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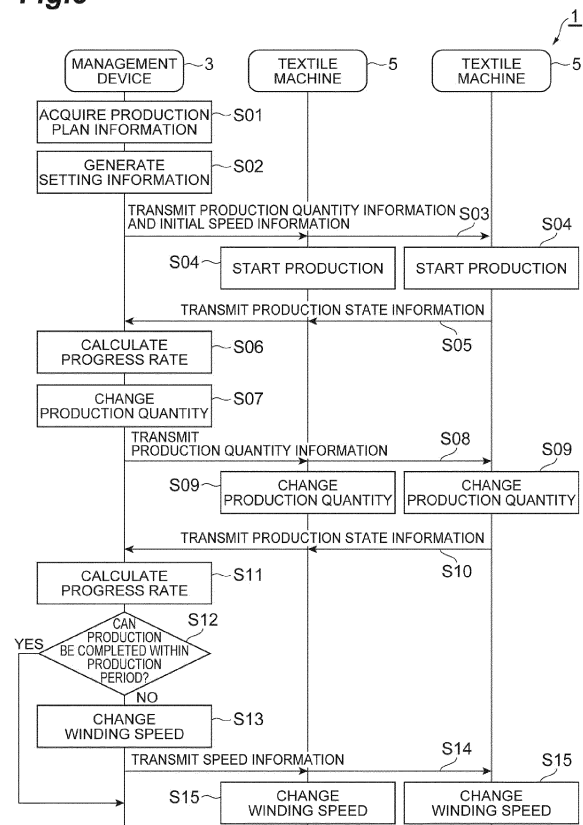
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(54) **TEXTILE MACHINE, MANAGEMENT DEVICE, YARN WINDING SYSTEM, AND YARN WINDING METHOD**

(57) A textile machine (5) includes: an acquisition section (34) configured to acquire production plan information on a production plan of packages (P) and production state information on a current production state of packages (P); a calculation section (36) configured to calculate a progress status on production of packages (P) based on the production plan information and the production state information acquired by the acquisition section (34); and a setting section (38) configured to change a setting of winding speed of yarn (Y) based on the progress status calculated by the calculation section (36) .

Fig.5



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Description

[0001] The present disclosure relates to a textile machine, a management device, a yarn winding system, and a managing method for managing a plurality of textile machines in the context of yarn winding.

BACKGROUND

[0002] A system configured to display a work plan and production progress, for example, based on an operation schedule in a spinning plant is known (see Japanese Unexamined Patent Publication No. H4-202816, for example).

SUMMARY

[0003] In such a conventional yarn winding system, an operator needs to check the production progress, and then the operator needs to adjust the production speed based on the work plan. Adjustment of the production speed can be a work burden on the operator.

[0004] It is an object of one aspect of the present disclosure to provide a textile machine, a management device, a yarn winding system, and a yarn winding method that enable reduction in workload of adjusting the production speed.

[0005] A textile machine according to one aspect of the present disclosure is a textile machine configured to wind yarn to form a package, the textile machine including: an acquisition section configured to acquire production plan information on a production plan of the package and production state information on a current production state of the package; a calculation section configured to calculate a progress status on production of the package based on the production plan information and the production state information acquired by the acquisition section; and a setting section configured to change a setting of winding speed of the yarn based on the progress status calculated by the calculation section.

[0006] In the textile machine according to this aspect of the present disclosure, the progress status is calculated based on the production plan information and the production state information, and the winding speed of yarn is changed based on the progress status. By changing the winding speed of yarn, the production speed of a package produced in the textile machine can be adjusted. In the textile machine, the winding speed of yarn can be automatically changed based on the progress status as described above, and thus a workload of adjusting the production speed can be reduced.

[0007] In one embodiment, the acquisition section may acquire the production state information that contains at least one of actual production quantity of the package and actual production efficiency of the package. With this configuration, the production state can be accurately determined.

[0008] In one embodiment, the textile machine may

include an input section configured to receive input of an upper limit and a lower limit of the winding speed, and the setting section may change the setting of the winding speed within a range between the upper limit and the lower limit input in the input section. The upper limit and the lower limit of the winding speed can be set such that the quality of yarn is maintained within a certain range. Thus, by changing the winding speed within the range between the upper limit and the lower limit of the winding speed, variation in yarn quality during formation of a package can be reduced.

[0009] In one embodiment, the textile machine may include an input section configured to receive input of a reference value of the winding speed, and the setting section may set an allowable range of the winding speed including the reference value and change the setting of the winding speed within the allowable range. The allowable range can be set such that the quality of yarn is maintained within a certain range. Thus, by changing the winding speed within the allowable range, variation in yarn quality during formation of a package can be reduced.

[0010] In one embodiment, the acquisition section may acquire the production plan information that contains at least a target production quantity of the package and a production schedule of the package. With this configuration, based on the target production quantity and the production schedule of the package, the calculation section can calculate the progress status accurately.

[0011] In one embodiment, the setting section may change the setting of the winding speed such that the winding speed becomes faster than an initial value of the winding speed set based on the production plan information when the progress status is behind a scheduled status. With this configuration, the production plan can be reliably accomplished.

[0012] In one embodiment, the setting section does not change the setting of the winding speed when the progress status is ahead of a scheduled status. With this configuration, the production plan can be reliably accomplished, and also variation in yarn quality during formation of a package can be reduced.

[0013] In one embodiment, the acquisition section may acquire a progress status of another textile machine, and the setting section may change the setting of the winding speed of the yarn based on the progress status calculated by the calculation section and the progress status of the other textile machine acquired by the acquisition section. With this configuration, for example, when the progress status of the other textile machine is behind its scheduled status, increasing the winding speed of yarn can compensate for production delay in the other textile machine.

[0014] In one embodiment, the textile machine may further include: a yarn feeder configured to support a yarn feeding bobbin around which the yarn is wound; and a winding device configured to wind the yarn unwound from the yarn feeding bobbin supported by the yarn feeder to form a package. When the above-described textile ma-

chine is configured as an automatic winder, the workload of an operator in adjusting the production speed can be reduced.

[0015] A management device according to one aspect of the present disclosure is a management device configured to manage one or a plurality of textile machines each configured to wind yarn to form a package, the management device including: an acquisition section configured to acquire production plan information on a production plan of the packages for the textile machines and production state information on a current production state of the package produced in each textile machine; a calculation section configured to calculate a progress status on production of the package in the textile machine based on the production plan information and the production state information acquired by the acquisition section; a setting section configured to change a setting of the textile machine based on the progress status calculated by the calculation section; and a transmission section configured to transmit setting information on the setting changed by the setting section to the textile machine, wherein when the number of the textile machines is one, the setting section changes a setting of a winding speed of the yarn based on the progress status, and when the number of the textile machines is more than one, the setting section changes a setting of at least one of a winding speed of the yarn in each textile machine and target production quantity of the packages in each textile machine based on the progress status.

[0016] In the management device according to this aspect of the present disclosure, the progress status is calculated based on the production plan information and the production state information. If the number of the textile machines is one, the setting of the winding speed of yarn is changed based on the progress status, and if the number of the textile machines is more than one, the setting of at least one of the winding speed of the yarn and the target production quantity of the packages in each textile machine is changed based on the progress status. In the management device, the settings of the winding speed of yarn in each textile machine and the production quantity of the packages can be automatically changed based on the progress status as described above, and thus the workload of adjusting the production speed can be reduced.

[0017] In one embodiment, the acquisition section may acquire the production state information that contains at least one of actual production quantity of the package and actual production efficiency of the package. With this configuration, the production state can be accurately determined.

[0018] In one embodiment, the management device may include an input section configured to receive input of an upper limit and a lower limit of the winding speed, and the setting section may change the setting of the winding speed within a range between the upper limit and the lower limit input in the input section. The upper limit and the lower limit of the winding speed can be set

such that the quality of yarn is maintained within a certain range. Thus, by changing the winding speed within the range between the upper limit and the lower limit of the winding speed, variation in yarn quality during formation of a package can be reduced.

[0019] In one embodiment, the management device may include an input section configured to receive input of a reference value of the winding speed, and the setting section may set an allowable range of the winding speed including the reference value and change the setting of the winding speed within the allowable range. The allowable range can be set such that the quality of yarn is maintained within a certain range. Thus, by changing the winding speed within the allowable range, variation in yarn quality during formation of a package can be reduced.

[0020] In one embodiment, the acquisition section may acquire the production plan information that contains at least target production quantity of the package and a production schedule of the package. With this configuration, based on the target production quantity and the production schedule of the package, the calculation section can calculate the progress status accurately.

[0021] In one embodiment, the setting section may change the setting of the winding speed such that the winding speed becomes faster than an initial value of the winding speed set based on the production plan information when the progress status is behind a scheduled status. With this configuration, the production plan can be reliably accomplished.

[0022] In one embodiment, the setting section does not change the setting of the winding speed when the progress status is ahead of a scheduled status. With this configuration, the production plan can be reliably accomplished, and also variation in yarn quality during formation of a package can be suppressed.

[0023] In one embodiment, when the number of the textile machines is more than one and the progress status is different from each other between the textile machines, the setting section may change the settings of the target production quantities of the respective textile machines such that the target production quantity assigned to the textile machine the progress of which is slow is assigned to the textile machine the progress of which is fast. With this configuration, even when there is a textile machine in which production of the package is delayed, this production delay can be compensated for by another textile machine. Furthermore, by assigning the production quantity to the other textile machine, the amount of change in winding speed can be reduced. Particularly when the number of the textile machines is larger, the amount of change in winding speed for each textile machine can be further reduced, and influence of the change in winding speed upon the yarn quality can be further reduced.

[0024] A yarn winding system according to one aspect of the present disclosure is a yarn winding system including a plurality of textile machines each configured to wind

yarn to form a package and a management device configured to manage the textile machines, wherein the management device includes: an acquisition section configured to acquire production plan information on a production plan of the packages for the textile machines and production state information on a current production state of the package in each textile machine; a calculation section configured to calculate a progress status on production of the package in each textile machine based on the production plan information and the production state information acquired by the acquisition section; a setting section configured to change a setting of at least one of a winding speed of the yarn in each textile machine and target production quantity of the packages in each textile machine based on the progress status calculated by the calculation section; and a transmission section configured to transmit at least one of speed information on the winding speed and production quantity information on the target production quantity changed by the setting section to each textile machine, and each textile machine comprises: a receiving section configured to receive at least one of the speed information and the production quantity information transmitted from the transmission section of the management device; and an operation controller configured to control operation of the textile machine based on at least one of the speed information and the production quantity information received by the receiving section.

[0025] In the yarn winding system according to this aspect of the present disclosure, the progress status is calculated based on the production plan information and the production state information, and the setting of at least one of the winding speed of yarn and the production quantity of the packages is changed based on the progress status. In the yarn winding system, the winding speed of yarn in each textile machine and the production quantity of the packages can be automatically changed based on the progress status as described above, and thus the workload of adjusting the production speed can be reduced.

[0026] In one embodiment, when the receiving section has received the speed information, the operation controller may control operation of the textile machine so as to wind the yarn at the winding speed in accordance with the speed information. With this configuration, in the textile machine, the yarn can be wound at the changed winding speed.

[0027] In one embodiment, when the progress status is different between the textile machines, the setting section may change the settings of the target production quantities of the respective textile machines such that the target production quantity assigned to the textile machine progress of which is slow is assigned to the textile machine the progress of which is fast. With this configuration, even when there is a textile machine in which production of the package is delayed, this production delay can be compensated for by another textile machine. Furthermore, by assigning the production quantity to the oth-

er textile machine, the amount of change in winding speed can be reduced. Particularly when the number of the textile machines is larger, the amount of change in winding speed for each textile machine can be further reduced, and influence of the change in winding speed upon the yarn quality can be further reduced.

[0028] In one embodiment, the setting section may change the target production quantity with a higher priority than changing the winding speed. With this configuration, by giving a higher priority to changing the target production quantity (redistribution of the target production quantity), the amount of change in winding speed can be reduced. Thus, influence of the change in winding speed upon the yarn quality can be reduced.

[0029] In one embodiment, when production cannot be completed within a production period that a production schedule indicates only by changing the target production quantity, the setting section may change the setting of the winding speed of each textile machine. With this configuration, the production plan can be reliably accomplished.

[0030] A yarn winding method according to one aspect of the present disclosure is a yarn winding method performed by a plurality of textile machines each configured to wind yarn to form a package and a management device configured to manage the textile machines, the yarn winding method including: an acquisition step of, by the management device, acquiring production plan information on a production plan of the packages for the textile machines and production state information on a current production state of the package in each textile machine; a calculation step of, by the management device, calculating a progress status on production of the package in each textile machine based on the production plan information and the production state information acquired at the acquisition step; a setting changing step of, by the management device, changing a setting of at least one of a winding speed of the yarn in each textile machine and target production quantity of the packages in each textile machine based on the progress status calculated at the calculation step; a transmitting step of, by the management device, transmitting at least one of speed information on the winding speed and production quantity information on the target production quantity changed at the setting changing step to each textile machine; a receiving step of, by each textile machine, receiving at least one of the speed information and the production quantity information transmitted at the transmitting step; and an operation controlling step of, by each textile machine, controlling operation of the textile machine based on at least one of the speed information and the production quantity information received at the receiving step.

[0031] In the yarn winding method according to this aspect of the present disclosure, the progress status may be calculated based on the production plan information and the production state information, and the setting of at least one of the winding speed of yarn and the target production quantity of the packages in each textile ma-

chine may be changed based on the progress status. In the yarn winding method, the winding speed of yarn in each textile machine and the target production quantity of the packages in each textile machine can be automatically changed based on the progress status as described above, and thus the workload of adjusting the production speed can be reduced.

[0032] According to one aspect of the present disclosure, a workload of adjusting the production speed can be reduced.

BRIEF DESCRIPTION OF THE DRAWINGS

[0033]

FIG. 1 is a diagram illustrating a yarn winding system according to one embodiment;
 FIG. 2 is a front view illustrating an automatic winder;
 FIG. 3 is a side view of a winding unit;
 FIG. 4 is a diagram illustrating a configuration of a management device; and
 FIG. 5 is a sequence diagram illustrating operation of the yarn winding system.

DETAILED DESCRIPTION

[0034] An embodiment of the present invention will now be described in detail with reference to the attached drawings. In the description of the drawings, like or equivalent elements are designated by like numerals, and duplicate description is omitted.

[0035] As depicted in FIG. 1, the yarn winding system 1 includes a management device 3 and a textile machine 5. In the yarn winding system 1 in the present embodiment, the textile machine 5 is provided in plurality.

[0036] The management device 3 manages the textile machines 5 in a centralized manner. The management device 3 includes a central processing unit (CPU), a read only memory (ROM), a random access memory (RAM), and an input/output port, which are not depicted. The ROM stores therein a program for controlling the textile machines 5. The CPU can perform processing for controlling the textile machines 5 by reading the program stored in the ROM into the RAM and executing the program. The management device 3 is connected to the textile machines 5 so as to be able to communicate therewith via wireless and/or wired communication.

[0037] In the present embodiment, each textile machine 5 is an automatic winder. As depicted in FIG. 2, the textile machine 5 includes a plurality of winding units 6 disposed in parallel, a machine control device (operation controller) 7, and a doffer 8.

[0038] Each winding unit 6 unwinds yarn Y from a yarn feeding bobbin SB, and simultaneously winds the yarn Y around a winding bobbin WB while traversing the yarn. In this manner, the winding unit 6 forms a package P. The winding unit 6 may be configured to unwind yarn Y from a package P to form a package P.

[0039] The machine control device 7 can communicate with the management device 3 and the respective winding units 6. An operator of the textile machine 5 can manage the winding units 6 in a collective manner by appropriately operating the machine control device 7. The machine control device 7 includes a display screen 7a and input keys 7b. The display screen 7a can display, for example, information on settings and/or the states of the winding units 6. The operator can make the settings of the winding units 6 by performing appropriate operations with the input keys 7b.

[0040] The machine control device 7 includes a communication section (receiving section) 7c. The communication section 7c transmits and receives information (data) to and from the management device 3. The machine control device 7 transmits production state information including information on the actual production quantity of packages P formed by the winding units 6 and information on the current production efficiency of the packages P to the management device 3 via the communication section 7c. The production efficiency is a production quantity of packages P per unit time. The information indicating the production quantity of packages P and the information indicating the production efficiency can be acquired based on the number of packages P processed by the doffer 8, for example. Timing when the machine control device 7 transmits the production state information to the management device 3 may be every time doffing is performed, may be at predetermined time intervals, or may be at all times.

[0041] The machine control device 7 receives, at the communication section 7c, production quantity information (described later) and speed information transmitted from the management device 3. The machine control device 7 controls operations of the respective winding units 6 on the basis of the production quantity information received at the communication section 7c. Specifically, based on the production quantity information, the machine control device 7 causes the winding units 6 to form a predetermined number of packages P. The machine control device 7 also controls the winding speed of yarn Y in each winding unit 6 on the basis of the speed information. Specifically, the machine control device 7 outputs information specifying a winding speed to a unit controller 10 described later.

[0042] When a package P has been fully wound in each winding unit 6 (in a state in which a specified amount of yarn is wound), the doffer 8 travels to the position of the corresponding winding unit 6, and removes the fully wound package to set an empty winding bobbin WB.

[0043] The following describes a configuration of each winding unit 6 with reference to FIG. 3. As depicted in FIG. 3, each winding unit 6 includes the unit controller 10, a yarn feeder 11, and a winding device 12.

[0044] The unit controller 10 controls operation of the winding unit 6. The unit controller 10 includes a CPU and a ROM, for example. The ROM stores therein a program for controlling the respective components of the winding

unit 6. The CPU executes the program stored in the ROM.

[0045] The yarn feeder 11 is a support mechanism configured to support a yarn feeding bobbin SB placed on a conveying tray (not depicted) at a predetermined position. By this yarn feeder, yarn Y is unwound from the yarn feeding bobbin SB, and the yarn Y is pulled out from the yarn feeding bobbin SB. In this manner, the yarn feeder 11 feeds the yarn Y. The type of the yarn feeder 11 is not limited to this conveying tray type, and may be a magazine type, for example. In the case in which a package P is formed from a package P as described above, the yarn feeder 11 may be a support mechanism configured to support the package P at a predetermined position.

[0046] The winding device 12 includes a cradle 13 and a winding drum 14. The cradle 13 has a pair of rotational-support portions (not depicted). With the rotational-support portions catching a winding bobbin WB therebetween, the cradle 13 rotatably supports the winding bobbin WB (or a package P). The cradle 13 can switch states between a state in which a package P supported thereby is brought into contact with the winding drum 14 and a state in which the package P is separated from the winding drum 14.

[0047] The winding drum 14 traverses yarn Y on a surface of a package P, and also rotates the package P. The winding drum 14 is rotationally driven by a drum drive motor (not depicted). Operation of the drum drive motor is controlled by the unit controller 10. By changing the rotation speed of the winding drum 14, the winding speed of yarn Y can be changed. Specifically, in the winding unit 6, the unit controller 10 controls the rotation speed of the drum drive motor, thereby controlling the winding speed of yarn Y.

[0048] With the outer periphery of a package P being in contact with the winding drum 14, the winding drum 14 is rotationally driven, whereby the package P is rotated in a driven manner. On the outer peripheral surface of the winding drum 14, a spiral traverse groove is formed. Yarn Y unwound from the yarn feeding bobbin SB is wound on a surface of the package P while being traversed at a certain width along the traverse groove. In this manner, a package P having a certain winding width can be formed. Herein, a configuration in which a motor directly rotates the package P may be used, or a configuration in which the winding drum 14 does not have the traverse groove and a separate traverse device (e.g., a traverse arm) is provided instead may be used.

[0049] Each winding unit 6 includes, on a yarn traveling path between the yarn feeder 11 and the winding device 12, in the order of from the yarn feeder 11 side, an unwinding assisting device 15, a tension applying device 17, a tension detecting device 18, a splicing device 19, and a yarn monitoring device 20. Near the splicing device 19, a first catching-and-guiding device 22 and a second catching-and-guiding device 23 are disposed.

[0050] The unwinding assisting device 15 includes a restriction member 16 that can cover a core tube of the yarn feeding bobbin SB. The restriction member 16 has

a substantially tubular shape, and is disposed so as to come into contact with a balloon formed at an upper portion of a yarn layer of the yarn feeding bobbin SB. Herein, the configuration of the unwinding assisting device 15 is not limited to this.

[0051] The tension applying device 17 applies a predetermined tension to traveling yarn Y. Operation of the tension applying device 17 is controlled by the unit controller 10. The tension detecting device 18 detects (measures) the tension of the traveling yarn Y between the yarn feeder 11 and the winding device 12. The tension detecting device 18 outputs a tension measurement signal indicating the tension of the yarn Y to the unit controller 10.

[0052] When the yarn Y has been divided (e.g. deliberately cut with a cutter or the like or by other means or unintentionally torn in two) between the yarn feeder 11 and the winding device 12 for some reason, the splicing device 19 splices yarn Y (lower yarn) on the yarn feeder 11 side and yarn Y (upper yarn) on the winding device 12 side. In the present embodiment, the splicing device 19 is configured as an air-type splicer device that twists yarn ends together using swirling airflow generated by compressed air. The splicing device 19 may be a disk-type splicer device, may be a piecer using a seed yarn, or may be a knoter configured to mechanically splice yarns.

[0053] The yarn monitoring device 20 monitors the state of yarn Y traveling on a yarn path to detect the presence or absence of a yarn defect on the basis of the monitored information. The yarn monitoring device 20 detects, as a yarn defect, thickness abnormality of yarn Y and/or foreign matter contained in the yarn Y, for example. The yarn monitoring device 20 also detects yarn breakage, that is the presence or absence of yarn Y in the yarn path, for example. When having detected a yarn defect, the yarn monitoring device 20 outputs a yarn defect detection signal to the unit controller 10. The yarn monitoring device 20 includes a cutter 21 configured to cut yarn Y. The cutter 21 is activated by the yarn monitoring device 20. The cutter 21 may be provided near the yarn monitoring device 20.

[0054] When yarn Y has been divided, the first catching-and-guiding device 22 catches the upper yarn. Controlled by the unit controller 10, the first catching-and-guiding device 22 can rotate (can move) from a standby position (solid line in FIG. 3) on the yarn feeder 11 side to a catching position (chain line in FIG. 3) on the winding device 12 side. The first catching-and-guiding device 22 is connected to a negative-pressure source (not depicted) to generate a suction flow. With this configuration, the first catching-and-guiding device 22 catches the upper yarn at the catching position and returns to the standby position, thereby guiding the upper yarn to the splicing device 19. Herein, the configuration and operation of guiding the upper yarn to the splicing device 19 are not limited to these.

[0055] Controlled by the unit controller 10, the second catching-and-guiding device 23 rotates from a standby

position (solid line in FIG. 3) on the yarn feeder 11 side to a catching position (dash-dot line in FIG. 3), which is slightly in front of the standby position, and can further rotate (can move) to a guidance position on the winding device 12 side (dash-dot-dot line in Fig. 3). The second catching-and-guiding device 23 is connected to a negative-pressure source (not depicted) to generate a suction flow. With this configuration, the second catching-and-guiding device 23 catches lower yarn to guide the lower yarn to the splicing device 19. Herein, the configuration and operation of guiding the lower yarn to the splicing device 19 are not limited to these.

[0056] As described above, the winding unit 6 winds yarn Y around the winding bobbin WB to form a package P. For splicing operation in the splicing device 19, yarn Y on the winding device 12 side is caught by the first catching-and-guiding device 22, and yarn Y on the yarn feeder 11 side is caught by the second catching-and-guiding device 23. The yarns Y caught by the first catching-and-guiding device 22 and the second catching-and-guiding device 23 are guided to the splicing device 19. At this time, the yarns Y are positioned at a slit of the yarn monitoring device 20. The splicing device 19 splices the yarns Y thus introduced. Herein, the configuration of guiding the yarn Y to the splicing device 19 is not limited to this.

[0057] The following describes the management device 3 in detail. As depicted in FIG. 4, the management device 3 includes an input section 30, a communication section (transmission section) 32, an acquisition section 34, a calculation section 36, and a setting section 38.

[0058] The input section 30 receives input of a production plan of packages P. The input section 30 is a keyboard or a touch panel display, for example. The production plan contains the production quantity of a lot (the total weight of packages P or the number of the packages P), a production schedule (that can include a production period, or at least one of a production start date and a production completion data), winding speeds (a reference value, an upper limit, and a lower limit) of yarn Y, and the number of textile machines 5 to be used (that may be the number of winding units 6). When the input section 30 is the above-described keyboard, for example, the operator inputs the production plan in an input screen displayed on a display unit (e.g., a display or a touch panel display) of the management device 3. The production plan input in the input section 30 is stored as production plan information on the production plan in a storage section (not depicted). The input section 30 may be configured to receive input of the production plan via a recording medium (e.g., a flash memory or an HDD) or a network, for example.

[0059] The communication section 32 communicates with the textile machines 5. The communication section 32 communicates with the communication section 7c of each textile machine 5 via wireless or wired communication. The communication section 32 receives the production state information, which is transmitted from the ma-

chine control device 7 of each textile machine 5, including information indicating the production quantity of packages P and information indicating the current production efficiency of the packages P. The communication section 32 causes the storage section to store therein the received production state information. The communication section 32 transmits the production quantity information and/or the speed information output from the setting section 38 to the textile machine 5.

[0060] The acquisition section 34 acquires production plan information on the production plan of packages P and production state information on the current production state of the packages P. In the present embodiment, the acquisition section 34 acquires the production plan information and the production state information from the storage section. The acquisition section 34 outputs the production plan information and the production state information thus acquired to the calculation section 36 and the setting section 38. The acquisition section 34 may directly acquire the production state information received by the communication section 32 from the communication section 32.

[0061] The calculation section 36 calculates a progress status on production of packages P on the basis of the production plan information and the production state information acquired by the acquisition section 34. In the present embodiment, when having received the production plan information and the production state information output from the acquisition section 34, the calculation section 36 calculates a progress rate as the progress status.

[0062] The calculation section 36 calculates the progress rate based on the number or the weight of packages P scheduled to be produced obtained from the production plan information, the number or the weight of packages P that have already been formed in the respective textile machines 5 obtained from the production state information, and the production schedule obtained from the production plan information. Specifically, for example, assuming that the production quantity of packages P scheduled to be produced is "100", the production quantity of packages P that have already been formed is "zero", and the production period is "four days", if "50" packages P should have been formed at the beginning of "day three" but only "40" packages have been formed, the calculation section 36 calculates the progress rate as "80%". Under the above-described assumption, if "60" packages P have been formed at the beginning of "day three", the calculation section 36 calculates the progress rate as "120%".

[0063] The calculation section 36 may also calculate the progress rate based on the number or the weight of packages P scheduled to be produced obtained from the production plan information and the number or the weight of packages P that have been already formed in the respective textile machines 5 obtained from the production state information. Specifically, assuming that the production quantity of packages P scheduled to be produced is

"100", if the production quantity of packages P that have been already formed is "40", the calculation section 36 calculates the progress rate as "40%".

[0064] The calculation section 36 may calculate the progress rate not only based on the number of packages P that have already been formed but also based on information including packages P that have not yet been formed (that are being wound). For example, the calculation section 36 preferably counts a package winding of which has been completed 50% as 0.5 to calculate the progress rate.

[0065] The calculation section 36 outputs progress information indicating the progress rate thus calculated to the setting section 38.

[0066] The setting section 38 sets the production quantity of packages P in each textile machine 5. When having received the production plan information output from the acquisition section 34, the setting section 38 sets the production quantity (the number or the weight) of packages P required to be produced in each textile machine 5, that is a target production quantity for each textile machine 5. Specifically, assuming that the production quantity of packages P is "100" and the number of textile machines 5 to be used is "five", for example, the setting section 38 sets the production quantity of packages P required to be produced in each textile machine 5 as "20". In other words, the setting section 38 makes the setting such that the production quantity of packages P is evenly assigned to each textile machine 5. The setting section 38 may also set the production quantity of packages P in each textile machine 5 in accordance with the number of winding units 6 that are operating in the textile machine 5. As a method of setting the production quantity by the setting section 38, various methods may be used. The setting section 38 also sets an initial value of the winding speed of yarn Y on the basis of the production plan information (the reference value of the winding speed). The setting section 38 outputs production quantity information specifying the production quantity set for each textile machine 5 and initial speed information indicating the initial value of the winding speed of yarn Y to the communication section 32.

[0067] After production of packages P is started in the textile machines 5, the setting section 38 can change the setting of the target production quantity of packages P in each textile machine 5. Based on the progress information output from the calculation section 36, the setting section 38 changes the target production quantity of packages P in each textile machine 5. When there are variations in progress rate in the progress information among the textile machines 5, the setting section 38 changes the target production quantity for each textile machine 5. When there are a textile machine 5 the progress rate of which is high (its progress is fast) and a textile machine 5 the progress rate of which is low (its progress is slow), the setting section 38 assigns the target production quantity assigned to the textile machine 5 the progress rate of which is low to the other textile machine

5 the progress rate of which is high. When there are a plurality of textile machines 5 the progress rates of which are high, the setting section 38 may assign production quantities evenly to these textile machines 5, or may assign production quantities depending on their progress rates.

[0068] The setting section 38 outputs setting information (the production quantity information, the speed information) thus changed to the communication section 32.

[0069] When the number of textile machines 5 to be used has been changed, the setting section 38 changes the setting of the target production quantity of packages P in each textile machine 5. The number of textile machines 5 when production of packages P is started may be different from the number of textile machines 5 to be used that has been input in the input section 30. When production of packages P is started, the number of the textile machines 5 to be used that has been input in the input section 30 can include a textile machine 5 that is producing a package P of another lot. Thus, after the production of packages P is started, a textile machine 5 in which production of a package P of another lot has been completed can be added therein. When the number of textile machines 5 has been changed, the setting section 38 changes the production quantity of packages P in each textile machine 5 on the basis of the changed number of the textile machines 5.

[0070] Based on the progress rate calculated by the calculation section 36, the setting section 38 changes (adjusts) the setting of the winding speed of yarn Y in each textile machine 5. The expression "changes the setting of the winding speed" can be paraphrased into "resets the winding speed". It can be also expressed that the setting section 38 "reviews the setting of the winding speed" of yarn Y in each textile machine 5 on the basis of the progress rate calculated by the calculation section 36. The expression "changes (adjusts) the setting of the winding speed" does not exclude the case "the setting is not changed". In other words, the setting section 38 may review the setting of the winding speed on the basis of the progress rate, and does not have to change the setting of the winding speed of yarn Y in each textile machine 5 if no problem is found in the progress rate.

[0071] When having received the progress information output from the calculation section 36, the setting section 38 changes the winding speed on the basis of the production schedule and the progress rate. When the progress rate is low against the production schedule, the setting section 38 changes the setting such that the winding speed becomes higher. When the progress rate is high compared with the production schedule, the setting section 38 may change the setting such that the winding speed becomes lower, or does not have to change the setting of the winding speed, that is, may maintain the current winding speed. The setting section 38 changes the setting of the winding speed such that the winding speed is maintained within the range of the upper limit

or the lower limit. The setting section 38 outputs speed information indicating the winding speed thus changed to the communication section 32.

[0072] The setting section 38 changes the target production quantity of packages P in each textile machine 5 with a higher priority than changing the winding speed of yarn Y in each textile machine 5. When production of a lot cannot be completed within a production period (by a production completion date) only by changing the production quantity of packages P in each textile machine 5, the setting section 38 changes the winding speed of yarn Y in each textile machine 5. After changing the production quantity of packages P in each textile machine 5, the setting section 38 determines, based on the progress rate of each textile machine 5, whether the production can be completed within the production period. If having determined that the production cannot be completed within the production period, the setting section 38 changes the winding speed of yarn Y in each textile machine 5.

[0073] The following describes a yarn winding method in the yarn winding system 1 with reference to FIG. 5. In FIG. 5, one example of the yarn winding system 1 including the management device 3 and two textile machines 5 will be described. The two textile machines 5 are to produce packages P of the same lot.

[0074] As depicted in FIG. 5, to begin with, the management device 3 acquires production plan information (step S01). Subsequently, the management device 3 generates setting information based on the acquired production plan information (step S02). The management device 3 generates production quantity information specifying the production quantity of packages P required to be produced in each textile machine 5. The management device 3 also generates initial speed information (speed information) indicating an initial value of the winding speed of yarn Y on the basis of the production plan information. The management device 3 transmits the production quantity information and the initial speed information thus generated to each textile machine 5 (step S03).

[0075] When having received the production quantity information and the initial speed information transmitted from the management device 3, each textile machine 5 starts production of a package P on the basis of the production quantity information and the initial speed information (step S04). Specifically, in the textile machine 5, the machine control device 7 outputs a command including the initial value of the winding speed to the unit controller 10 of each winding unit 6. Thus, formation of a package P in each winding unit 6 is started.

[0076] Subsequently, each textile machine 5 transmits production state information on the production state of packages P to the management device 3 (step S05). When having received the production state information transmitted from each textile machine 5, the management device 3 acquires the production plan information and the production state information from the storage

section (acquisition step), and calculates the progress rate of production of packages P in each textile machine 5 on the basis of the production plan information and the production state information (step S06, calculation step).

[0077] Subsequently, based on the calculated progress rate, the management device 3 changes the setting of the production quantity of packages P in each textile machine 5 (step S07, setting changing step). Specifically, for example, the management device 3 changes the target production quantity for each textile machine 5 in accordance with the progress rate of the textile machine 5. More specifically, when the progress rate of one textile machine 5 is higher than that of the other textile machine 5, the management device 3 assigns the target production quantity assigned to the other textile machine 5 the progress rate of which is lower to the one textile machine 5 the progress rate of which is higher.

[0078] The management device 3 transmits production quantity information indicating the changed target production quantity of packages P to each textile machine 5 (step S08, transmitting step).

[0079] When having received the production quantity information transmitted from the management device 3 (receiving step), each textile machine 5 changes the setting of the target production quantity, and also controls operation of the textile machine so as to achieve the new target production quantity (step S09, operation controlling step).

[0080] Subsequently, when having changed the target production quantity of packages P, each textile machine 5 transmits the production state information after this change to the management device 3 (step S10).

[0081] When having received the production state information transmitted from each textile machine 5, the management device 3 calculates the progress rate of production of packages P in each textile machine 5 on the bases of the production plan information and the production state information (step S11).

[0082] Subsequently, the management device 3 determines whether production of a scheduled quantity (target production quantity) of packages P can be completed within the production period if the current target production quantities assigned to the respective textile machines 5 are continuously used (step S12).

[0083] If having determined the production can be completed within the production period (YES at step S12), the management device 3 ends the process. If having determined that the production cannot be completed within the production period (NO at step S12), the management device 3 changes the setting of the winding speed in each textile machine 5 on the basis of the calculated progress rate (step S13, setting changing step).

[0084] The management device 3 transmits speed information indicating the changed winding speed to each textile machine 5 (step S14, transmitting step).

[0085] When having received the speed information transmitted from the management device 3, each textile machine 5 changes the winding speed of each winding

unit 6 on the basis of the speed information (step S15, operation controlling step). Specifically, the unit controller 10 in each winding unit 6 controls the winding device 12 such that the winding speed based on the speed information is reached.

[0086] In the yarn winding system 1, when the production quantity of produced packages P has reached the production quantity indicated in the production quantity information, the textile machines 5 end production of packages P. When the production has been completed, each textile machine 5 transmits completion information indicating that the production has been completed to the management device 3 and stops operation. When the production is nearing completion, the textile machine 5 stops the winding units 6 in the order from fully wound one to gradually reduce the number of operating winding units 6, and stops operation when production of packages P in the scheduled production quantity has been completed. When a package P is still being formed at the time of production completion, the corresponding winding unit 6 is preferably operated until this package P is fully wound.

[0087] In the embodiment above, a mode has been described as one example in which the production quantity of packages P in each textile machine 5 is changed once. However, the production quantity of packages P may be changed more than once. In the embodiment, a mode has been described as one example in which the winding speed of yarn Y is changed once. However, the winding speed of yarn Y may be changed more than once.

[0088] As described in the foregoing, in the yarn winding system 1 according to the present embodiment, the management device 3 calculates the progress status based on the production plan information and the production state information, and changes at least one of the winding speed of yarn and the production quantity of packages on the basis of the progress status. By changing at least one of the winding speed of yarn Y and the production quantity of packages P in each textile machine 5, the production speed of packages P produced in the textile machine 5 can be adjusted. In the yarn winding system 1, the winding speed of yarn Y and the production quantity of packages can be automatically changed based on the production plan as described above, and thus the workload of adjusting the production speed can be reduced.

[0089] In the yarn winding system 1 according to the present embodiment, the acquisition section 34 of the management device 3 acquires the production state information including the production quantity and the production efficiency. With this configuration, the production state can be accurately determined.

[0090] In the yarn winding system 1 according to the present embodiment, the management device 3 includes the input section 30 configured to receive input of the upper limit and the lower limit of the winding speed. The setting section 38 of the management device 3 changes

the winding speed within a range between the upper limit and the lower limit input in the input section 30. The upper limit and the lower limit of the winding speed can be set such that the quality of yarn Y is maintained within a certain range. Thus, by changing the winding speed within the range between the upper limit and the lower limit of the winding speed, variation in yarn quality during formation of a package P can be reduced.

[0091] In the yarn winding system 1 according to the present embodiment, the acquisition section 34 of the management device 3 acquires the production plan information including the production quantity and the production schedule of packages P. With this configuration, based on the production quantity and the production schedule of packages P, the calculation section 36 can calculate the progress rate accurately.

[0092] In the yarn winding system 1 according to the present embodiment, when the progress status is different from each other between the textile machines 5, the setting section 38 of the management device 3 assigns the production quantity of packages P assigned to a textile machine 5 the progress of which is slow to a textile machine 5 the progress of which is fast. With this configuration, even when there is a textile machine 5 in which production of packages P is delayed, this production delay can be compensated for by another textile machine 5. Consequently, the original production plan can be reliably accomplished. Furthermore, by assigning the production quantity to the other textile machine 5, the amount of change in winding speed can be reduced. Particularly when the number of the textile machines 5 is larger, the amount of change in winding speed for each textile machine 5 can be further reduced, and influence of the change in winding speed upon the yarn quality can be further reduced.

[0093] In the yarn winding system 1 according to the present embodiment, the setting section 38 changes the production quantity of packages P with a higher priority than changing the winding speed of yarn Y. With this configuration, by giving a higher priority to changing the production quantity, the amount of change in winding speed can be reduced. Thus, influence of the change in winding speed upon the yarn quality can be reduced.

[0094] In the yarn winding system 1 according to the present embodiment, when production cannot be completed within the production period only by changing the production quantity, the setting section 38 changes the winding speed in each textile machine 5. With this configuration, the production plan can be reliably accomplished.

[0095] In the yarn winding system 1 according to the present embodiment, when the progress rate is low against the production schedule, the setting section 38 sets the winding speed such that the winding speed becomes higher than its initial value. When the progress rate is high against the production schedule, the setting section does not have to change the winding speed. With this configuration, the production plan can be reliably ac-

complished, and also variation in yarn quality during formation of a package P can be reduced.

[0096] Although the present embodiment has been described above in detail, it is obvious for those skilled in the art that the present embodiment is not limited to the examples described in this specification. The present embodiment can be modified and changed to be implemented without departing from the gist and scope of the present invention defined by the claims. Thus, this specification is described for the purpose of exemplification, and should not be construed as being limited to the present embodiment.

[0097] In the embodiment, a mode has been described as one example in which each textile machine 5 is an automatic winder. However, the textile machine may be an air spinning machine or an open-end spinning machine, for example.

[0098] In the embodiment, a mode has been described as one example in which the yarn winding system 1 includes the management device 3 and a plurality of textile machines 5. However, the yarn winding system may consist of the management device and one textile machine. In this case, based on the production plan information and the production state information of this one textile machine, the management device calculates the progress status on production of packages in the textile machine. The management device changes the winding speed of yarn in the textile machine on the basis of the progress status. In this yarn winding system, the management device calculates the progress status based on the production plan information and the production state information, and changes the winding speed of yarn in the textile machine on the basis of the progress status. In the yarn winding system, the winding speed of yarn can be automatically changed based on the production plan as described above, and thus the workload of adjusting the production speed can be reduced.

[0099] In the embodiment, a mode has been described as one example in which the yarn winding system 1 includes the management device 3 and a plurality of textile machines 5. However, the yarn winding system does not have to include the management device in addition to the textile machines 5. The yarn winding system may consist of the textile machines. In this yarn winding system, one textile machine among the textile machines serves as a host device having the same functions as those of the management device 3 in the embodiment. In other words, the machine control device of any textile machine can correspond to the management device. The textile machine serving as a host device and another or other textile machines are connected to each other so as to be able to communicate therewith via wireless and/or wired communication. In this configuration, the textile machine serving as a host device (the machine control device of any textile machine serving as the management device) may include an input section (e.g., the above-described input keys 7b) configured to receive input of a production plan of packages, and may receive

input of the production plan in the input section to acquire production plan information. Alternatively, this textile machine may acquire the production plan information via a recording medium or a network, for example.

[0100] The above-described textile machine calculates the progress status based on the production plan information and the production state information of the textile machines (including this textile machine). Based on the progress status, this textile machine changes at least one of the winding speed of yarn in the textile machines and the production quantity of packages. In this yarn winding system, at least one of the winding speed of yarn in the textile machines and the production quantity of packages can be automatically changed, and thus the workload of adjusting the production speed can be reduced.

[0101] In the embodiment, a mode has been described as one example in which the yarn winding system 1 includes the management device 3 and a plurality of textile machines 5, the management device 3 serves as a host device, and the management device 3 calculates the progress rate, for example. However, one textile machine among the textile machines may calculate the progress rate, for example. In this configuration, this textile machine calculates the progress status on production of packages on the basis of the production plan information and the production state information. The textile machine changes the setting of each textile machine on the basis of the calculated progress status. The textile machine changes the winding speed of yarn on the basis of the progress status. Alternatively, the textile machine changes at least one of the winding speed of yarn in each textile machine and the production quantity of packages on the basis of the progress status. The textile machine may acquire production plan information transmitted from the management device, and may acquire production plan information based on a production plan input in the textile machine.

[0102] In the embodiment, a mode has been described as one example in which the yarn winding system 1 includes the management device 3 and a plurality of textile machines 5. However, in the present invention, only one textile machine may be provided. In this configuration, the textile machine may include an input section configured to receive input of a production plan of packages P, and may receive input of a production plan in the input section to acquire production plan information. Alternatively, this textile machine may acquire the production plan information via a recording medium or a network, for example.

[0103] The above-described textile machine includes: an acquisition section configured to acquire production plan information on a production plan of packages P and production state information on the current production state of packages P in the textile machine; a calculation section configured to calculate the progress status on production of packages based on the production plan information and the production state information ac-

quired by the acquisition section; and a setting section configured to change the setting of the winding speed of yarn based on the progress status calculated by the calculation section. This textile machine calculates the progress status on the basis of the production plan information and the production state information of the textile machine, and changes the winding speed of yarn on the basis of the progress status. By changing the winding speed of yarn, the production speed of packages produced in the textile machine can be adjusted. In the textile machine, the winding speed of yarn can be automatically changed based on the production plan as described above, and thus the workload of adjusting the production speed can be reduced.

[0104] The acquisition section of the above-described textile machine may acquire the progress status of another textile machine. The above-described textile machine and the other textile machine may be connected to each other so as to be able to communicate therewith via wireless and/or wired communication, or may be connected so as to be able to communicate via another device. In this configuration, the setting section may change the setting of the winding speed of yarn on the basis of the progress status calculated by the calculation section and the progress status of the other textile machine acquired by the acquisition section. In this textile machine, for example, when the progress status of the other textile machine is behind its scheduled status, increasing the winding speed of yarn can compensate for production delay in the other textile machine.

[0105] In the embodiment, a mode has been described as one example in which the management device 3 sets an initial value of the winding speed of yarn Y on the basis of the production plan information (the reference value of the winding speed). However, the initial value of the winding speed of yarn Y may be set by the textile machine 5. In this case, the management device 3 transmits, for example, information indicating the amount of change in winding speed from the initial value to the textile machine 5.

[0106] In the embodiment, a mode has been described as one example in which the input section 30 receives input of a production plan including the reference value, the upper limit, and the lower limit of the winding speed of yarn Y. However, the input section may receive input of a production plan including only the reference value of the winding speed of yarn Y. In this case, the setting section sets an allowable range of the winding speed including the reference value, and also changes the winding speed within the allowable range. The allowable range can be set such that the quality of yarn is maintained within a certain range. Thus, by changing the winding speed within the allowable range, variation in yarn quality during formation of a package can be reduced.

[0107] In the embodiment, a mode has been described as one example in which the setting section 38 sets the winding speed such that the winding speed is maintained within the range of the upper limit or the lower limit. How-

ever, the setting section may set the amount of change in winding speed, and may set the winding speed in accordance with the amount of change.

[0108] In the embodiment, a mode has been described as one example in which the calculation section 36 calculates the progress rate as the progress status. However, the progress status calculated by the calculation section is not limited to the progress rate.

[0109] In the embodiment, a mode has been described as one example in which, based on the progress rate calculated by the calculation section 36, the winding speed of yarn Y in each textile machine 5 is changed, and the speed information is transmitted to the textile machine 5. However, when the progress rate calculated by the calculation section is inappropriate, the setting section may change the winding speed. Furthermore, when the progress status is behind a scheduled status, the setting section may increase the winding speed to a value larger than an initial value of a set speed that is set based on production plan information. The scheduled status is set based on the production plan information. With this configuration, the production plan can be reliably accomplished.

[0110] In the embodiment, a mode has been described as one example in which the machine control device 7 includes the display screen 7a and the input keys 7b as separate components. However, for example, in the machine control device 7, a touch panel-type display device may be used, and a display unit and an operation unit may be included in the same device.

[0111] At least some parts of the embodiment described above may be optionally used in combination.

[0112] The expression "based on (on the basis of)" used in this specification does not mean "only based on (only on the basis of)" unless otherwise specified. In other words, the expression "based on (on the basis of)" means both "only based on (only on the basis of)" and "at least based on (at least on the basis of)".

[0113] Procedures, sequences, and the like of each mode/embodiment described in this specification may be permuted unless contradiction arises. For example, the method described in this specification includes various step elements in an exemplary order, which is not limited to the specific order described herein.

[0114] A textile machine (5) includes: an acquisition section (34) configured to acquire production plan information on a production plan of packages (P) and production state information on a current production state of packages (P); a calculation section (36) configured to calculate a progress status on production of packages (P) based on the production plan information and the production state information acquired by the acquisition section (34); and a setting section (38) configured to change a setting of winding speed of yarn (Y) based on the progress status calculated by the calculation section (36).

Claims

1. A textile machine (5) configured to wind yarn (Y) to form a package (P), the textile machine (5) being **characterized by:**

an acquisition section (34) configured to acquire production plan information on a production plan of the package (P) and production state information on a current production state of the package (P) ;
a calculation section (36) configured to calculate a progress status on production of the package (P) based on the production plan information and the production state information acquired by the acquisition section (34); and
a setting section (38) configured to change a setting of winding speed of the yarn (Y) based on the progress status calculated by the calculation section (36).

2. The textile machine (5) according to claim 1, wherein the acquisition section (34) is adapted to acquire the production state information that contains at least one of actual production quantity of the package (P) and actual production efficiency of the package (P) .

3. The textile machine (5) according to claim 1 or 2, further comprising an input section (30) configured to receive input of an upper limit and a lower limit of the winding speed, or a reference value of the winding speed, wherein
the setting section (38) is adapted to

change a setting of the winding speed within a range between the upper limit and the lower limit input in the input section (30), or
to set an allowable range of the winding speed including the reference value and to change the setting of the winding speed only within the allowable range.

4. The textile machine (5) according to any one of claims 1 to 3, wherein the acquisition section (34) is adapted to acquire the production plan information that contains at a least target production quantity of the package (P) and a production schedule of the package (P) .

5. The textile machine (5) according to any one of claims 1 to 4, wherein the setting section (38) is adapted to change the setting of the winding speed such that the winding speed becomes faster than an initial value of the winding speed set based on the production plan information when the progress status is behind a scheduled status.

6. The textile machine (5) according to claim 5, wherein

the setting section (38) is configured not to change the setting of the winding speed when the progress status is ahead of a scheduled status.

7. The textile machine (5) according to any one of claims 1 to 6, wherein

the acquisition section (34) is adapted to acquire a progress status of another textile machine (5), and the setting section (38) is adapted to change the setting of the winding speed of the yarn (Y) based on the progress status calculated by the calculation section (36) and the progress status of the other textile machine (5) acquired by the acquisition section (34) .

8. A management device (3) configured to manage one or a plurality of textile machines (5) each configured to wind yarn (Y) to form a package (P), the management device (3) being **characterized by:**

an acquisition section (34) configured to acquire production plan information on a production plan of the packages (P) for the textile machines (5) and production state information on a current production state of the package (P) produced in each textile machine (5) ;

a calculation section (36) configured to calculate a progress status on production of the package (P) in the textile machine (5) based on the production plan information and the production state information acquired by the acquisition section (34);

a setting section (38) configured to change a setting of the textile machine (5) based on the progress status calculated by the calculation section (36); and

a transmission section (32) configured to transmit setting information on the setting changed by the setting section (38) to the textile machine (5), wherein

when the number of the textile machines (5) is one, the setting section (38) is adapted to change a setting of a winding speed of the yarn (Y) based on the progress status, and
when the number of the textile machines (5) is more than one, the setting section (38) is adapted to change a setting of at least one of a winding speed of the yarn (Y) in each textile machine (5) and target production quantity of the packages (P) in each textile machine (5) based on the progress status.

9. The management device (3) according to claim 8, wherein when the number of the textile machines (5) is more than one and the progress status is different from each other between the textile machines (5), the setting section (38) is adapted to change the settings of the target production quantities of the respective textile machines (5) such that the target pro-

duction quantity assigned to the textile machine (5) progress of which is slow is assigned to the textile machine (5) the progress of which is fast.

10. A yarn winding system (1) including a plurality of textile machines (5) each configured to wind yarn (Y) to form a package (P) and a management device (3) configured to manage the textile machines (5), **characterized in that** the management device (3) comprises:

an acquisition section (34) configured to acquire production plan information on a production plan of the packages (P) for the textile machines (5) and production state information on a current production state of the package (P) in each textile machine (5) ;

a calculation section (36) configured to calculate a progress status on production of the package (P) in each textile machine (5) based on the production plan information and the production state information acquired by the acquisition section (34) ;

a setting section (38) configured to change a setting of at least one of a winding speed of the yarn (Y) in each textile machine (5) and target production quantity of the packages (P) in each textile machine (5) based on the progress status calculated by the calculation section (36); and a transmission section (32) configured to transmit at least one of speed information on the winding speed and production quantity information on the target production quantity changed by the setting section (38) to each textile machine (5), and

each textile machine (5) comprises:

a receiving section (7c) configured to receive at least one of the speed information and the production quantity information transmitted from the transmission section of the management device (30); and

an operation controller (7) configured to control operation of the textile machine (5) based on at least one of the speed information and the production quantity information received by the receiving section (7c).

11. The yarn winding system (1) according to claim 10, wherein when the receiving section (7c) has received the speed information, the operation controller (7) is adapted to control operation of the textile machine (5) so as to wind the yarn (Y) at the winding speed in accordance with the speed information.
12. The yarn winding system (1) according to claim 10 or 11, wherein when the progress status is different

from each other between the textile machines (5), the setting section (38) is adapted to change the setting of the target production quantities of the respective textile machines (5) such that the target production quantity of the packages (P) assigned to the textile machine (5) progress of which is slow is assigned to the textile machine (5) the progress of which is fast.

13. The yarn winding system (1) according to any one of claims 10 to 12, wherein the setting section (38) is adapted to change the target production quantity with a higher priority than changing the winding speed.

14. The yarn winding system (1) according to claim 13, wherein when production cannot be completed within a production period that a production schedule indicates only by changing the target production quantity, the setting section (38) is adapted to change the setting of the winding speed of each textile machine (5).

15. A managing method for managing a plurality of textile machines (5) each winding yarn (Y) to form a package (P), the method comprising:

an acquisition step of, acquiring production plan information on a production plan of the packages (P) for the textile machines (5) and production state information on a current production state of the package (P) in each textile machine (5); a calculation step of, calculating a progress status on production of the package (P) in each textile machine (5) based on the production plan information and the production state information acquired at the acquisition step;

a setting changing step of, changing a setting of at least one of a winding speed of the yarn (Y) in each textile machine (5) and target production quantity of the packages (P) in each textile machine (5) based on the progress status calculated at the calculation step;

a transmitting step of, transmitting at least one of speed information on the winding speed and production quantity information on the target production quantity changed at the setting changing step to each textile machine (5);

a receiving step of, by each textile machine (5), receiving at least one of the speed information and the production quantity information transmitted at the transmitting step; and

an operation controlling step of, by each textile machine (5), controlling operation of the textile machine (5) based on at least one of the speed information and the production quantity information received at the receiving step.

Fig.1

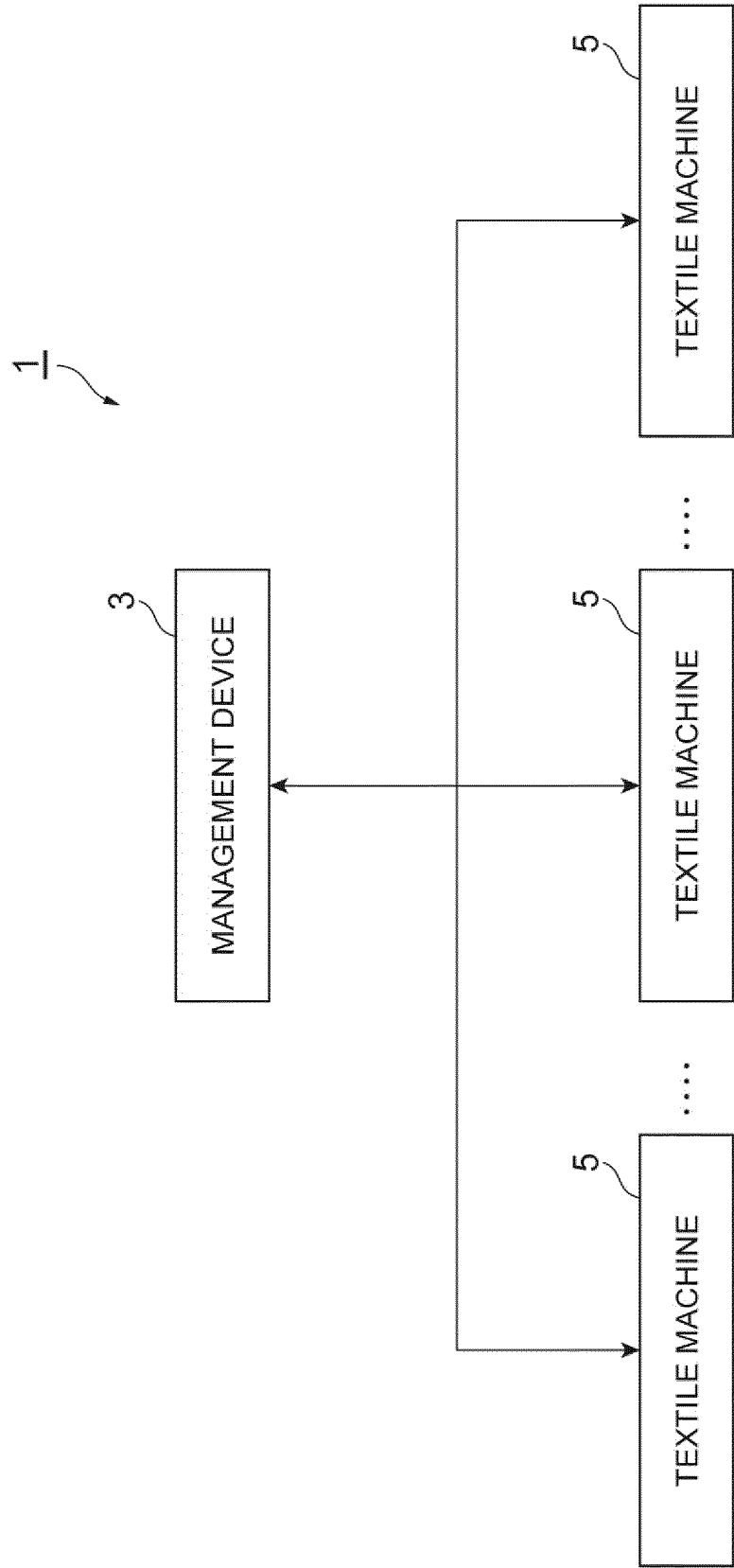


Fig.2

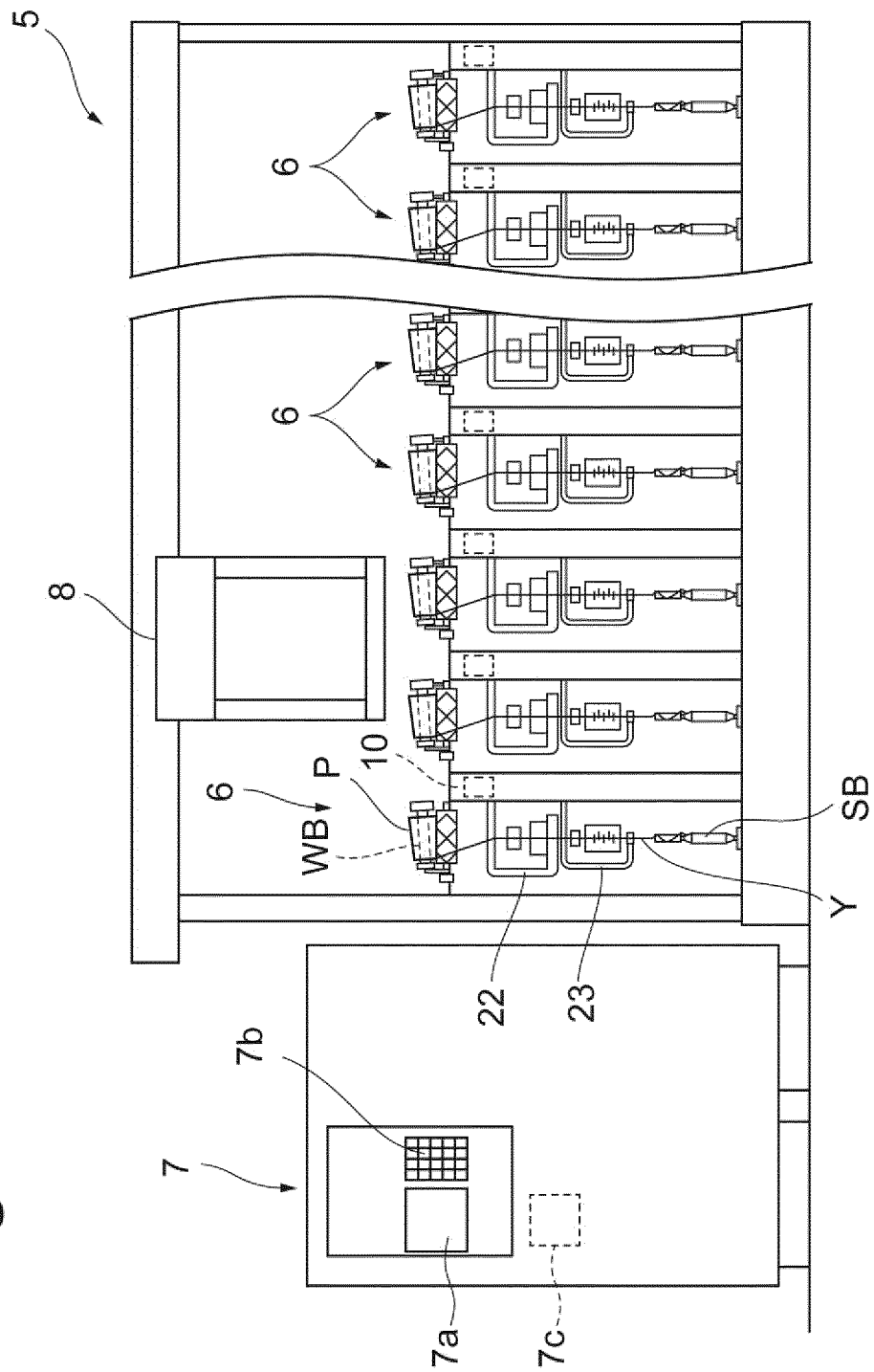


Fig.3

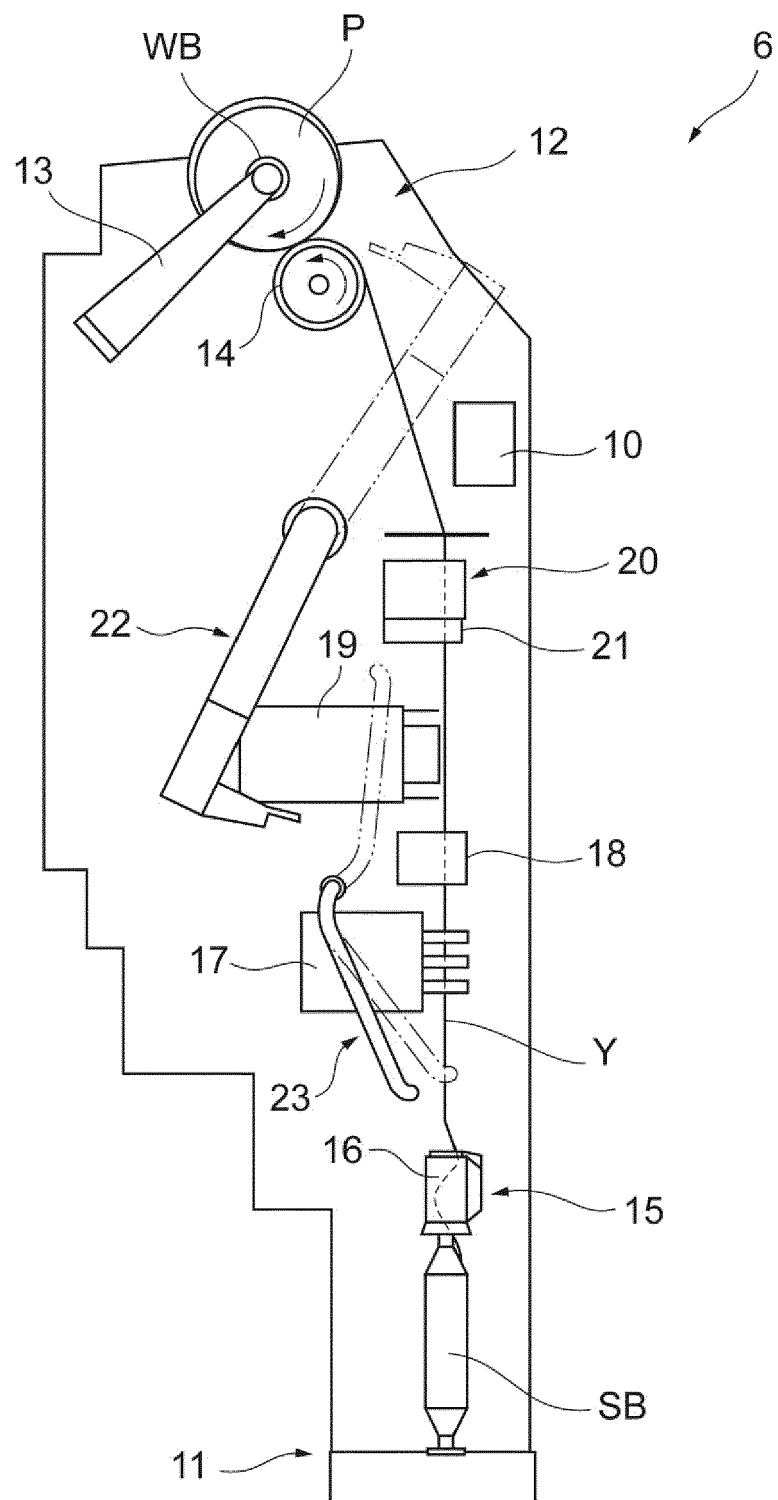


Fig.4

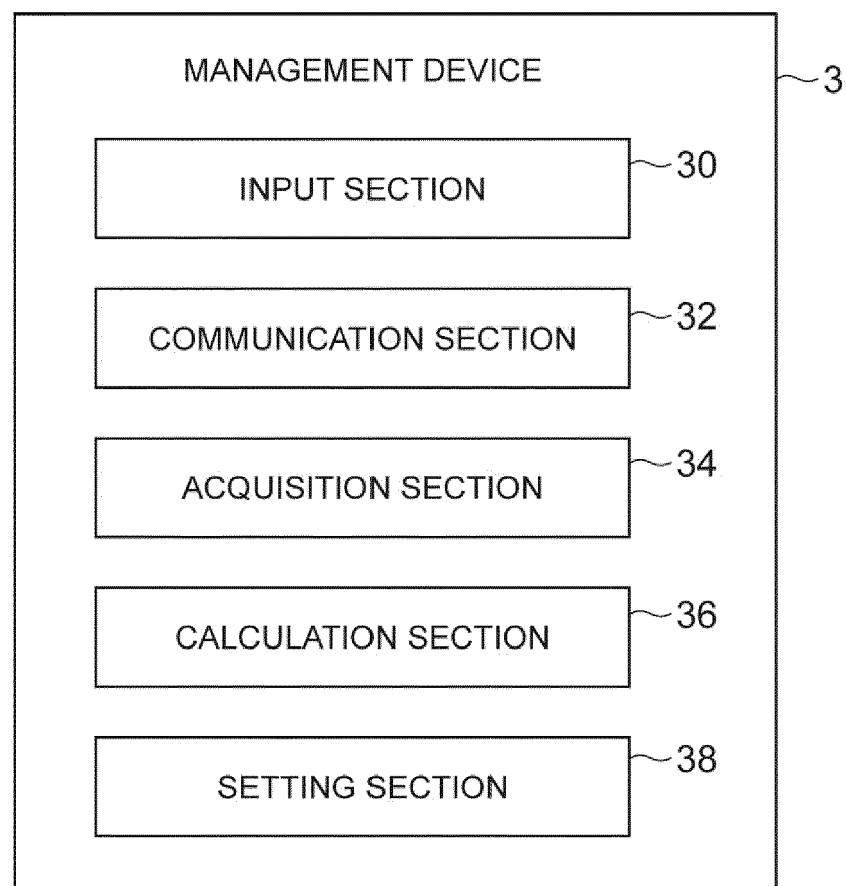
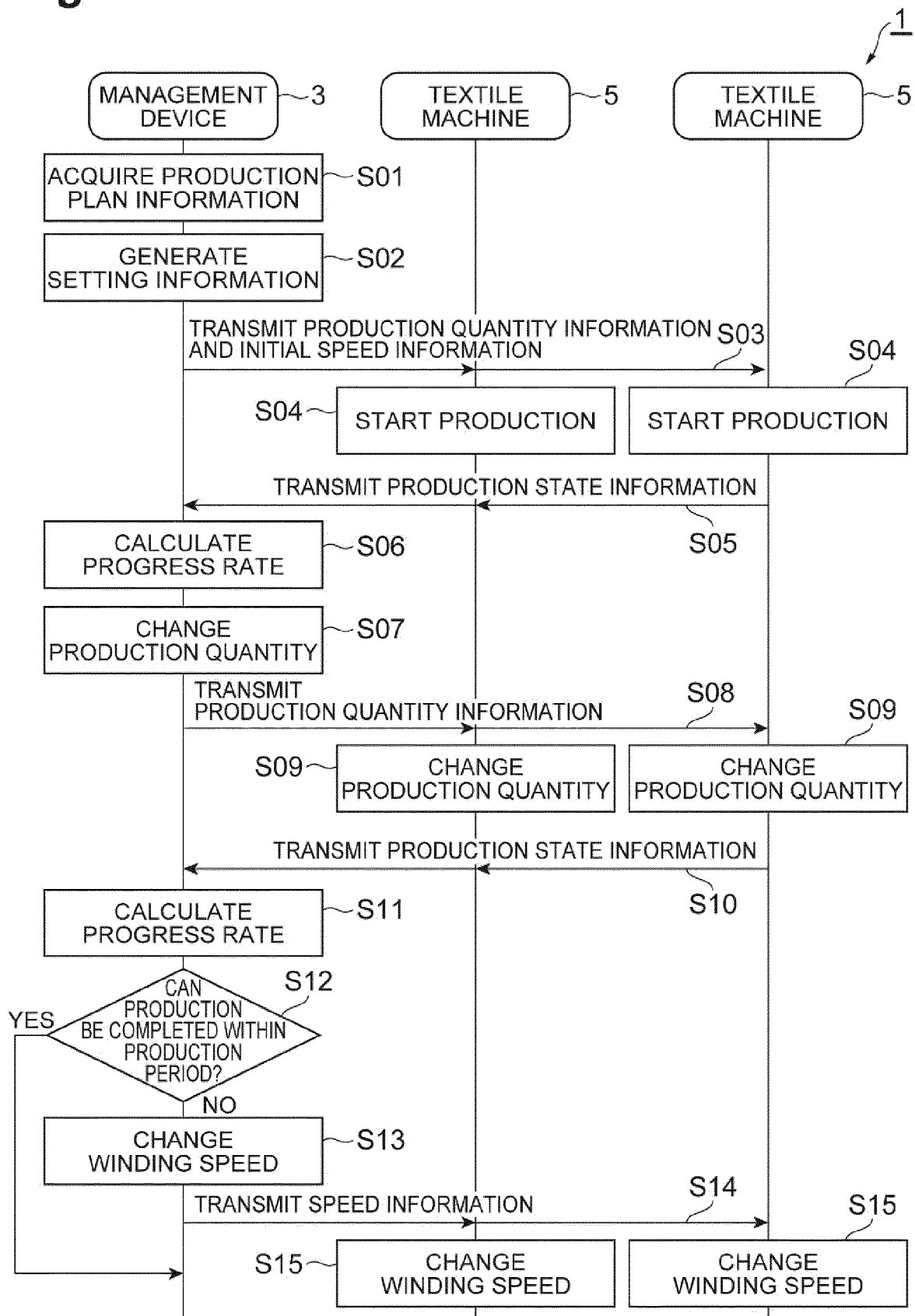


Fig.5



EUROPEAN SEARCH REPORT

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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