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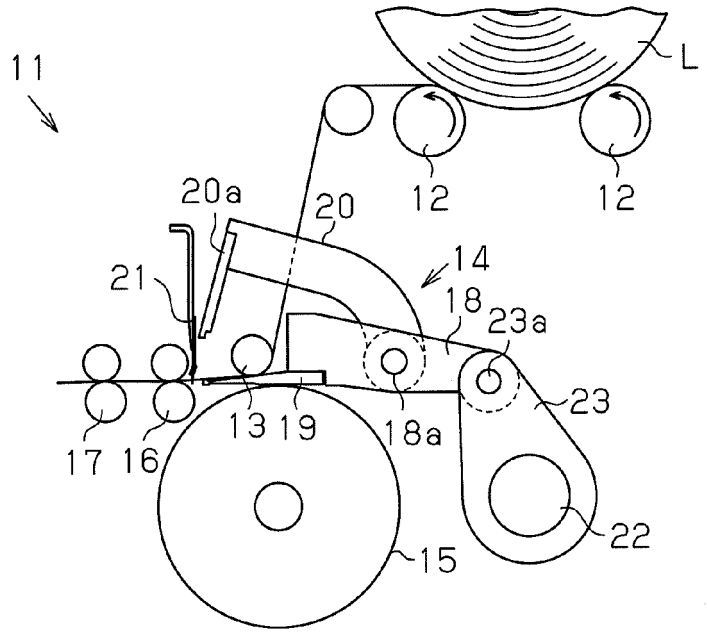
(54) Movement setting device for detaching roller of comber

(57) A detaching roller movement setting device for a comber that sets a movement curve (31) for a detaching roller (16,17). The detaching roller movement setting device includes a computing unit and an input unit. The computing unit sets the movement curve as a curve gradually plotted along eight points, which are an origin point (P_0) , first distinctive point (S1), second distinctive point (S2), third distinctive point (S3), fourth distinctive point (S4), first auxiliary point, second auxiliary point, and third auxiliary point. The input unit inputs to the computing unit at least the first, second, third, and fourth distinctive points.

Fig.1



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Description

BACKGROUND OF THE INVENTION

[0001] The present invention relates to a movement setting device for a detaching roller of a comber, and more particularly, to a movement setting device for a detaching roller of an independent comber that drives the detaching roller with a motor that differs from a motor that drives a combing cylinder.

[0002] A comber includes a nipper and a combing cylinder. A lap is fed to the nipper, which holds the lap at a rear position to which the nipper moves. The combing cylinder combs a front end of the lap, which is held by the nipper. This removes short fibers from the lap, which becomes fleece. The nipper moves forward to move the fleece toward the detaching roller. Rotation of the detaching roller is reversed in correspondence with the forward movement of the nipper to move a fleece that was received previously (front fleece) toward the rear. This overlaps a front end portion of the preceding fleece with a rear end portion of the newly combed fleece (trailing fleece). Then, the detaching roller is rotated forward. The detaching roller receives the fleece from the nipper and joins the preceding fleece with the trailing fleece. A top comb combs a rear end of the trailing fleece.

[0003] The movement of the detaching roller in the comber greatly affects the sliver quality (evenness) and machine load in a cycle that performs the cutting of fiber fleece, combing, and piecing (joining). In the prior art, the rotation of a drive shaft (cylinder shaft) of the combing cylinder is transmitted by a mechanical mechanism, such as a cam or crank, to the detaching roller in accordance with a movement curve of the detaching roller. Generally, piecing point adjustment that is in accordance with the spinning conditions is mechanically performed. In the recent trend for improving productivity (increased speed), to lower the rearward movement speed of the front fleece and reduce the mechanical load, the shape of the movement curve is changed. However, in a structure that transmits the rotation of the cylinder shaft with a mechanical mechanism to drive the detaching roller, the mechanical structure imposes limits on the movement curve (output curve).

[0004] Accordingly, a comber that drives the detaching roller with an independent and dedicated motor instead of the cylinder shaft has been proposed (refer to, for example, Japanese Laid-Open Patent Publication No. 8-260255). The publication describes a comber that drives a detaching roller (detaching cylinder), a cylinder shaft (circular comb shaft), and a nipper shaft with different driving devices. The publication also recites that "the driving device of the detaching is a servomotor and especially advantageous in which an adjustment signal controls an energy supplying device of the servomotor to change the position of a starting point A of a detaching movement, a detaching speed (t), a detaching length (a), or a joining interval (I)." The starting point A and the like are shown in Fig. 4, which illustrates the motion process for a single point on the circumference of the detaching roller during a single rotation of the cylinder shaft.

[0005] It can be understood from the above publication that the freedom of movement for the detaching roller can be increased by driving the detaching roller with the servomotor. However, the publication does not describe how to set a movement curve that is suitable for the spinning conditions. Thus, it is difficult to set a movement curve that is suitable for the spinning conditions based on the description in the publication. Further, when driving the detaching roller with the servomotor, the movement curve can be set without mechanical limitations. However, when the movement curve exceeds the movement capacity of the servomotor, the movement curve cannot be used.

SUMMARY OF THE INVENTION

[0006] It is an object of the present invention to provide a movement setting device for a detaching roller of a comber allowing easy setting of a movement curve for the detaching roller that is suitable for the spinning conditions.

[0007] One aspect of the present invention is a detaching roller movement setting device for a comber. The detaching roller movement setting device sets a movement curve for a detaching roller that shows a movement amount from an origin point of the detaching roller in correspondence with a rotational angle position of the combing cylinder, the detaching roller movement setting device includes a computing unit and an input unit. The computing unit sets the movement curve as a curve gradually plotted along eight points, which are the origin point, a first distinctive point serving as a factor that determines a speed change when a front fleece moves toward the rear, a second distinctive point serving as a factor that determines a rearward movement length of the front fleece, a third distinctive point serving as a factor that determines a piecing speed, a fourth distinctive point serving as a factor that determines a feeding length/drafting amount, a first auxiliary point located between the first distinctive point and the second distinctive point, a second auxiliary point located between the second distinctive point and the third distinctive point, a third auxiliary point located between the third distinctive point and the fourth distinctive point. The input unit inputs to the computing unit at least the first distinctive point, the second distinctive point, the third distinctive point, and the fourth distinctive point.

[0008] Other aspects and advantages of the present invention will become apparent from the following description, taken in conjunction with the accompanying drawings, illustrating by way of example the principles of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] The invention, together with objects and advantages thereof, may best be understood by reference to the following description of the presently preferred embodiments together with the accompanying drawings in which:

Fig. 1 is a schematic side view showing a combing head according to one embodiment of the present invention;

Fig. 2 is a schematic diagram showing the structure of a detaching roller driving unit and a detaching roller movement setting device;

Fig. 3 is a chart showing a movement curve setting screen; and

Fig. 4 is a chart showing a reciprocating pivotal motion of a detaching roller in the prior art.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0010] A movement setting device for a detaching roller included in a comber according to one embodiment of the present invention will now be described with reference to Figs. 1 to 3.

[0011] A typical comber includes a working area in which eight combing heads are arranged. Referring to Fig. 1, a combing head 11 includes two lap rollers 12, a nipper 14, a combing cylinder 15, and two pairs of detaching rollers 16 and 17, which are arranged beside each other. The nipper 14 includes a feed roller 13 and a nipper frame 18. The nipper frame 18 is arranged above the combing cylinder 15 and is tiltable toward the front and rear. A nipper arm 20, which is pivotal about a pivot shaft 18a, is arranged on the nipper frame 18. The nipper arm 20 has a distal end to which a top nipper 20a is fixed. The top nipper 20a opens and closes at a predetermined timing in synchronism with the front and rear tilting motion of the nipper frame 18 to hold a lap L in cooperation with a bottom nipper 19. A top comb 21 is attached to the nipper frame 18 in front of the bottom nipper 19 so as to move in a predetermined manner in synchronism with the nipper frame 18.

[0012] A nipper shaft 22, which is pivotal in a reciprocating manner, is arranged rearward from the combing cylinder 15 and downward from the nipper frame 18. A nipper frame drive arm 23 includes a first end portion, which is fixed to and pivoted integrally with the nipper shaft 22, and a second end portion, which is supported pivotally about a pivot shaft 23a by a rear end portion of the nipper frame 18. When the nipper shaft 22 pivots back and forth (rocking motion), the nipper frame 18 tilts toward the front and rear so that a distal portion of the bottom nipper 19 moves toward and away from the detaching rollers 16 and 17. Rotation of a drive shaft, which is driven by a main motor (not shown), is transmitted by a mechanical mechanism such as a gear or crank, to the combing cylinder 15 and the nipper shaft 22, and the nipper 14 is driven in synchronism with the combing cylinder 15.

[0013] The two pairs of detaching rollers 16 and 17 are driven by servomotors that are independent from the main motor. As shown in Fig. 2, gear boxes 24 are arranged at the two longitudinal ends (left and right ends as viewed in Fig. 2) of the comber. Shafts 25 and 26 of the detaching rollers 16 and 17 are arranged parallel to each other between the gear boxes 24. The shafts 25 and 26 each have two end portions extending into the gear boxes 24 and supported by bearings (not shown) in a rotatable manner. Two servomotors 27 and 28, respectively corresponding to the shafts 25 and 26, are arranged at the outer side of each gear box 24. The servomotors 27 and 28 have motor shafts 27a and 28a extending into the gear boxes 24. Gear trains 29 including idle gears 29a are arranged between the shafts 25 and 26 and the motor shafts 27a and 28a. The shafts 25 and 26 are rotated at the same speed as the motor shafts 27a and 28a (rotation speed ratio of 1:1). The servomotors 27 and 28 are synchronously driven to produce rotation in the forward direction and reverse direction by a servo amplifier (not shown) based on a command from a controller 30.

[0014] The controller 30 drives and controls motors such as the main motor and the servomotors 27 and 28 that are required to drive the comber. The controller 30 includes a CPU 31, a memory 32, an input unit 33, and a display unit 34. The CPU 31 is operated based on program data stored in the memory 32. The input unit 33 is used to input the spinning conditions, such as the fiber type (fiber length), grain, and number of nips, in addition to other data. The input unit 33 includes, for example, an input operation portion of keys or the like operated by an operator. The operator operates the input unit 33 to input data to the controller 30.

[0015] The controller 30 functions as a detaching roller movement setting device. The input unit 33 is used to input data required to generate a movement curve for the detaching rollers 16 and 17.

[0016] The configuration of the controller 30 used to function as the detaching roller movement setting device of the comber will now be described. The CPU 31 sets the movement curve that indicates the movement amount of the detaching rollers 16 and 17 from an origin point in correspondence with a rotational angular position of the combing cylinder 15. In the present embodiment, when setting the movement curve, as shown in Fig. 3, a setting screen 36 is shown on a display 35 of the display unit 34. The setting screen 36 shows coordinates in which the horizontal axis indicates index values, which are obtained by equally dividing the rotational angular position of the combing cylinder 15 (in the present embodiment, equally divided into forty) and the vertical axis indicates tilting angles as the movement amount of the detaching rollers 16 and 17. Further, the setting screen 36 shows the set movement curve.

[0017] In the movement curve shown in Fig. 3, when the tilting angle decreases as the index value increases, the detaching rollers 16 and 17 are rotated in the reverse direction. When the tilting angle increases as the index value increases, the detaching rollers 16 and 17 are rotated in the forward direction.

[0018] As shown in Fig. 3, the movement curve is a curve gradually plotted along eight points, namely, an origin point Po, a first distinctive point S1, a second distinctive point S2, a third distinctive point S3, a fourth distinctive point S4, a first auxiliary point P1, a second auxiliary point P2, and a third auxiliary point P3. The origin point Po represents the position of the nipper frame 18 when located at a rearmost position and is a constant fixed point regardless of the spinning condition. The first distinctive point S1 represents a position serving as a factor that determines a speed change when a front fleece moves toward the rear. The second distinctive point S2 represents a position serving as a factor that determines the rearward movement length of the front fleece. The third distinctive point S3 represents a position serving as a factor that determines the piecing speed. The fourth distinctive point S4 represents a position serving as a factor that determines the feeding length/drafting amount. The first auxiliary point P1 is located between the first distinctive point S1 and the second distinctive point S2. The second auxiliary point P2 is located between the second distinctive point S2 and the third distinctive point S3. The third auxiliary point P3 is located between the third distinctive point S3 and the fourth distinctive point S4. The first auxiliary point P1 is preferably a median point between the first distinctive point S1 and the second distinctive point S2. The second auxiliary point P2 is preferably a median point between the second distinctive point S2 and the third distinctive point S3. The third auxiliary point P3 is preferably a median point between the third distinctive point S3 and the fourth distinctive point S4. Further, the third auxiliary point P3 is preferably located above a straight line extending between the third distinctive point S3 and the fourth distinctive point S4.

[0019] The CPU 31 functions as a computing unit that sets the movement curve as a curve gradually plotted along eight points, namely, the origin point Po, the four distinctive points S1, S2, S3, and S4, and the auxiliary points P1, P2, and P3. The memory 32 stores the data (tilting angle and index value) of the origin point Po. The data (tilting angle and index value) of the distinctive points S1, S2, S3, and S4 is input to the CPU 31 by the input unit 33. The memory 32 stores initial values (reference values) of the distinctive points S1, S2, S3, and S4.

[0020] When inputting the distinctive points S1, S2, S3, and S4, the initial values of the distinctive points S1, S2, S3, and S4 are shown on the setting screen 36 of the display 35, and the index direction and the tilting angle direction can be finely adjusted. For example, a tilting angle adjustment switch and index adjustment switch may be arranged in the setting screen 36. These switches may be operated to finely adjust the tilting angle or index and change the position of the distinctive points S1, S2, S3, and S4 on the setting screen 36.

[0021] When functioning as the computing unit that sets the movement curve, the CPU 31 computes data (tilting angle and index value) for the first auxiliary point P1, the second auxiliary point P2, and the third auxiliary point P3 based on the data (tilting angle and index value) of the four distinctive points S1, S2, S3, and S4 input by the input unit 33. Then, the CPU 31 sets the movement curve of the detaching rollers 16 and 17 so as to form a curve plotted along the eight points, namely, the origin point Po, the four distinctive points S1, S2, S3, and S4, and the auxiliary points P1, P2, and P3.

[0022] After setting the movement curve, the CPU 31 computes the tilting angle for every predetermined index interval, for example, every 0.1 index, from the movement curve, and stores the value of the computed tilting angle in the memory 32 in a tilting angle table for every 0.1 index. The CPU 31 computes the moving speed of the detaching rollers 16 and 17 for every 0.1 index based on the data of the tilting angle table and stores the value of the computed moving speed in the memory 32 in a speed table for every 0.1 index. Further, the CPU 31 differentiates the speed data for every 0.1 index based on the data of the speed table to compute the acceleration of the detaching rollers 16 and 17 for every 0.1 index and stores the value of the computed acceleration in the memory 32 in an acceleration table for every 0.1 index.

[0023] The CPU 31 is capable of showing graphs respectively indicating changes in the tilting angle, speed, and acceleration on the display 35 of the display unit 34 based on the tilting angle table, speed table, and acceleration table stored in the memory 32. The CPU 31 determines whether or not the values of the speed and acceleration are appropriate based on the capacities of the servomotors 27 and 28 that drive the detaching rollers 16 and 17 and outputs a warning signal for an inappropriate value. In this manner, the CPU 31 also functions as a determination unit that determines whether or not the values of the speed and acceleration are appropriate and outputs the warning signal when the values are inappropriate. A warning unit such as a warning lamp (not shown) is operated when the warning signal is output. Here, an inappropriate speed value refers to the speed value that cannot be obtained with the capability of a motor. Further, an inappropriate acceleration value refers to the acceleration value obtained by driving the detaching rollers 16 and 17 and resulting in the application of an overload on the servomotors 27 and 28.

[0024] The movement curve set by the CPU 31 is not directly used as movement curve that actually moves the comber. The movement curve is used to test-run (test-spin) the comber. When the test-spinning obtains satisfactory results, the data of the movement curve is stored together with the spinning conditions in a database region of the memory 32.

[0025] When operating the comber, the controller 30

determines whether or not the movement curve corresponding to the spinning conditions input by the input unit 33 is stored in the memory 32. When the corresponding movement curve is stored, the controller 30 uses the movement curve to drive the detaching rollers 16 and 17. When the movement curve corresponding to the spinning conditions is not stored in the memory 32, the controller 30 issues a notification that the setting or a movement curve is required.

[0026] The operation of the comber will now be described.

[0027] When the comber is manufactured in a factory, the memory 32 does not store a movement curve or stores only a tentative movement curve. Thus, when the comber is operated the first time, the movement curve must first be set. When setting the movement curve, the controller 30 selects a state in which it functions as a movement curve setting device. Then, the input unit 33 is used to input to the CPU 31 the spinning conditions, such as the fiber type (fiber length), grain, and number of nips, and data of the first distinctive point S1, the second distinctive point S2, the third distinctive point S3, and the fourth distinctive point S4.

[0028] When the spinning conditions and the data of the four distinctive points S1, S2, S3, and S4 are input, the CPU 31 computes the three auxiliary points P1, P2, and P3. Then, the CPU 31 sets the movement curve by gradually plotting the eight points, namely, the origin point Po, the four distinctive points S1, S2, S3, and S4, and the auxiliary points P1, P2, and P3. After setting the movement curve, the CPU 31 computes the speed and acceleration of each index, determines whether or not the values of the speed and acceleration are appropriate, and outputs a warning signal when there is an inappropriate value. When recognizing that the warning unit is outputting a warning signal, the operator changes the data for at least one of the distinctive points S1, S2, S3, and S4. After setting a new movement curve, unless a warning signal is output, the CPU 31 stores the movement curve in the memory 32 and performs test-spinning. When the test-spinning obtains a satisfactory result, the data for the movement curve is stored in the memory 32 together with the spinning conditions. The memory 32 also stores the tilting angle table, the speed table, and the acceleration table.

[0029] Even when data for the movement curve is stored together with the spinning conditions in the memory 32, if the spinning conditions input by the input unit 33 do not correspond to the data of the movement curve, a movement curve that corresponds to the spinning conditions is set. Then, the comber is operated.

[0030] When the comber is operated, the CPU 31 controls the main motor or the like. The CPU 31 also uses the movement curve stored in the memory 32 to control the servomotors 27 and 28. More specifically, the CPU 31 controls the servomotors 27 and 28 using the movement curve to obtain the tilting angle corresponding to the index at the time of control from the tilting angle table stored in the memory 32. During operation of the comber, the CPU 31 outputs the warning signal and stops operation of the comber if the acceleration data of the movement curve includes an inappropriate value when changing the rotation speed of the servomotors 27 and 28.

[0031] The present embodiment has the advantages described below.

(1) The detaching roller movement setting device sets a movement curve that shows the movement amount of the detaching rollers 16 and 17 from the origin point in correspondence with the rotational angular position of the combing cylinder. Further, the detaching roller movement setting device includes a computing unit (CPU 31), which sets the movement curve by gradually plotting eight points, namely, the origin point Po, the four distinctive points S1, S2, S3, and S4, and the auxiliary points P1, P2, and P3, and an input unit 33, which inputs at least the first to fourth distinctive points. The first distinctive point S1 is a point serving as a factor that determines speed change when a front fleece moves toward the rear. The second distinctive point S2 is a point serving as a factor that determines the rearward movement length of the front fleece. The third distinctive point S3 is a point serving as a factor that determines the piecing speed. The fourth distinctive point S4 is a point serving as a factor that determines the feeding length/drafting amount. The first auxiliary point P1 is a point located between the first distinctive point S1 and the second distinctive point S2. The second auxiliary point P2 is a point located between the second distinctive point S2 and the third distinctive point S3. The third auxiliary point P3 is a point located between the third distinctive point S3 and the fourth distinctive point S4. Accordingly, the operator can easily generate a movement curve that is suitable for the spinning conditions.

(2) The CPU 31 computes the three auxiliary points P1, P2, and P3 based on the four distinctive points S1, S2, S3, and S4, which are input by the input unit 33. Accordingly, the operator further easily generates the movement curve that is suitable for the spinning conditions without the need for the operator to input the three auxiliary points P1, P2, and P3.

(3) The detaching roller movement setting device includes a database that stores the movement curve in correspondence with the spinning conditions when the set movement curve is suitable for the spinning conditions. Accordingly, the data for movement curves corresponding to different spinning conditions is gradually accumulated in the database. When spinning conditions are input, the database is checked for a movement curve that is suitable for the spinning conditions. When such a movement curve is present, the movement curve, which is

stored in the database, is used and a movement curve setting process is not performed.

(4) The detaching roller movement setting device includes the computing unit, which differentiates the set movement curve and computes the speed and acceleration, and the display unit 34, which shows the speed and acceleration in a graph based on the computation results. Accordingly, by showing the speed and acceleration as a graph on the display 35 of the display unit 34, the operator can easily view and check changes in the speed and acceleration. Thus, the operator can refer to changes in speed or acceleration when changing data of the distinctive point S1 or the like.

(5) The detaching roller movement setting device includes the computing unit, which differentiates the set movement curve to compute the speed (one differentiation) and acceleration (two differentiations), and a determination unit, which determines whether or not the values of the computed speed and acceleration are appropriate for the capacities of the servomotors 27 and 28 and outputs a warning signal when the values are inappropriate. This prevents the set movement curve from being used for test-spinning when the values of the speed and acceleration are inappropriate.

(6) During operation of the comber, when the acceleration data of the movement curve includes an inappropriate value, the CPU 31 outputs a warning signal and stops operation. Accordingly, even when a movement curve is erroneously set including inappropriate data and such a movement curve is stored in the memory 32, the CPU 31 automatically determines whether operation is possible. This prevents the servomotors 27 and 28 from being driven in an overload state.

(7) When generating the movement curve, the display 35 of the display unit 34 shows in the setting screen 36 coordinates in which the horizontal axis indicates index values and the vertical axis indicates tilting angles as the movement amount of the detaching rollers 16 and 17. Accordingly, the operator can check the shape adjustment of the movement curve and adjustment of the piecing point on a panel.

(8) The operator does not input the distinctive points S1, S2, S3, and S4 as new data. Rather, the operator finely adjusts initial values shown on the setting screen 36. This facilitates the input of the distinctive points S1, S2, S3, and S4.

[0032] It should be apparent to those skilled in the art that the present invention may be embodied in many other specific forms without departing from the spirit or scope of the invention. Particularly, it should be understood that the present invention may be embodied in the following forms.

[0033] The detaching roller movement setting device may be arranged independently from the comber. For example, the movement curve may be set using a dedicated detaching roller movement setting device. Alternatively, the movement curve may be set using a personal computer in which a movement curve setting program is installed.

[0034] The data of the movement curve and spinning conditions stored as a database in the memory 32 may be transferred to the controller 30 of another comber using an external memory or through communication.

[0035] Movement curves for spinning conditions of the same fiber type but differing in that one is for spinning that puts significance on quality and one is for spinning that puts significance on productivity may be stored in the database. In this case, the optimal pattern is selected in accordance with purpose.

[0036] When the comber includes a sliver quality monitor, quality information may be associated with the movement curve in cooperation with the sliver quality monitor.

[0037] Instead of providing initial values for the distinctive points S1, S2, S3, and S4, the distinctive points S1, S2, S3, and S4 may be directly input via the input unit 33.

[0038] The database that stores the set and appropriate movement curve in correspondence with the spinning conditions is not necessary.

[0039] The function for showing a graph of the speed and acceleration is not necessary.

[0040] The determination unit that outputs a warning signal when the values of the speed and acceleration are inappropriate is not necessary. Alternatively, the determination unit may determine whether or not the value of the acceleration is appropriate and output a warning signal when the acceleration value is inappropriate.

[0041] The movement curve is not necessarily limited to a shape that reverses rotation of the detaching rollers 16 and 17 from a state in which the index value is 0 and may be a shape that rotates the detaching rollers 16 and 17 in the forward direction and then reverses rotation of the detaching rollers 16 and 17. In this case, the tilting angle at the first distinctive point is a positive value, and the front fleece does not immediately start to move to the rear when the combing cylinder 15 is pivoted from the origin point. Rather, the front fleece moves rearward after moving forward. Accordingly, in addition to functioning as a factor for determining speed change when the front fleece moves rearward, the distinctive point S1 also functions as a factor for determining the point for starting the rearward movement of the front fleece.

[0042] The CPU 31 may compute the tilting angle data, speed data, and acceleration data in intervals that are smaller than the 0.1 index value interval or in intervals that are larger than the 0.1 index value interval.

[0043] Instead of using the index value as the horizontal axis of the coordinates showing movement curve, the

rotational angle from the origin point of the combing cylinder 15 may be used. Further, instead of using the tilting angle as the vertical axis, the movement distance of a single specific point (reference point) on the surface of the detaching rollers 16 and 17 may be used.

[0044] The gear train 29 that transmits the rotation of the motor shafts 27a and 28a to the shafts 25 and 26 does not necessarily have to include the idle gear 29a, and gears fixed to the motor shafts 27a and 28a may be directly engaged with the gears fixed to the shafts 25 and 26.

[0045] The servomotors 27 and 28 may drive one side of the shafts 25 and 26 and drive the other side with a gear train that integrally rotates the two shafts 25 and 26. Further, the two shafts 25 and 26 may be driven by a single servomotor.

[0046] The rotation ratio of the motors 27a and 28a and the shafts 25 and 26 is not limited to 1:1, and the rotation speed of the motor shafts 27a and 28a may be higher or lower than the rotation speed of the shafts 25 and 26.

[0047] The movement curve generated as a curve gradually plotted along eight points, namely, the origin point Po, the four distinctive points S1, S2, S3, and S4, and the auxiliary points P1, P2, and P3 may be shifted in the positive or negative direction of the index value to adjust the piecing point.

[0048] The present examples and embodiments are to be considered as illustrative and not restrictive, and the invention is not to be limited to the details given herein, but may be modified within the scope and equivalence of the appended claims.

[0049] A detaching roller movement setting device for a comber that sets a movement curve for a detaching roller. The detaching roller movement setting device includes a computing unit and an input unit. The computing unit sets the movement curve as a curve gradually plotted along eight points, which are an origin point, first distinctive point, second distinctive point, third distinctive point, fourth distinctive point, first auxiliary point, second auxiliary point, and third auxiliary point. The input unit inputs to the computing unit at least the first, second, third, and fourth distinctive points.

Claims

1. A detaching roller movement setting device for a comber, wherein the detaching roller movement setting device sets a movement curve for a detaching roller (16, 17) that shows a movement amount from an origin point (Po) of the detaching roller (16, 17) in correspondence with a rotational angle position of the combing cylinder (15), the detaching roller movement setting device **characterized by**:

   a computing unit (31) that sets the movement curve as a curve gradually plotted along eight points (Po, S1, P1, S2, P2, S3, P3, S4), which are the origin point (Po), a first distinctive point (S1) serving as a factor that determines a speed change when a front fleece moves toward the rear, a second distinctive point (S2) serving as a factor that determines a rearward movement length of the front fleece, a third distinctive point (S3) serving as a factor that determines a piecing speed, a fourth distinctive point (s4) serving as a factor that determines a feeding length/drafting amount, a first auxiliary point (P1) located between the first distinctive point (S1) and the second distinctive point (S2), a second auxiliary point (P2) located between the second distinctive point (S2) and the third distinctive point (S3), a third auxiliary point (P3) located between the third distinctive point (S3) and the fourth distinctive point (S4); and

   an input unit (33) that inputs to the computing unit (31) at least the first distinctive point (S1), the second distinctive point (S2), the third distinctive point (S3), and the fourth distinctive point (S4).

2. The detaching roller movement setting device according to claim 1, **characterized by** a database (32) that stores the movement curve in association with a spinning condition when the set movement curve is suitable for the spinning condition.

3. The detaching roller movement setting device according to claim 1 or 2, **characterized in that** the computing unit (31) differentiates the set movement curve and computes a speed and acceleration, and the detaching roller movement setting device further comprises a display unit (34) that shows a graph of the speed and acceleration based on the computing result.

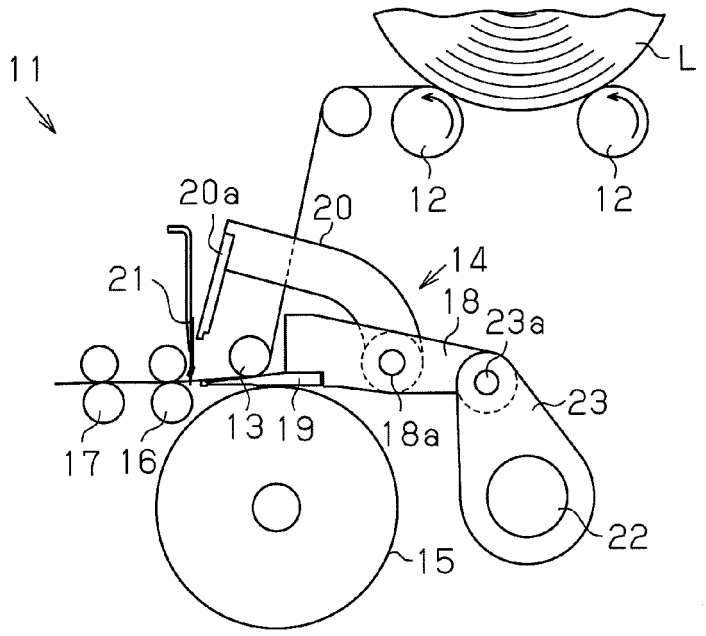
4. The detaching roller movement setting device according to any one of claims 1 to 3, **characterized in that** the computing unit (31) differentiates the set movement curve and computes a speed and acceleration, and the detaching roller movement setting device further comprises a determination unit (31) that determines whether or not the computed speed and acceleration are appropriate values and outputs a warning signal when determining that the computed speed and acceleration are inappropriate values.

5. The detaching roller movement setting device according to claim 1, **characterized in that** the input unit inputs only the four distinctive points (S1, S2, S3, S4), and the computing unit (31) computes the three auxiliary points (P1, P2, P3) based on the four input distinctive points (S1, S2, S3, S4).

6. A comber **characterized by** the detaching roller

movement setting device according to any one of claims 1 to 5.

Fig.1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16
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Fig.2

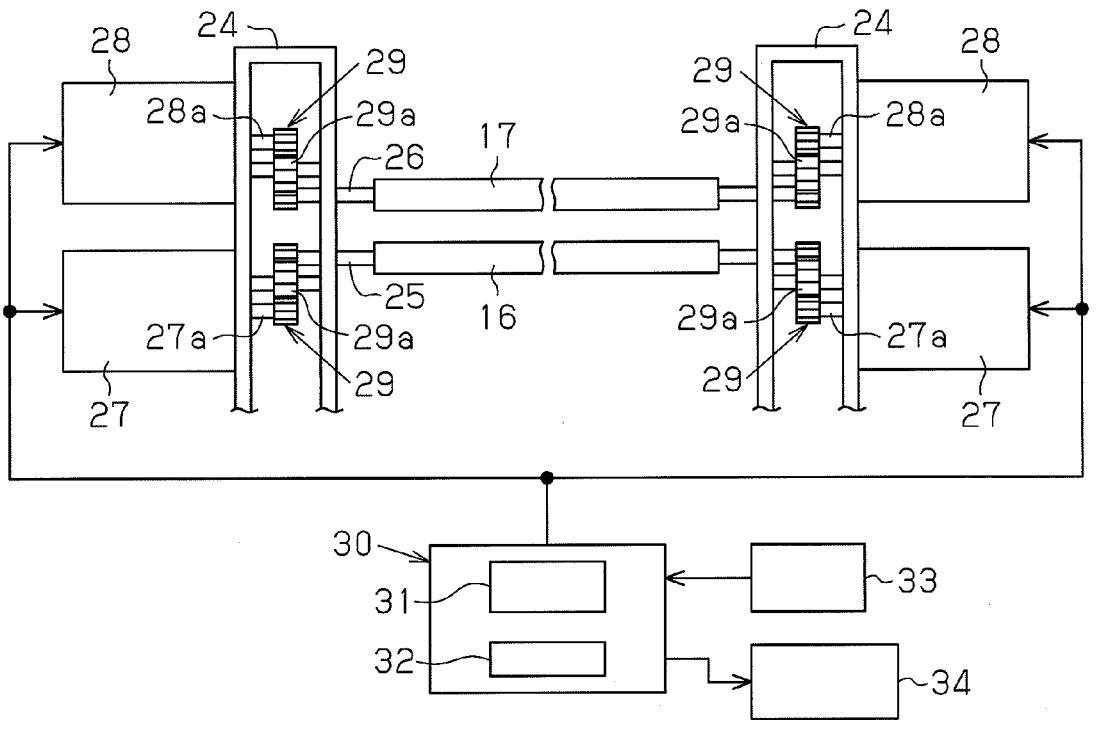
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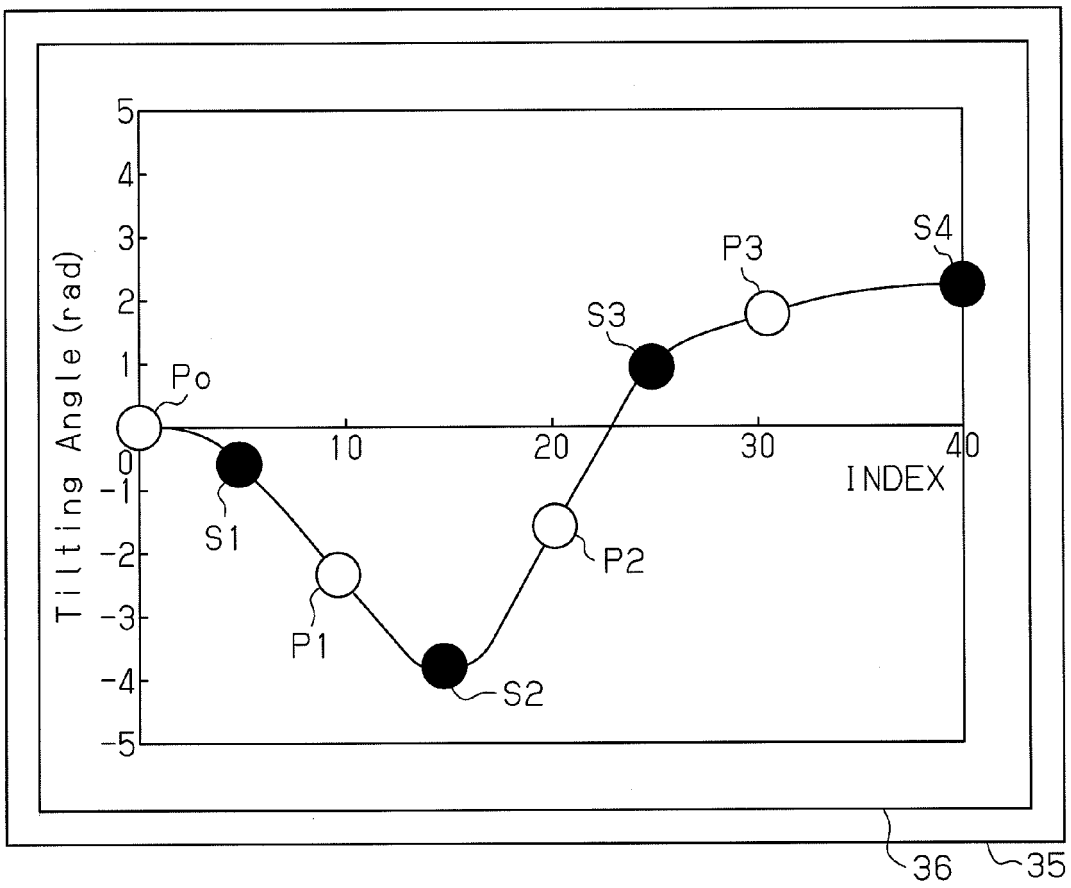
Fig.3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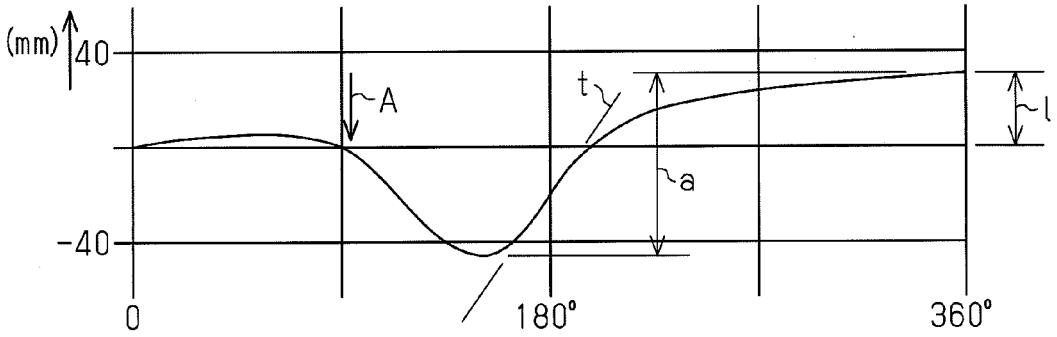
S1
P1
S2
P2
S3
P3
S4
36
35

Fig.4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EUROPEAN SEARCH REPORT

Application Number
EP 11 18 5563

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	WO 2007/093120 A1 (KUNSHAN KAIGONG MECHANISM CO L [CN]; LI GENQIAN [CN]; YANG XIMING [CN]) 23 August 2007 (2007-08-23) * abstract; figure 1 * -----	1-6	INV. D01G19/06
A	DE 10 2006 002390 A1 (RIETER AG MASCHF [CH]) 19 July 2007 (2007-07-19) * claim 1; figure 1 * -----	1-6	
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			TECHNICAL FIELDS SEARCHED (IPC) D01G

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	27 January 2012	Dupuis, Jean-Luc

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1

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