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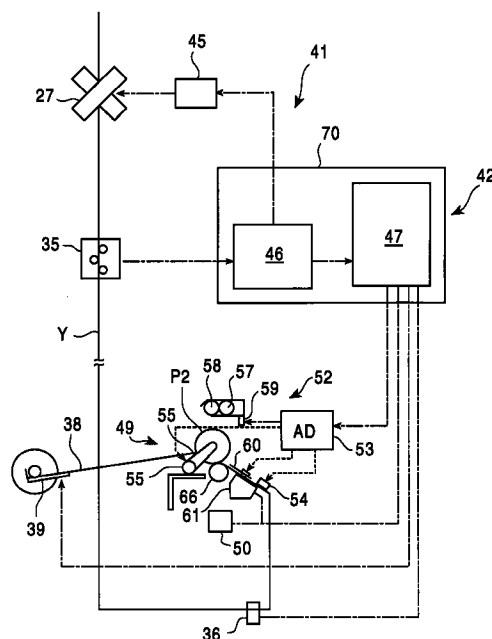
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(54) **Automatic system for texturing process**

(57) To automatic system for a false twisting process that can automatically transfer not only full packages but also small packages and that allows packages to be reliably associated with quality data. The present system comprises a means 36 for informing an operator that a yarn has been cut during winding for a package, a means 50 for detecting the size of the package, and a means 56 using the detected size to inform the operator whether the package is to be disposed of or discharged to a transfer system.

FIG. 1



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Description

Field of the Invention

The present invention relates to a system for a texturing process that uses quality data obtained during winding to rank packages, and in particular, to an automatic system for a texturing process that can automatically transfer not only full packages but also small packages and that can reliably associate packages with quality data.

Background of the Invention

An single-spindle independent type automatic doffing device having in each spindle a mechanism for doffing produced packages to perform a separate doffing operation has been introduced into a draw texturing machine consisting of a large number of spindles. The draw texturing machine has in each spindle a storage arm for holding doffed packages. A package doffed by each spindle is held in the storage arm located at the spindle that has produced the package and waits until it is automatically discharged to a transfer system or handled by an operator.

The amount of yarn wound around a package is controlled by a yarn length observer (a doffing timer), and packages around which the yarn has been wound up to a specified length (referred to as "full packages") are doffed. Doffing, however, is carried out even if the yarn has been cut, so the doffed packages are not always full. Conventional systems automatically discharge full packages on a storage arm to the transfer system for transfer, whereas the other packages doffed by their yarn cut are handled by the operator.

The packages doffed by their yarn cut (referred to as "half packages") can be sold as commodities unless the amount of wound yarn is significantly small. These packages are referred to as "small packages". Packages with a significantly small amount of wound yarn can not be sold as commodities. These packages are referred to as "very small packages". The operator transfers the small packages to the transfer system while removing and disposing of the very small packages to the transfer system.

If data obtained by the draw texturing machine, e.g., quality data represented by the value of the tension of the yarn, is used as individual information on each package for grading, data obtained by a controller on the machine body must be associated with corresponding packages. In the conventional systems, which automatically transfer only full packages, only those packages for which the yarn length observer considers the specified time has passed must be extracted and associated with the data, so the association is relatively simple and is not subjected to mistakes, provided that the order of package transferal is observed.

Recently, however, there has been increasing

demand for the automation of the transfer of not only full packages but also small packages, which conventionally are transferred manually. If the small packages are also automatically transferred, the association becomes difficult because a reference required to determine packages to be disposed of (a reference required to distinguish small packages from very small packages) depends on the operator's subjective viewpoint provided that a cut-yarn message is conveyed only to the operator, as in the conventional system.

The draw texturing machine is normally programmed not to generate quality data for several minutes (e.g., three minutes) after the start of winding. This is to prevent unwanted data from increasing because the yarn is likely to be cut at the beginning of winding due to a yarn threading error. Those packages for which the yarn is cut within this winding start period are disposed of by the operator as very small packages. If, however, the yarn is cut about 3 minutes after the start of winding, the operator must subjectively determine whether the package is to be disposed of, i.e., whether data has been generated for the package, thereby precluding the number of data from corresponding to the number of packages. This problem occurs because the controller and operator separately distinguish small packages used as commodities from very small packages to be disposed of throughout the process, including the winding start period.

It is an object of the present invention to provide an automatic system for a texturing process that can solve the above problem and that can automatically transfer not only full packages but also small packages while reliably associating packages with quality data.

Summary of the Invention

To achieve this object, the present invention provides an automatic system for a texturing process characterized in that the system comprises a means for detecting the size of a package, a means for generating quality data of a yarn during winding for the package, and a means for determining depending on the detected size of the package whether the package is to be disposed of or discharged to a transfer system in order to add disposal information to the quality data on packages to be disposed of and to perform different operations during doffing depending on whether the package is to be disposed of or discharged to the transfer system.

The system may include a means for transmitting the quality data to the transfer system in response to the discharge of the package to the transfer system, and a means for prohibiting quality data with disposal information added thereto from being transmitted to the transfer system.

The system may include a means for transmitting the quality data to the transfer system in response to the discharge of the package to the transfer system, and a

means for transmitting quality data with disposal information added thereto to the transfer system.

The means for detecting the size of the package comprises a doffing timer that measures the time required for winding so that the disposal information is added based on the value of the time measured by the doffing timer.

Packages to be discharged to the transfer system may be discharged from a cradle, whereas packages to be disposed of may be held in the cradle while being separated from a friction roller.

The system includes an inspection means for inspecting the weight and appearance of a package, and a host computer so that both inspection data provided by the inspection means and the quality data are sent to the host computer, where both sets of data are combined to rank the package.

Brief Description of the Drawings

Figure 1 shows a configuration of a winding control mechanism in an automatic system for a texturing process according to the present invention.

Figure 2 shows a composition of data used to rank packages in an automatic system for a texturing process according to the present invention.

Figure 3 is a layout of a plant into which an automatic system for a texturing process according to the present invention is introduced.

Figure 4 is a layout of a single spindle in a draw texturing machine.

Figure 5 shows a configuration of a winding section in a draw texturing machine.

Figure 6 shows changes in tension during winding in a draw texturing machine.

Figure 7 is a block diagram of an automatic system for a texturing process according to the present invention.

Detailed Description of the Preferred Embodiments

The preferred embodiments of the present invention are described below with reference to the drawings. Figure 1 shows a configuration of a winding control mechanism in an automatic system for a twisting process according to this invention, and Figure 2 shows the composition of data used to rank packages. In addition, the configuration and operation of the entire automatic system and its components are described with reference to Figure 3, which is a layout of a factory, Figure 4, which is a layout drawing of a draw texturing machine, Figure 5, which shows a configuration of a winding section, Figure 6, which shows changes in tension, and Figure 7, which is a block diagram of the system.

In Figure 3, 1 is a draw texturing machine, 4 is an STS (Sky Train System that is a self-traveling transfer cart consisting of a carrier 40 (described below) suspended from and supported on a track provided on a

ceiling), 6 is a tray loading device for transferring to a tray a package installed on a transfer cart of the STS, 7 is a weight inspection device, 8 is a sampling device, 9 is a knitting inspection device, 10 is an automatic warehouse, 11 is a warehouse crane, 12 is an appearance inspection device, 13 is a labeler that reads an ID number added to each tray to determine the draw texturing machine and spindle to which the ID number corresponds, 14 is a bagging device, 15 is a packing device, 16 is a labeler that indicates the rank of boxed packages, and 17 is a seal device for wrapping packages with plastic films.

As shown in Figure 3, the draw texturing machine 1 unwinds a yarn from a supply package P1 on a creel 19, applies a draw texturing processing to the yarn, and rewinds it around a package P2. In the draw texturing machine 1, a large number of spindles each comprise an automatic doffing device of a single-spindle independent type, and a tension sensor 35 described below. The draw texturing machine obtains and stores yarn quality data such as the tension of the yarn for each package, and ejects the full package P2 to a storage arm 38 (Figure 4) provided in each spindle for temporary storage. Each spindle in the draw texturing machine 1 winds a specified length of yarn at the same speed and ejects the full package P2 from each spindle every time period corresponding to the specified length in order to store it on the storage arm 38.

Package shutters 39 are provided that simultaneously open the storage arm 38 in each spindle of the draw texturing machine 1 to simultaneously eject only the package P2 at the tip of the arm, and simultaneously operate every time period for slightly shorter than the time period corresponding to the specified length. By operating the package shutter 39 every time period slightly shorter than the time period corresponding to the specified length, not only full packages but also small packages can be automatically transferred. Since the packages P2 are simultaneously ejected from the spindles disposed along the machine body, they are loaded on the transfer cart 4 of the STS in the order of the spindles along the machine body. Thus, the packages P2 ejected from the draw texturing machine 1 in the order of the corresponding spindles are transferred to the tray loading device 6 in a tray circulating device 20, where they are loaded on trays, thereby enabling the trays to be associated with the spindles of the draw texturing machine 1.

The tray circulating device 20 inspects the package P2 loaded on the tray for its weight (the weight inspection device 7), knitting (the sampling device 8 and knitting inspection device 9), and appearance (the appearance inspection device 12). Data on each package (inspection data) from these inspection means is sent to a host computer 73 (Figure 7) to rank the packages as "A", "B" or "C" while also using data on the quality of the yarn (quality data, which is described below) from the draw texturing machine 1. These ranks

are written in an ID number on the tray with the package P2 loaded thereon. The package P2 is subsequently stored in the automatic warehouse 10 in such a manner that each storage position is associated with each of the ranks "A", "B" and "C". The result of the knitting inspection is also manually written in the ID number on the package P2 in the automatic warehouse 10 to determine the rank of this package in the warehouse 10. Packages P2 of a specified rank are then removed from the automatic warehouse 10 and transferred through the bagging device 14, packing device 15, labeler 16, and seal device 17.

In Figure 4, the draw texturing machine 1 comprises feed rollers 24, 28, 30, heaters 25, 29, a cooling plate 26, and a belt type false twisting device 27. A yarn (filament yarn) Y drawn from the supply package P1 by the first feed roller 24 is introduced into the primary heater 25, passes through the cooling plate 26 and the belt type false twisting device 27 to the second feed roller 28, and further travels through the secondary heater 29 and the third feed roller 30 so as to be wound and formed into the wound package P2. Twisting formed by the belt type false twisting device 27 propagates to the primary heater 25 and is thermally fixed by the primary heater 25. In other words, the upstream side of the belt type false twisting device 27 is a twisting side, while the downstream side is an untwisting side. In the draw texturing machine 1, such a unit is configured as a single spindle and a large number of such spindles are located in the direction of the thickness of the sheet of the drawing.

As shown in Figure 4, the belt type false twisting device 27 consists of two belts 33 and 34 crossing each other, and the tension of the processed yarn Y is detected by the tension sensor 35 provided on the downstream side of the belt type false twisting device 27. The tension sensor 35 measures the untwisting tension and controls the contact pressure of the two belts to adjust the nipping force of the belt type false twisting device 27 so that the untwisting tension falls within a specified control range. In addition, a yarn cut detection sensor 36 is provided on the downstream side of the secondary heater 29, 37 is a yarn cutter that cuts the yarn on the upstream side of the first feed roller 24 in response to detection by the yarn cut detection sensor 36, thereby preventing the intertwinement of the yarn in the middle of the yarn path.

The draw texturing machine 1 includes an single-spindle independent type automatic doffing device. Each spindle automatically performs doffing operations such as the replacement of paper tubes used for the draw texturing machine 1 and the threading of the yarn. The fully wound packages P2 are held on the storage arms 38, and the package shutters 39 are opened and closed to simultaneously load the packages on the carrier 40 comprising the transfer cart 4 of the STS. The packages P2 discharged in this manner are then transferred to the tray loading device 6 shown in Figure 3.

If the tension sensor 35 detects an abnormal tension in the yarn, the yarn is cut during winding and the corresponding package P2 is doffed even though it is not full. In addition, if the yarn is cut due to a mechanical error, the yarn cut detection sensor 36 that detects a cut in the yarn is operated to activate a lamp informing the operator that the yarn has been cut and to allow the half package P2 to be doffed. When winding is aborted in this manner, the controller 70 on the machine body shown in Figure 1 references the value of the doffing timer 50 (the means for detecting the size of the package) to detect the size of the package. Depending on the detected size, the controller 70 informs the operator whether the package is to be disposed of or discharged to the transfer system.

As the means for providing this information, this embodiment uses a cradle driving shaft 56 in the automatic doffing device 52. If the package P2 is to be disposed of, the cradle driving shaft 56 separates a cradle 55 from a friction roller 66 and then stops the cradle 55 instead of opening it in order to urge the operator to remove the package.

In addition, if any package has been manually removed, there will be a gap in the order of the packages removed from each spindle. The controller 70 then automatically marks (disposal information) the quality data on the removed package based on the value of the doffing timer 50 in order to indicate that package is absent, thereby facilitating the subsequent association of the tray ID numbers with the spindles and preventing package grading errors through the comparison between the quality data based on the tension of the yarn and the inspection data on the appearance. In addition, based on the disposal information, the controller 70 can determine spindles that have produced very small packages as well as the number of such very small packages. The controller 70 can output the identity and the number of such very small packages as required.

A tension control mechanism 41 and a winding control mechanism 42 are described with reference to Figures 1 and 6. These mechanisms maintain the appropriate tension of the yarn based on the quality data from the tension sensor 35, and if the tension exceeds an allowable range, the winding of the yarn is aborted to allow the half package to be doffed. In addition to this operation, the quality data is stored in the host computer 73 (Figure 7) so as to be used to rank the full packages P2.

The tension control mechanism 41 is composed of the tension sensor 35 located on the downstream side of the belt type false twisting device 27 relative to the traveling path of the yarn, and a tension control section 46 for driving a contact pressure control means 45 of the belt type false twisting device 27 based on the value detected by the tension sensor 35.

A yarn tension target value T_0 , a target range including an appropriate interval (e.g., $\pm 2\text{gr}$) above and

below the target value T_0 , and an allowable range including allowable upper and lower limits (e.g., $\pm 10\text{gr}$) relative to the target value T_0 as shown in Figure 6 are input to the tension control section 46 beforehand, and the contact pressure of the false twisting device 27 is adjusted using the contact pressure control means 45 so that a untwisting tension T falls within the target range ($T_u > T > T_d$). If an abnormal untwisting tension T ($T > T_{\text{max}}$, $T < T_{\text{min}}$) is detected during this control, that tension value and the corresponding detection time period (a yarn length L ; e.g., L_1) are input to a winding control section 47 in the winding control mechanism 42. If the tension exceeds the target range ($T_u > T > T_d$), that tension value and the corresponding detection time period (a yarn length M ; e.g., M_1) are detected. Based on the degrees to which the target and allowable ranges are exceeded, the yarn can be ranked relative to the quality of the texturing processing.

The winding control section 47 in the winding control mechanism 42 is integrated with the tension control section 46 into the controller 70 provided on the machine body of the draw texturing machine 1, controls the winding mechanism 49 in the draw texturing machine 1, and doffs the full package P2 based on a specified length signal from the doffing timer 50 provided in each spindle. Based on information from the tension control section 46, the winding control section 47 determines the quality of the package P2 around which the yarn is being wound, and if an error is detected, stops the winding to doff the package immediately. In addition to the tension abnormal value and the abnormal detection time period L ($L_1 + L_2 + \dots$) becoming a cumulative value of a yarn length, both of which are input information, tension abnormal detection times (frequency) N are counted, and these values are compared with preset allowable values (acceptable references). If, for example, the length L of part of the yarn subjected to an abnormal tension is 10 m or less, that package is ranked as "a", whereas if the length L is more than 10 m, that package is ranked as "b". In the latter case, once the package has been ranked as "b", an instruction is provided to the drive section 53 in the automatic doffing device 52 provided on each winding mechanism 49 to doff the package P2 around which the yarn is being wound.

Those automatically transferred packages that are ranked as "a" can be further ranked. Of the "a" rank packages for which the length L of part of the yarn subjected to an abnormal tension is 10 m or less, those packages for which the length L is 5 m or less are ranked as "a1", whereas those packages for which the length L is more than 5 m and less than 10 m are ranked as "a2". Alternatively, the yarn length M in the case in which the target range ($T_u > T > T_d$) is exceeded can be combined with the yarn length L to rank the packages as "a1" or "a2". Since the untwisting tension T in the draw texturing machine 1 relates to the quality of the texturing processing, it can be used to rank the yarn

quality of the package P2 in order to facilitate the determination of comprehensive rankings "A", "B" and "C", which are described below.

The automatic doffing device 52 is composed of a yarn cutting means 54 for cutting the processed yarn Y to be wound, the cradle driving shaft 56 that moves, forward and backward, the cradle 55 that grips the wound package P2 and that also opens and closes the cradle as required, a paper tube supplying drive shaft 59 that vertically moves a paper tube stocker 58 in which empty paper tubes are accommodated, and a yarn threading arm 60 that threads a yarn into a new paper tube 57. The yarn cutting means 54 is provided near a traverse device 61 in the winding mechanism 49, and is composed of a cutter 64 having a yarn capturing groove 63 including a cutting edge 62, and an actuator (not shown in the drawings) that lifts the cutter 64 up to the level of the yarn path, as shown in Figure 5.

In response to an instruction from the winding control section 47, the actuator lifts the cutter 64 to capture and cut the processed yarn Y being traversed. The cut yarn Y is held in an air sucker 65 provided at the front end of the traverse device 61, and after the exchange of the paper tube, the yarn threading arm 60 is swiveled to draw the yarn to the end of the new paper tube for threading. In addition, after the yarn has been cut, the cradle 55 is opened to eject the wound package P2 onto the storage arm 38 provided in the rear of the winding mechanism 49. Then, when the paper tube stocker 58 lowers to allow the cradle 55 to grip the new paper tube, the cradle driving shaft 56 causes the cradle 55 to fall forward until it contacts the friction roller 66 for a new winding process.

In Figure 1, 36 is the yarn cut detection sensor that detects if the yarn has been cut due to an abnormal tension or a mechanical error in order to start doffing. The doffed package is temporarily held on the storage arm 38 provided in each spindle. Based on an instruction output from the controller 70 on the machine body every time period shorter than the time period corresponding to the specified length, the package shutters 39 simultaneously ejects the leading packages from the spindles along the machine body.

The system block diagram in Figure 7 is described below. The major devices described above are disposed in the order of a creel robot 2, the draw texturing machine 1, STS 4, tray loading device 6, weight inspection device 7, knitting inspection device 9, appearance inspection device 12, automatic warehouse 10, and labeler 13. The packages P2 discharged from the draw texturing machine 1 are arranged in the order of the spindles and are transferred to the automatic warehouse 10 in this order. Data on the quality of the yarn in the draw texturing machine 1 is input to the controller 70 on the machine body, while data on the package P2 from the weight inspection device and the appearance inspection device 12 is input to a personal computer 71 at the site.

The STS 4, tray loading device 6, and automatic warehouse 10 enable a transfer controller 75 to transfer the package P2 while associating the ID number of the tray with the source of the package P2. A personal computer 74 for the labeler 13 outputs data required for labels. The controller 70 on the machine body, onsite personal computer 71, labeler personal computer 74, and transfer controller 75 are connected to the host computer 73 via a main communication network 72. The host computer 73 combines data for each spindle from a yarn quality monitor means such as the tension sensor 35 with data for each package P2 from the inspection means such as the appearance inspection device 12 to determine the rank of each package P2.

The controller 70 on the machine body including an indicator indicating data or conditions required for operations, a temperature control device, various alarm devices, and a machine operation panel is provided at each end of the machine body of the draw texturing machine 1. The controller 70 on the machine body can process data on the quality of the yarn from the tension sensor 35 in the draw texturing machine 1 to control the tension of the yarn and determine the source of the package (the spindle that has produced that package and the time of the production). The controller 70 inputs the quality data to the host computer 73 for the transfer system via a main communication network 72.

Data on the weight of the package P2 from the weight inspection device 7, on the acceptability of dyeing from the knitting inspection device 9, and on the appearance of the package P2 from the appearance inspection device 12 are input to the site personal computer 71. This data can be displayed on the onsite personal computer 71 and output at the site (through a monitor or by means of print out). In addition, if the transfer controller 75 loads on the tray a package P2 discharged to the machine body of the draw texturing machine 1, the package P2 is associated with the corresponding tray ID number and transferred and each set of inspection data from the site personal computer 71 is associated with the corresponding tray ID number and then input to the host computer 73 via the main communication network 72.

In this manner, the yarn quality data from the controller 70 on the machine body and the inspection data on the package P2 from the onsite personal computer 71 is input to the host computer 73 and can be output using an appropriate means such as a monitor or a printer. Therefore, data such as that shown in Figure 2 can be output from the host computer 73 as a list. The yarn type, doffing date and time, machine number (MC No.), spindle number (SP No.), and grade "A", "B" or "C" can be identified for each package P2 loaded on the tray. In addition, the host computer 73 stores individual data on the packages P2 stored in the automatic warehouse 10 and can operate the warehouse crane 11 to remove packages P2 of a desired rank.

Data on those packages such as ID No. 144-48 in

Figure 2, which have been discharged from the draw texturing machine 1 as half packages due to an abnormal tension and which have been determined to be disposed of, is marked so as to indicate that those packages are absent. In other words, data consisting of the word "ejected" is stored in the remark column of the list. The yarn quality data, however, is transmitted to the host computer 73 as production control data for the transfer system in the same miner as the other data. This serves to ensure that the packages are not confused when they are ranked after the appearance inspection using the quality data based on the yarn tension.

Although in this embodiment, the means for detecting the size of the package is composed of the doffing timer 50, the doffing timer 50 also controls the winding start time period. That is, the doffing timer 50 controls the time that has passed since the start of winding following the refilling of empty paper tubes. In this case, no quality data is generated until a predetermined amount of time has passed (this value is variable but is assumed to be three minutes herein). This is to prevent unwanted data from increasing because the yarn is likely to be cut at the beginning of winding due to a yarn threading error.

If the yarn is cut within the winding start time period, that package is determined to be very small and the cradle driving shaft 56 in the automatic doffing device 52 separates the cradle 55 from the friction roller 66 to stop the cradle instead of opening it, thereby informing the operator that this is a very small package. The operator then removes this very small package. Of course, there is no quality data on this package. After three minutes, corresponding to the winding start time period, have passed, the generation of quality data is initiated. If the yarn is subsequently cut within a predetermined time (this value is variable but is assumed to be ten minutes herein), the package is determined to be very small from the elapsed time. The operator is then informed through the separation and stoppage of the cradle 55 that said very small package has been produced, and generated quality data is marked so as to indicate that the package is to be disposed of, as described above.

The operator determines the appropriate action to be taken based on the condition of the cradle 55 instead of his or her subjective judgment, and removes the very small package and pressed a start button. When the start button is pressed, a yarn threading operation is automatically performed and winding is then resumed. If additional time passes and the yarn is cut 10 minutes or more after the resumption of winding, the package is determined to be large enough to be sold as a commodity, i.e., it is determined to be a small package. The small package is then automatically discharged to the transfer system together with full packages. During the discharge, the very small package is not discharged to the transfer system because it has already been removed by the operator as described above. Since quality data

is provided for those spindles for which three minutes have passed, however, if the yarn is cut within 10 minutes and the package is then disposed of, then the quality data for this spindle is contained in the communication via the main communication network 72. Since disposal information is added to the quality data for this spindle, this data can be excluded during ranking to allow the number of data to correspond to the number of packages.

In the above embodiments, the disposal information is added to the quality data on the very small package and the quality data is transmitted to the transfer system as in the full and small packages, but the quality data on the very small package can be prevented from being transmitted to the transfer system. That is, although the disposal information is added to the quality data on the very small package to facilitate production control by the controller 70 on the machine body of the draw texturing machine, the quality data with the disposal information added thereto can be prohibited from being transmitted to the host computer 73 for the transfer system. In this case, the host computer 73 is not required to execute exclusion processing of quality data on very small packages.

In addition, in the above embodiments, the cradle driving shaft 56 in the automatic doffing device 52 performs different operations to inform the operator whether the package is to be disposed of or discharged to the transfer system, but the present invention is not limited to this aspect. For example, all packages may be simultaneously discharged to the storage arm 38 without distinguishing between full packages and small packages and very small packages, and a lamp may be provided on the storage arm and turned on during doffing to inform the operator of a package to be disposed of.

The present invention provides the following excellent effects.

To automatically transfer not only full packages but also small packages that are conventionally transferred manually in order to save labor, the operator can reliably distinguish between small and very small packages according to instructions from the automatic doffing device instead of the operator's subjective judgment, and can use the disposal information to identify quality data indicating that package is absent in order to reliably associate the package with the quality data even if a very small package has been disposed of prior to automatic transfer. In addition, since the disposal information is added to the quality data on the very small package, the controller on the machine body of the draw texturing machine can determine spindles that have produced very small packages as well as the number of such spindles.

Since quality data on very small packages that have been removed by the operator is not transmitted, packages can be reliably associated with the quality data without the need to remove quality data with the dis-

posal information added thereto on the transfer system side.

Since quality data on very small packages that have been removed by the operator is transmitted to the transfer system together with the disposal information, the transfer system can reliably associate packages with quality data, and the transmitted quality data can be used to control the production of packages that have been disposed of.

The doffing timer enables the size of the package to be detected reliably using a simple configuration.

Controlling the operation of the cradle driving shaft enables the operator to reliably distinguish between small and very small packages instead of providing a new member for informing the operator of package sizes.

Combining the weight and appearance inspections of the package with the quality data enables packages other than very small ones to be reliably ranked in detail.

Claims

1. An automatic system for a texturing process characterized in that the system comprises a means for detecting the size of a package, a means for generating quality data of a yarn during winding for the package, and a means for determining, depending on the detected size of the package, whether the package is to be disposed of or discharged to a transfer system, in order to add disposal information to the quality data on packages to be disposed of and to perform different operations during doffing depending on whether the package is to be disposed of or discharged to the transfer system.
2. An automatic system for a texturing process as in claim 1 characterized in that the system includes a means for transmitting said quality data to the transfer system in response to the discharge of the package to the transfer system, and a means for prohibiting quality data with disposal information added thereto from being transmitted to the transfer system.
3. An automatic system for a texturing process as in claim 1 characterized in that the system includes a means for transmitting said quality data to the transfer system in response to the discharge of the package to the transfer system, and a means for transmitting quality data with disposal information added thereto to the transfer system.
4. An automatic system for a texturing process as in any one of claims 1 to 3 characterized in that the means for detecting the size of the package comprises a doffing timer that measures the time required for winding so that the disposal information

is added based on the value of the time measured by the doffing timer.

5. An automatic system for a texturing process as in any of claims 1 to 4 characterized in that packages 5
to be discharged to the transfer system are discharged from a cradle, whereas packages to be disposed of are held in the cradle while being separated from a friction roller.
- 10
6. An automatic system for a texturing process as in any one of 1 to 5 characterized in that the system includes an inspection means for inspecting the package for its weight and appearance, and a host computer so that both inspection data provided by 15
the inspection means and said quality data are sent to the host computer, where both sets of data are combined to rank the package.

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FIG. 1

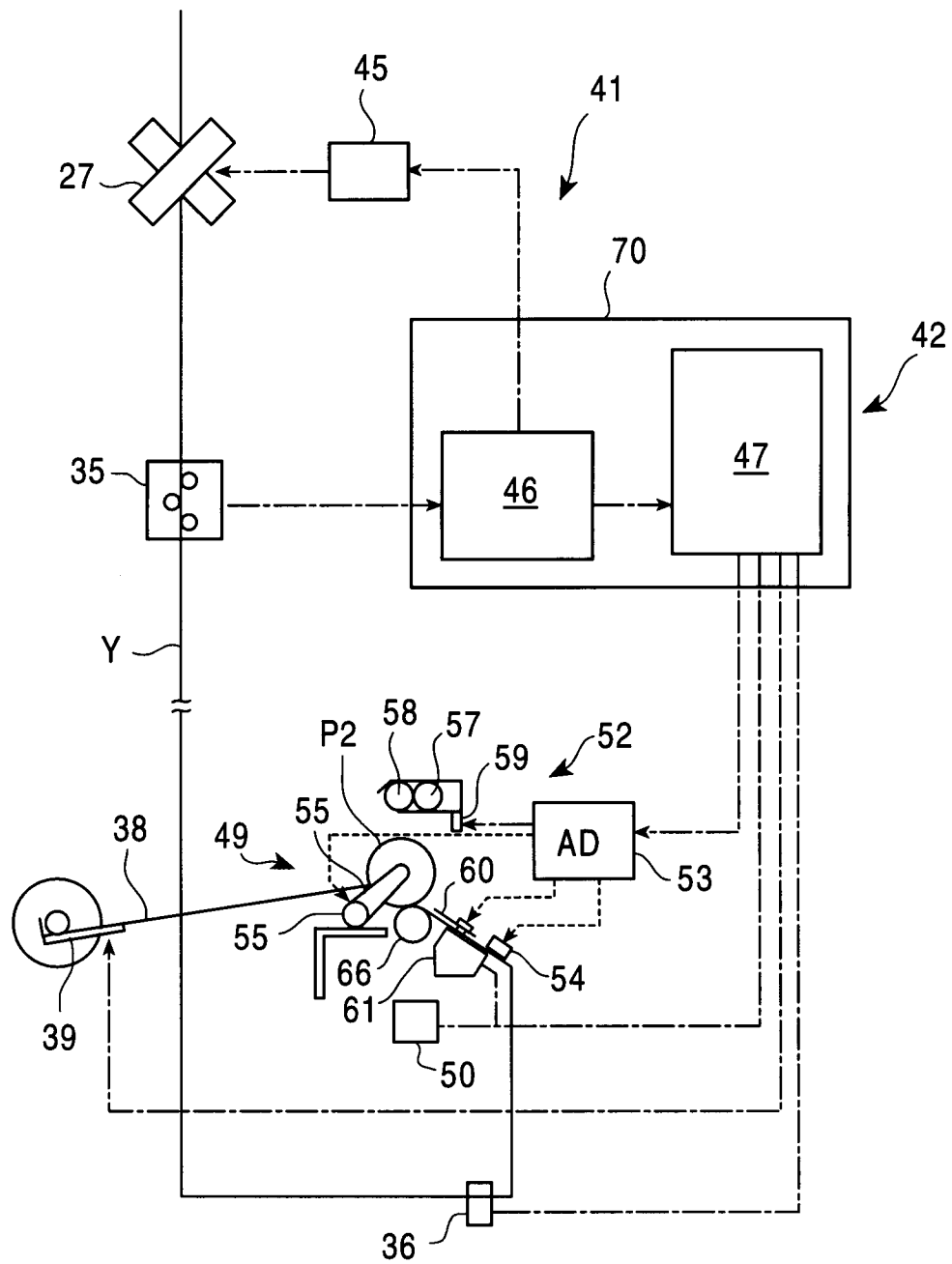


FIG. 2

PACKAGE ID	MC No.	SP No.	DOFFING DATE	TCS RANK	WEIGHT RANK	APPEAR- ANCE RANK	RANK	DYEING	REMARK
144-46	3	24	1996/12/25 14:23	○	○	○	A	○	——
144-47	3	25	1996/12/25 12:10	○	×	○	A	○	——
144-48	3	26	——	—	—	—	—	—	EJECTION
144-49	3	27	1996/12/25 13:20	○	×	×	B	○	

FIG. 3

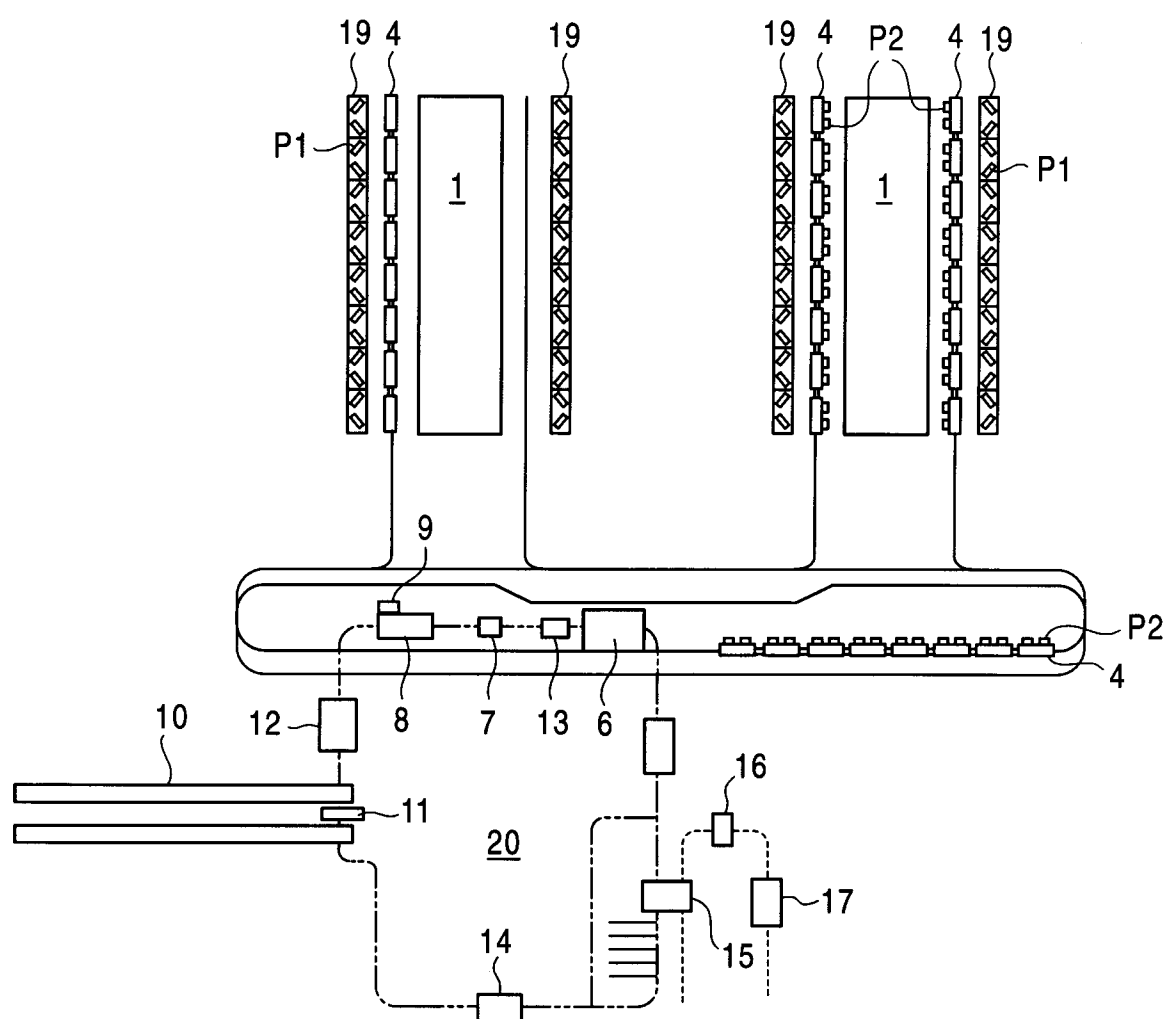


FIG. 4

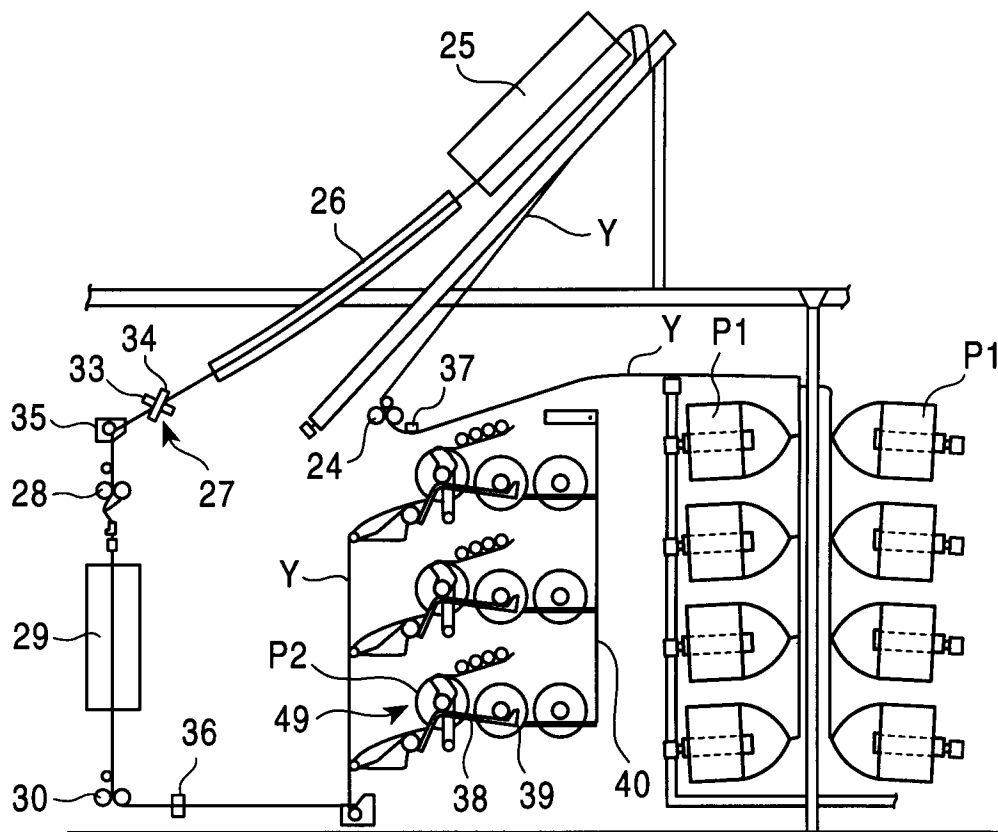


FIG. 5

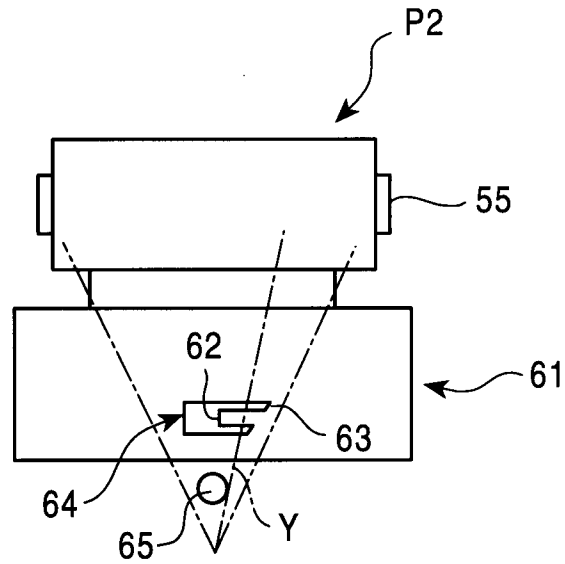


FIG. 6

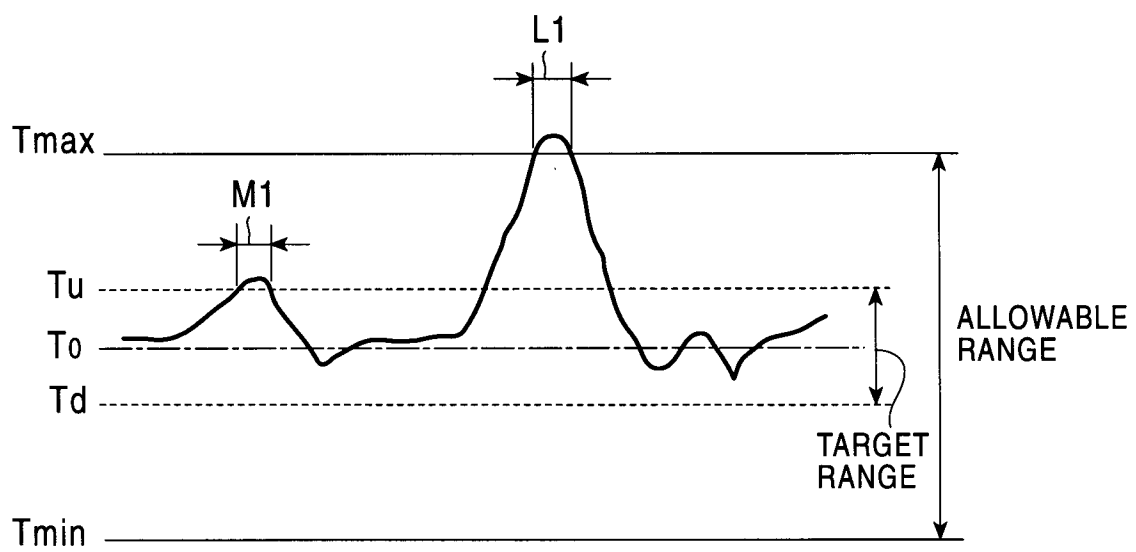


FIG. 7

