin **12** to be processed into a crimped filament yarn **7.** It should be understood that throughout this operation, compressed air is constantly fed to the gas bearings **17** and **18** to maintain the high speed rotation of the rotary member **11.**

An example of the relationship between the number n of revolutions per minute (r.p.m.) of the high speed rotary member and the gauge pressure p (kg/cm^2) of the compressed air which is supplied to the rotary member is shown in FIG. **4.** As shown by the curve in FIG. **4,** when for example $n = 800,000$, p takes the value of 4. When n=800,000, the range of ±1 percent of n is

Δn. Thus, from the same drawing, it is known that Δp for this Δn is about ±5 percent. More specifically, since $\Delta n/n <<< \Delta p/p$, the turbine-blade type high speed rotary member is able to easily acquire a rotation speed within the desired range by virtue of a pressure adjusting valve. Besides, it is usually easy to maintain the value of Δp within ±1 percent. Since Δn for Δp has a permissible value of about 5 times as great, the allowance of ±1 percent of n can be materialized as desired even if there occurs fluctuation of load.

Description will next be directed to the electric brake shown in FIGS. **5** and **6.** The compressed air is ejected onto the turbine-blade type high speed rotary member **11** from the nozzles **26** always in such an amount that the rotary member **11** is rotated at a speed somewhat greater than the predetermined speed. Also, the number of revolutions per unit time of the rotary member **11** is detected not by mechanical contact method but by utilizing light or magnetic energy. The detected number of revolutions is compared with the predetermined value. Only in case there is detected an excess, a brake is applied to the rotary member electrically to correct the number of revolutions for that excessive amount. This comparison with the predetermined rotation speed, and the operation to apply electric braking to the rotary member may be performed manually. However, it is preferred that they be conducted automatically. FIG. **5** shows an example of this automatic control means. FIG. **6** shows an example of electric brake means. First, in FIG. **5,** the number of revolutions per unit time of the turbine-blade type rotary member **11** is detected in the form of pulse by a pulse detector **29** according to the so-called photo-transistor system as will be described hereunder. In the left end portion, in FIG. **2,** of the cylindrical wall of the rotary member **11,** there are provided four of the aforesaid light-passing slits **16** which are positioned so that two of them oppose each other diametrically and that they cross, at right angle, the diametrically opposing other two. Beams of light coming from a light source **27** are passed through these four slits **16** to impinge onto the light-receiving element **28.** The pulse is such that four signals are derived for one revolution. The detected signals are then applied to the control circuit **31** after a DC conversion by a DC converter **30.** At the same time, a signal of the predetermined number of revolutions per unit time is applied as a reference to this control circuit as indicated by an arrow **32,** to be deducted from the aforesaid DC converted signal. Only in case the amount of the detected number of revolutions per unit time is greater than the reference value, a signal representing the excess amount is transmitted to the operation circuit **35.** A voltage in proportion to this signal is applied from the brake circuit power source **33** to the electric brake means **25** as shown by arrow **34.** Whereupon, this electric brake means **25** — which is a rotary magnetic field type having it cylindrical portion **14** being a magnetizable member made of iron or the like as shown in FIG. **6** — acts as a kind of inner iron core. It aluminum sleeve **15** acts as a kind of conductor. Since an AC voltage which is supplied from the brake circuit power source and which is in proportion to the said signal is applied between terminals U and V, there is caused a phase change between coils AA and coils BB, producing a synthesized magnetic field by a phase change of $\pi/2$ at which an eddy current crosses the aluminum sleeve **15.** As a result, there is generated a driving torque by the electro-magnetic force between the said rotating magnetic field and the said eddy current. It should be understood that the magnitude of this eddy current is proportional to the magnitude of the magnetic field, and that the magnitude of the rotating magnetic field is in proportion to the voltage. Accordingly, the said driving torque will be in proportion to the square of the voltage. Since this torque is applied to the rotary member **11** in a direction opposite to that of the rotation of this member, the rotating rotary member **11** is subjected to this amount of braking force. This braking action continues until the rotary member **11** gains the predetermined rotation speed. Arrangement is provided so that if the number of revolutions of the rotary member **11** is less than the reference value, then a negative signal is generated to give a warning by, for example, lighting up a red lamp and to render the brake means **25** inoperative.

In FIG. **5,** the detection of the rotation speed has been described as being performed by utilizing the phototransister system. It is needless to say that this detection may be performed by other optical or magnetic systems. Also, the electric brake means is not limited to the rotary magnetic field type shown in FIG. **6** but it may be a movable magnetic field type or a DC magnetic field type.

Description will hereunder be made on an example of actual operation. Let us now assume that a polyamide filament of a fineness of 40 denier is to be subjected to a crimp forming process. The conditions for this process are: the rotation speed of the turbine-blade type rotary member 750,000 r.p.m.; number of turns of twist 4000T/*m;* overfeed "−2%"; velocity of filament fed 190*m*/min.; electric brake capacity 30 percent; variance between respective rotary members ±1 percent; pressure of compressed air for driving the rotary members $3.5 kg/cm^2$; pressure of compressed air for the gas bearings $3 kg/cm^2$; and consumption of compressed air $1.5 Nm^3/h$. What should be noted here is the fact that according to the present invention, there is obtained a processing speed of approximately twice as great as that obtained from the operation employing the conventional spindles. This means that the productivity according to the present invention can be enhanced to about twice that of the prior art.

FIG. **7** shows an example which is arranged so that a single phase synchronous magnetic field is applied to the rotary member **11** to maintain the constant rotation speed of this member. More specifically, a compressed air is impinged onto the blades **13** of the rotary member **11** through nozzles **26** to obtain a predetermined high speed rotation. This high speed rotation force is held constant by the compressed air, for example at the rate of 13,000 revolutions per second. However, due to such factors as the fineness of the filament yarn, changes in the pressure or the nozzles and the condition of the machines being used, there may arise a change in the load, and accordingly it is not always possible to obtain the predetermined rotation speed of the rotary members. The change in the rotation speed of the rotary members due to the said changes in the load can be controlled so as to maintain the predetermined rotation speed by supplying a synchronous current, for example 13,000 Hz, to the coil **36,** whereby the resulting magnetic force acts via this coil **36** and a stator **37** on the blades **13** of the rotary member **11** in such a way that, if a change in the rotation speed tends to develop, the rotation of the rotary member 11 is held at the predetermined r.p.m. (for example 13,000^{r}/sec.) by a magnetic force which is within the pull out torque and which is given to the rotary member 11. It should be understood that the aforesiaid single-phase synchronous magnetic field may be substituted by two-phase or three-phase synchronous magnetic fields, and that by doing so, a further enhanced synchronizing effect can be obtained.

FIG. 8 is a schematic circuit diagram showing an example of the alarm circuit of the synchronous system. A synchronous signal generator 46 is comprised of a variable frequency synchronous generator 47 and a synchronous output means 48. From the said synchronous signal generator 46 is delivered a synchronous signal to the respective current detectors 49. At the same time therewith, a signal corresponding to the magnitude of the synchronous current supplied to each of the synchronous system rotary means (which implies the entity including the turbine-blade type rotary member 11, coil 36, stator 37, etc. as shown in FIG. 7) is transmitted from each detector 49 to an alarm selecting means 50. If there is applied to the rotary member 11 of the synchronous system rotary means a force which urges its rotation speed to depart from the predetermined value for any reasons such as a disorder of the machine, the magnitude of the synchronous current increases. The detector 49 which was detected such a current having an increased magnitude will transmit to the alarm selecting means 50 a signal corresponding to the increased magnitude of the current. Whereupon, the alarm selecting means 50 will selectively actuate either one of the caution alarm means 51, the disorder alarm means 52, the yarn cutting means 53 and the rotary member stopping means 54, in accordance with the magnitude of the signal delivered to the alarm selecting means 50. In some cases, the alarm selecting means 50 may actuate some or all of the said alarm means in combination. By doing so, it is possible to perform reasonable control of operation.

Next, as seen in FIG. 2, a thrust force resulting from the difference in tension between the feed yarn side 2 and the crimped yarn side 7 is applied onto the yarn in the direction of its advancement (to the right side in FIG. 2). In order to support this thrust force, there are formed jet nozzles 19 and 19a in the gas bearings 17 and 18, respectively, of the device shown in FIG. 2. In those devices shown in FIGS. 9 and 10, on the other hand, the means for supporting this thrust force is accomplished by utilizing the repelling force of magnetizable members having the same polarity. The device shown in FIG. 9 has magnetizable members 38, 39 and 40, 41 on the opposing faces of the rotary member 11 and the left and right gas-bearings 17 and 18. The South pole of the magnetizable member 38 is arranged to face the South pole of the magnetizable member 39, whereas the South pole of the magnetizable member 40 is arranged to face the South pole of the magnetizable member 41, so that these pairs of magnetizable members magnetically repel each other. The device shown in FIG. 10 is arranged so that magnetizable members 42, 43 and 44, 45 are mounted on the opposing faces of both the end portions of the rotary member 11 and the casing, in such a way that the South pole of the magnetizable member 42 faces the South pole of the magnetizable member 43, and that the South pole of the magnetizable member 44 faces the South pole of the magnetizable member 45 to repel each other, respectively.

As stated above, according to the present invention, a twister pin is provided on the turbine-blade type high speed rotary member and this rotary member is supported on gas-bearings within a casing, whereby a high speed rotation of the order of 750,000–800,000 r.p.m. of the rotary member having the twister pin is obtained. Thus, it is possible to obtain an improvement of productivity of crimped yarn up to about twice as high as that of the productivity attained by the prior art. In addition, according to the present invention, not only that desired crimped filament yarns can be produced always without fail with substantially no wearing-out of the bearing sections, but also that, because the compressed air which is intended for rotating the rotary members undergoes adiabatic expansion and accordingly deprives ambient heat, the rotary member itself is cooled thereby, causing the twister pin to be cooled also to impart a cooling effect to the filament yarn in its stage prior to being de-twisted, whereby enhancing the durability of the crimps produced.

The control of the number of revolutions per unit time of the rotary member may be performed by first detecting the number of revolutions per unit time and converting it to an electric signal and feeding this signal so as to regulate the pressure and/or the rate of the compressed air supplied to the rotary member. Or, alternatively, the device may comprise means for detecting the number of rotation of the rotary members with no contact therewith, and means for electrically controlling the rotary members. This latter arrangement is easier in operation and provides more precise operation.

In particular, with the arrangement designed to electrically brake the rotary member to serve as the means for making electric control, it is possible to correct all the rotational errors due to manufactural errors of parts, by applying electric brake to the rotary members, granted that the pressure of the compressed air supplied to the twister member of the respective spindles is in common to each other twister members. Accordingly, even if there exists a braoder range of manufactural errors of parts, there arises no practical trouble in operation.

Also, with a device in which the said electric control of the rotation speed is effected by the application of a synchronous magnetic field to the rotary members, it is possible to keep the rotation speed of the rotary members at the predetermined number of rotation per unit time, if the load applied to the rotary member is within the pull out torque of rotating rotary member. Accordingly, each rotary member can always maintain its predetermined rotation speed at any moment. Besides, an extremely precise control can be obtained. Moreover, it is possible to very easily select a desired value by a mere alteration of both the pressure of the compressed air and the synchronous signal supplied to the respective rotary members. Furthermore, in case a load is applied to the rotary members to depart from the predetermined number of revolutions per unit time due to a disorder the machine, the synchronous current will increase to a certain extent in magnitude and this can be detected by the said current magnitude detector incorporated in the device, so that this detector can be actuated as a caution signal generator. In case the number of revolutions per unit time of the rotary members have departed from the predetermined level, the synchronous current will increase all the more in magnitude. Whereupon, the detector will be actuated to either generate a signal to cut the yarn, or to bring the running rotary members to a halt, or to produce an alarm indicating a disorder to easily perform rationalization of control of operation. These performances can be effected unfailingly.

On the other hand, by the use of a device arranged to support, by gas bearings, the thrust applied to the turbine-blade type high speed rotary members in the direction of the advancement of the yarn, it is possible to support all of the bearing surfaces of the rotary member by a compressed air. This can be accomplished by a very simple structure so that the costs of equipment and operation can be greatly reduced.

Also, by the use of a device arranged so that a magnetic force which acts in the direction opposite to that of the thrust applied to the rotary member is imparted to this member, it is possible to support the said thrust by virtue of that magnetic force, whereby making it possible to positively avert such contact of the rotary member with the gas bearing as is caused by the said thrust.

It should be understood that the configuration of the blades of the turbine-blade type high speed rotary member of the present invention can be altered in various ways from view points of aerodynamics and processing engineering.

It should be understood further that the said jet streams of compressed gas may be only one such stream.

Although a particular preferred embodiment of the invention has been disclosed in detail for illustrative purposes, it will be recognized that variations or modifications of the disclosed apparatus, including the rearrangement of parts, lie within the scope of the present invention.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. In a false twister device for use in producing crimps in a filament yarn, said device including a turbine blade type hollow high speed rotary member having a twister pin provided in the hollow bore thereof in the path of travel of the filament yarn and being rotatably housed in a casing and being rotated at a high speed by at least one jet stream of a gas directed to the blades, and gas bearing means rotatably supporting said rotary member in a floating condition within the casing to enable the rotary member to rotate at a high speed, the improvement comprising:

speed detecting means for detecting the actual number of revolutions per unit time of the rotary member;

means for comparing the actual number of revolutions per unit time of the rotary member as detected by said detecting means with a predetermined number of revolutions per unit time;

electro-magnetic brake means for selectively decelerating said rotary member for maintaining the speed of said rotary member at said predetermined number of revolutions; and

control means coacting between said comparing means and said brake means for actuating said brake means so as to decelerate said rotary member only when the actual number of revolutions detected by said detecting means exceeds said predetermined number of revolutions whereby the actual number of revolutions is automatically maintained substantially equal to said predetermined number of revolutions.

2. A false twister device according to claim **1**, in which: the said gas bearings are provided at appropriate portions thereof with passageways for jetting out streams of compressed gas onto the rotary member to support the thrust applied to the rotary member in the direction of the ad-vancement of the yarn, without the gas bearings contacting the rotary member.

3. A false twister device according to claim **1**, in which:

magnetizable members are provided on the opposing faces of both the blades and the gas bearings in such a way that these opposing magnetizable members repel each other when magnetized, to thereby support the thrust applied to the rotary member in the direction of the advancement of the yarn, without the gas bearings contacting the rotary member.

4. A false twister device according to claim **1**, in which:

magnetizable members are provided on the ends of the rotary member and fixed members provided close to and opposing to the said ends in such a way that these opposing magnetizable members repel each other when magnetized, to thereby support the thrust applied to the rotary member in the direction of advancement of the yarn, without the gas bearings contacting the rotary member.

5. A device according to claim **1**, wherein said speed detecting means includes means for generating a number of signals proportional to said actual number of revolutions, said comparing means comparing said actual number of signals with a preselected number of signals which is proportional to said predetermined number of revolutions, said comparing means emitting a signal for actuating said control means only when said actual number of signals exceeds said preselected number of signals, and said control means when actuated by the signal emitted from said comparing means supplying electrical energy to said electro-magnetic brake means for actuating same.

6. A device according to claim **5**, wherein said speed detecting means includes photocell means coacting with said rotary member for generating said actual number of signals.

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