



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
09.04.2003 Bulletin 2003/15

(51) Int Cl.7: **B65H 63/00**

(21) Application number: **02021474.8**

(22) Date of filing: **25.09.2002**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
IE IT LI LU MC NL PT SE SK TR
Designated Extension States:
AL LT LV MK RO SI

(72) Inventor: **Kawamoto, Kenji**
Kameoka-shi, Kyoto (JP)

(74) Representative: **Liedl, Christine et al**
c/o Hansmann & Vogeser,
Albert-Rosshaupter-Strasse 65
81369 München (DE)

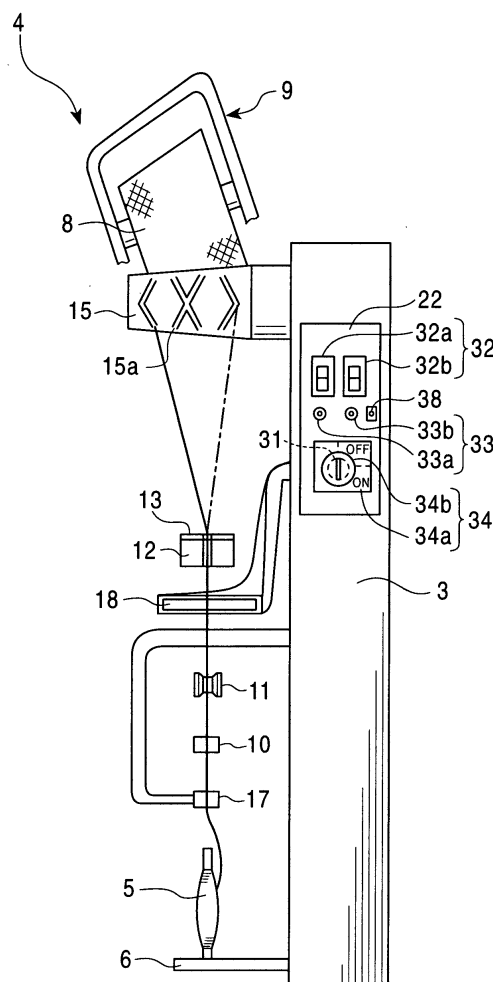
(30) Priority: **04.10.2001 JP 2001308746**

(71) Applicant: **Murata Kikai Kabushiki Kaisha**
Minami-ku, Kyoto-shi, Kyoto 601 (JP)

(54) **Yarn winding machine**

(57) A yarn winding machine is capable of easily checking input/output equipment of the respective winding units completely in short time, without using a portable check tool. A yarn winding machine, having a plurality of winding units 1 that are laid side by side, is capable of checking operation of the input equipment of the respective winding units 1 while choosing the input equipments of the winding units 1 with a unit controller 21. The respective winding units 1 comprise a display switch part 33 that is capable of switching operation of the output equipment of a traverse drum 15, etc. to be subject of operation check and an operation switch 34 that is capable of switching the operation of the unit controller 21. The unit controller 21 activates the chosen output equipment, based on the drive control of the operation switch 34 (Fig. 2).

FIG. 1



Description

Field of the Invention

[0001] The present invention relates to a winding machine, which comprises a plurality of winding units wherein a yarn unwound from a yarn supply bobbin is rewound to a winding bobbin for making a package, more particularly to a yarn winding machine that is capable of checking operation of input/output equipment in the winding units.

Background of the Invention

[0002] Conventionally, the yarn winding machine, arranging a plurality of the yarn winding units in a line wherein the yarn unwinding from the yarn supply bobbin is rewound to the bobbin for making the package and disposing a machine control unit in one end side of these winding units, is comprised so as to drive and stop the whole winding units altogether by the operation in the machine control unit. Moreover, in the yarn winding machine, a portable check tool in a notebook computer, etc. can be connected to the respective winding units conventionally, and an input/output equipment that is built in the winding unit can be activated individually by the portable check tool.

[0003] Therefore, in case of checking the yarn winding machine, when the portable check tool is prepared first and is connected to a winding unit through a signal cable, a data signal can be transmitted and received in between the control unit of the winding unit and the portable check tool. After that, it is determined whether or not each input/output equipment can be worked properly by operating the portable check tool for working the input/output equipment individually, checking operational condition of the input/output equipment directly and visually, and checking the screen of the portable check tool indirectly. The yarn winding machine is checked by carrying out such a series of operations to the respective winding units repeatedly.

[0004] However, the conventional way of checking the respective winding units with the portable check tool when checking the yarn winding machine needs the operation of preparing the portable check tool and the operation of removing the portable check tool from the respective winding units. Therefore, there is a problem that the check of the yarn winding machine takes longer time as the preparation time from the time of activating to the time of checking the input/output equipment takes much time.

[0005] Furthermore, as the portable check tool is needed to be activated by designating a specific input/output equipment by operating a keyboard, etc. of the portable check tool, the operation in checking tends to be troublesome, and there is a problem that an operator who is strange to computers is difficult to check the yarn winding machine with the portable check tool.

[0006] Consequently, it is an object of the present invention to provide the yarn winding machine that is capable of easily checking the input/output equipment of the respective winding unit without using the portable check tool and checking the input/output equipment completely in short time.

Summary of the Invention

[0007] In order to solve the above problems, according to first aspect of the present invention, in a yarn winding machine having a plurality of winding units that are laid side by side, which is capable of checking operation of output equipments of the respective winding units while choosing the output equipments of the winding units with a unit controller, the respective winding units comprise an output equipment choice means that is capable of switching operation of the output equipment to be subject of operation check and an operation switch means that is capable of controlling the switch for driving and stopping the winding units, and the unit controller comprises an operation check drive means that is capable of activating an output equipment chosen by the output equipment choice means, according to the operation of driving the operation switch means.

[0008] According to the above configuration, if the operator chooses the output equipment with the output equipment choice means, the output equipment is subject to operation check and only the output equipment to be subject of operation check can be activated by the operation switch means. Therefore, the operation status can be checked by seeing the movement such as rotating the output equipment of the motor, etc.. Thus, even if not carrying out a series of conventional operations that the portable check tool is connected to the winding unit to establish communication and the winding units are checked by operating the portable check tool, the output equipment of the respective winding units can be checked easily by the simple operation of the output equipment choice means and the operation switch means of the winding unit. Consequently, the yarn winding machine can be checked completely in short time.

[0009] According to second aspect of the present invention, in a yarn winding machine having a plurality of winding units that are laid side by side, which is capable of checking operation of input equipments of the respective winding units while choosing the input equipments of the winding units with a unit controller, the respective winding units comprise an input equipment choice means that is capable of switching operation of the input equipment to be subject of operation check and an operation check indicator, and the controller unit comprises a display control means that controls the display status of the operation check indicator based on the input signal from the input equipment chosen by the input equipment choice means.

[0010] According to the above configuration, if the operator chooses the input equipment such as the sensor

with the choice means, the input equipment is subject to operation check and the input equipment can be associated with the operation check indicator. Therefore, the operation status can be checked by the display including the lighting of the operation check indicator that is activated in response to the input of the input equipment. Thus, even if not carrying out a series of conventional operations that the portable check tool is connected to the winding unit to establish communication and the input equipment can be checked with the portable check tool, the input equipment of the respective winding units can be checked easily by the simple operation of the input equipment choice means provided in the winding unit. Consequently, the yarn winding machine can be checked completely in short time.

[0011] According to third aspect of the present invention, in the yarn winding machine as described above, comprising a machine control unit that is connected to the unit controller so as to communicate data, the machine control unit comprises an operation mode setting means that is capable of choosing an operation check mode for checking operation from a plurality of the operation check modes, and a winding unit is capable of setting in the operation check mode in data communication from the machine control unit to the unit controller.

[0012] According to the above configuration, as the machine control unit is connected to the unit controller so as to communicate data if the operation mode is set in a part of the machine control unit side, the necessary winding unit can be set in the desired operation mode through the unit controller. Consequently, even if multiple winding units are existed, the operation mode can be easily switched and set completely in short time.

[0013] According to forth aspect of the present invention, in the yarn winding machine as described in the above third aspect, the respective winding units comprise a mode valid/invalid switch means that is capable of switching the set operation mode to be valid or invalid.

[0014] According to the above configuration, when the mode valid/invalid switch means is kept invalid even if the winding unit is set in the output operation check mode, for example, the operation switch means can be used as the switch for starting and stopping the production (winding) by manual operation. Moreover, when the mode valid/invalid switch means is kept invalid even if the winding unit is set in the input operation check mode, for example, the operation check indicator can be used as the alarm annunciation indicator. More specifically, because the yarn winding machine comprises the mode valid/invalid switch means, the operation switch means and the operation check indicator can be used as further application.

Brief Description of the Drawings

[0015]

Figure 1 is a front view of a winding unit.

Figure 2 is a block diagram of a yarn winding machine.

Figure 3 is a flow chart showing an operation check procedure of output equipment.

Figure 4 is a flow chart showing an operation check procedure of input equipment.

Detailed Description of the Invention

[0016] A preferred embodiment of the present invention will be described with reference to Figure 1 to Figure 4.

[0017] A yarn winding machine (automatic winder) in the preferred embodiment of the present invention, as illustrated in Figure 2, comprises a plurality of winding units 1 that are laid side by side, and a machine control unit 2 that is disposed in one end part to the direction that these winding units 1 are laid side by side. As illustrated in Figure 1, when the winding unit 1 is seen from head-on, a unit frame 3 is provided on either side of the winding unit 1 and a winding unit body 4 that winds yarn from a yarn supply bobbin 5 (yarn supply winding body) to a winding bobbin 8 (winding body) is provided on the side of the unit frame 3.

[0018] The winding unit body 4 comprises a bobbin tray mechanism 6 in the lower end part of the winding unit body 4 that keeps the posture of the yarn supply bobbin 5 upright, and a cradle 9 (winding tube support means) in the upper end part of the winding unit body 4 that supports the winding bobbin 8 so as to rotate. A yarn detection sensor 10 that detects whether or not a yarn 7 is existed in a detection area, a tensor 11 (tension application unit) that applies a predetermined tension to the yarn 7, a yarn splicing device 14 that splices the yarn ends on the winding bobbin 8 side and the yarn supply bobbin 5 side in breaking yarn, a slab catcher 12 (yarn thickness detector) that detects the defective of the yarn 7 and cuts it, a traverse fulcrum guide 13 that becomes a traverse fulcrum of the yarn 7, and a traverse drum 15 that rotates a winding bobbin 8 and traverses the yarn 7 are provided between the bobbin tray mechanism 6 and the cradle 9, in the order named from the bobbin tray mechanism 6 side.

[0019] The traverse drum 15, the base end of which is connected to a rotation drive mechanism (not shown in the drawings) in the unit frame 3, is provided so as to rotate the traverse drum 15 normally and reversely in any rotation speed by the rotation drive mechanism. A traverse groove 15a for traversing the yarn 7 is formed in the peripheral surface of the traverse drum 15. Moreover, the cradle 9 that supports the winding bobbin 8 is disposed above the traverse drum 15, and presses the winding bobbin 8 to the traverse drum 15 direction in a predetermined pressure. Therefore, as the winding bobbin 8 is rotated by the frictional engagement when the traverse drum 15 is rotated and the yarn 7 is rewound to the winding bobbin 8 with being traversed by the traverse drum 15, the winding bobbin 8 around which

the yarn 7 in a predetermined length is wound can be produced.

[0020] A transmission pipe 17, which is the yarn supply-side yarn end acquisition guide member grasping the yarn end (lower yarn) on the yarn supply bobbin 5 side and guiding it to the yarn splicing device 14, is provided in the unit frame 3.

[0021] The transmission pipe 17 sucks and grasps the yarn end on the yarn supply bobbin 5 side after cutting yarn, and rotates so as to make the yarn end pass in front of the yarn splicing device 14, so that the yarn end that is sucked and grasped may be introduced to the yarn splicing device 14. Moreover, a suction mouth 18, that is the winding-side yarn end acquisition guide member grasping the yarn end on the winding bobbin 8 side and guiding it to the yarn splicing device 14, is provided in the unit frame 3. The suction mouth 18 sucks and grasps the yarn end on the winding bobbin 8 side after breaking yarn, and rotates so as to make the yarn end pass in front of the yarn splicing device 14, so that the yarn end that is sucked and grasped may be introduced to the yarn splicing device 14.

[0022] As described above, the unit frame 3 supports the respective members comprising the winding unit body 4. As illustrated in Figure 2, an operation check device 20, having a function of making the operator check the operational condition by activating the input/output equipment of the winding unit body 4 individually, is provided in the unit frame 3. In addition, the input/output equipment includes an input system (input equipment) and an output system (output equipment). The input system is connected to an input port of a unit controller 21 such as the yarn detection sensor 10 and the various types of switches, and has a function of outputting the status signal to the unit controller 21. The output system is connected to the output port of the unit controller 21 such as a traverse drum drive motor, a suction mouth drive motor (yarn splicing cam drive motor), and an indicator (LED), and causes automatism such as rotation and lighting, etc. by the operational signal from the unit controller 21. A specific equipment number and / or code is added to the input/output equipment, and for example, the code "A0 ~ BF" is set in the input system, and the code "C0 ~ DF" is set in the output system.

[0023] The operation check device 20, comprising a programmable controller connected to the input/output equipment of the winding unit body 4, includes the unit controller 21 having a plurality of input/output ports, and an operation panel 22 connected to the unit controller 21 so as to input and output the various signals. The unit controller 21 comprises an operation part 23 that is capable of storing and executing various programs, an input/output part 24 that is connected to the winding unit body 4 and the operation panel 22 so as to input and output signal, and a communication part 25 so as to communicate with the machine control unit 2 through a telecommunication cable 26. The telecommunication cable 26 is provided commonly to a plurality of the unit

controllers 21, and the data communication can be implemented between one machine control unit 2 and a plurality of the unit controllers 21 through the common telecommunication cable 26. The operation part 23 is capable of executing a program (an operation check drive means 41) that fulfills the operation check drive function for activating the output equipment chosen by a display switch part 33 based on the drive operation of an operation switch 34, and also executing a program (a display control unit 42) that fulfills the display control function that controls display status of an operation check indicator 31 based on the input signal from the input equipment chosen by the display switch part 33.

[0024] Furthermore, the unit controller 21 has a memory part (not shown in the drawings) that stores the relation between the equipment number or code and the equipment (input/output port) in the input equipment and the output equipment. Therefore, when the equipment number or code is chosen in the display switch part 33 (choice means), the equipment (input/output port) to be subject of operation check can be specified. Moreover, the relation between the equipment number or code and the equipment can be set from the machine control unit 2 to the unit controller 21 through the telecommunication cable 26. Thus, when operating on the machine control unit 2 side, the relation can be set in a plurality of the unit controllers 21 together.

[0025] The operation panel 22 connected to the input/output part 24 is provided in the upper end part of the front surface of the unit frame 3. The upper end part of the front surface of the unit frame 3 is tilted gradually to the backside from the lower part to the upper part. Thus, as the operation panel 22 faces upward at an angle, the operator can easily check the display information in the operation panel 22, and the operation panel 22 can be easily operated.

[0026] An operation check display part 32, the display switch part 33, and the operation switch 34 are disposed in the operation panel 22 in the order named from the upper part. The operation check display part 32 has a high order indicator 32a and a low order indicator 32b. The indicators 32a and 32b, comprising a seven segment LED, are capable of displaying the input system equipment number or code "A0 ~ BF" and the output system equipment number or code "C0 ~ DF" in the input/output equipment. When using a plurality of the seven segment LEDs as described above, a plurality of the equipment numbers or codes can be classified and displayed in a simple configuration. Additionally, the operation check display part 32 can be comprised so as to show the equipment number on the liquid crystal display. In this case, a specific name of the input/output equipment can be displayed directly.

[0027] The display switch part 33 is disposed in the vicinity of the operation check display part 32. In the drawings, the display switch part 33 is disposed in the vicinity of the lower part of the operation check display part 32, and the operator can easily switch the display

switch part 33 while seeing the display content of the operation check display part 32. In the drawings, the display switch part 33 has a high order display switch 33a and a low order display switch 33b, comprising a tact switch, etc.. The respective switches 33a and 33b are provided in response to the respective indicators 32a and 32b, and the numerical value on the display (hexadecimal numeral display) of the respective indicators 32a and 32b can be counted up by pressing the switch.

[0028] Moreover, the operation switch 34, disposed in the lower part of the display switch part 33, has an operation plate 34a on which the letters "ON" and "OFF" are put, and a switch grip part 34b that is disposed in the operation plate 34a and is capable of switching to the "ON" and "OFF" positions. When the switch grip part 34b of the operation switch 34 is rotated and switched from the "OFF" display position to the "ON" display position, the objective output equipment (the output equipment chosen in the operation check display part 32) can be switched to operation status in checking the operation of the output equipment. Therefore, as illustrated in the drawings, when the operation switch 34 has a turnable switch grip part 34b, the operator can surely and easily recognize the status of the operation switch 34 based on the angle of the switch grip part 34b. Additionally, the operation switch 34 can have the press-type switch grip part, instead of the turnable one. In case of having the press-type switch grip part, the output equipment can be switched to ON status and OFF status alternately, every time the operation switch 34 is pushed.

[0029] A mode valid/invalid switch 38 is disposed in the side (right side in the drawing) of the display switch part 33. The mode valid/invalid switch 38, comprising a single dip switch, is capable of switching the operation mode set by the machine control unit 2 to be valid or invalid.

[0030] Moreover, the operation check indicator 31 is embedded in the operation switch 34. The operation check indicator 31, comprising a high-intensity LED, etc., switches operation status of input equipment by the control of the unit controller 21 and announces the status to the operator. More specifically, if the yarn detection sensor 10 is designated as the object for operation check, the operation check indicator 31 lights up when detecting the yarn 7, and the operation check indicator 31 lights off when not detecting the yarn 7. Additionally, though the operation check indicator 31 announces the status of the input equipment to the operator by the lighting, the status of the input equipment may be announced to the operator by switching the display color of the lighting.

[0031] The winding unit 1 comprised as described above has specific unit numbers (m1 ~ mn) respectively. The machine control unit 2, connected to the winding unit 1 through the common telecommunication cable 26, chooses a winding unit 1 by the unit number, and has a winding unit choice function for changing the setting of the operation mode in the chosen one or a plurality of

the winding unit 1 by remote control. More specifically, when the operator conduct a predetermined operation to the machine control unit 2, the operation mode of the necessary winding unit 1 can be set or changed. Moreover, the machine control unit 2 has an operation mode set means 2a that is capable of choosing any operation mode from a plurality of the operation modes including the operation check mode. Furthermore, the machine control unit 2 has a display device (not shown in the drawings) and a list display function that is capable of displaying the relation between the equipment number or code and the output equipment.

[0032] The way of checking operation of the output equipment and the input equipment in the winding unit 1 will be described, using the above configuration. Additionally, in the description below, the operation switch 34 in the winding unit 1 to be subject to operation check is in halt condition (OFF status) and the winding is stopped.

[0033] In case of checking operation of the output equipment, as illustrated in Figure 3, the mode signal including data of the output operation check mode is transmitted to the respective winding units 1 through the telecommunication cable 26 by issuing the communication instruction after the operator chooses the output operation check mode from the operation mode in the machine control unit 2. Then, if the operator does not designate the unit number, the mode signal from the machine control unit 2 is received by the whole winding units 1 as the winding unit 1 is not chosen. Moreover, if the unit number is designated, only the winding unit 1 corresponding to the unit number receives the mode signal. Consequently, the output operation check mode is temporarily set in the whole or a part of the winding unit 1 that receives the mode signal (S1).

[0034] The reason of temporarily setting the output operation check mode is as follows:

[0035] If the winding unit 1 carries out the winding operation as usual, the mode valid/invalid switch 38 is set to be invalid so as to make the setting by the mode signal invalid even if receiving the mode signal from the machine control unit 2.

[0036] Consequently, even if the machine control unit 2 sets the winding unit 1 to be in the output operation check mode, the winding unit 1 is only set to be in the output operation check mode temporarily and can continue the normal winding operation if not the mode valid/invalid switch 38 is valid.

[0037] Next, the operator is moved to the winding unit 1 that the operation check is going to be carried out, and the mode valid/invalid switch 38 provided in the operation panel 22 of the winding unit 1 is switched to be in the valid status (S2). Thus, the temporary setting of the output operation check mode is canceled in the winding unit 1, and the winding unit 1 is switched to be capable of receiving the signal from the operation switch 34 and the display switch part 33 of the operation panel 22.

[0038] After that, the winding unit 1 is operated by

switching the high order display switch 33a and the low order display switch 33b in the display switch part 33. Then, the high order indicator 32a and the low order indicator 32b of the operation check display part 32 switch the display of the equipment number and code, accompanied by the switch operation of the respective switches 33a and 33b. Therefore, the operator can choose the output equipment to be subject to operation check while watching the display of the operation check display part 32 actually (S3). Additionally, the operator can see the list showing the relation of the equipment number or code and the output equipment on display in the machine control unit 2.

[0039] When the choice of the output equipment to be subject of operation check is completed, the output equipment chosen in the display switch part 33 is activated by rotating the operation switch 34 from the OFF position to the ON position and switching the operation. If the output equipment is activated normally, the output equipment is determined to be activated normally after the operator checks the operation status of the output equipment visually. Meanwhile, if the output equipment is not activated or activated abnormally, the output equipment is determined to have a problem in the output equipment itself or a connection problem between the output equipment and the unit controller 21 (S4). After that, if existing the output equipment that carries out the operation check continuously, the output equipment is chosen in the display switch part 33 and the operation of the output equipment is checked by rotating the operation switch 34 and switching the operation as described above.

[0040] Next, if the operation check of the input equipment is carried out, as illustrated in Figure 4, the operator chooses the input operation check mode from the operation mode in the machine control unit 2, and the mode signal including the data of the input operation check mode is transmitted to the respective winding units 1 through the telecommunication cable 26 by carrying out the communication instruction. Then, if the operator does not designate the unit number, the mode signal from the machine control unit 2 is received by the whole winding units 1 as the winding unit 1 is not chosen. Moreover, if the unit number is designated, only the winding unit 1 corresponding to the unit number receives the mode signal. The input operation check mode is going to be set in the whole or a part of the winding unit 1 that receives the mode signal (G1).

[0041] Next, the operator is moved to the winding unit 1 that carries out the operation check, and switches the mode valid/invalid switch 38 provided in the operation panel 22 in the winding unit 1 to be in the valid status (G2). Thus, the temporary setting of the input operation check mode is canceled in the winding unit 1, the winding unit 1 can receive the signal from the display switch part 33 of the operation panel 22, and the operation check indicator 31 may be switched to light up if the input equipment to be subject of operation check is made to

be in the operation status.

[0042] After that, the operation of the high order display switch 33a and the low order display switch 33b in the display switch part 33 is switched. Then, the high order indicator 32a and the low order indicator 32b of the operation check display part 32 switches the display of the equipment number and code, accompanied by switching the operation the respective switches 33a and 33b. Therefore, the operator can choose the input equipment to be subject of operation check while watching the display of the operation check display part 32 actually (G3). Additionally, the operator can refer to the list showing the relation between the equipment number or code and the input equipment on display in the machine control unit 2.

[0043] When choosing the input equipment to be subject of operation check completely, the chosen input equipment is operated so as to be in the operation status. For example, if the yarn detection sensor 10 is chosen as the input equipment to be subject of operation check, the check member such as the yarn is disposed in the check area of the yarn detection sensor 10. If the input equipment is activated normally, the operation check indicator 31 lights up, which shows the operation status of the input equipment, so that the input equipment is determined to be activated normally after the operator checks the display status visually. Meanwhile, if the operation check indicator 31 does not light up, the input equipment is determined that there is a problem in the input equipment itself or there is a connection problem between the input equipment and the unit controller 21 (G4). After that, if existing the input equipment that carries out the operation check continuously, the input equipment is chosen in the display switch part 33, and the input equipment is operated so as to be in the operation status and the display status of the operation check indicator 31 is checked as described above.

[0044] As described above, the yarn winding machine in the preferred embodiment of the present invention, as illustrated in Figure 2, comprises a plurality of the winding units 1 that are laid side by side, and is capable of checking operation while choosing the input/output equipment of the respective winding units 1 through the unit controller 21. The respective winding units 1 comprises the display switch part 33 (output equipment choice means) that is capable of choosing the output equipment to be subject of operation check in the input/output equipment, in the output operation check mode, and the operation switch 34 (operation switch means) that is capable of switching the operation for activating and stopping and drives the output equipment. Moreover, the unit controller 21 is comprised of having the operation part 23 (the operation check drive means 41) that is capable of executing the program which activates the output equipment chosen by the display switch part 33, based on the drive operation of the operation switch 34.

[0045] Actual examples of the output equipment are

an electronic valve in the nozzle for untwisting yarn in the yarn splicing device 14, an electromagnetic valve in the nozzle for twisting yarn in the yarn splicing device 14, an actuator for exchanging bobbin, a motor for splicing yarn, a motor for driving the transmission pipe 17, and the indicator (LED), etc.

[0046] According to the above configuration, regarding the output operation check mode, if the operator operates display switch part 33 and chooses the output equipment, the output equipment is subject to operation check, and only the output equipment to be subject of operation check can be activated by the operation switch 34. Thus, the operation status can be checked by the movement of the rotation, etc. of the motor, etc. in the output equipment. Consequently, even if a series of operations that the portable check tool is connected to the winding unit 1 for establishing communication and the check is carried out by operating the portable check tool, the output equipment of the respective winding units 1 can be easily checked by the simple operation of the display switch part 33 and the operation switch 34 of the winding unit 1, so that the yarn winding machine can be checked completely in short time.

[0047] Moreover, the respective winding units 1 of the yarn winding machine in the preferred embodiment of the present invention comprises the display switch part 33 that is capable of choosing the operation by switching the input equipment to be subject of operation check in the input/output equipment and the operation check indicator 31 for announcing the operation status of the chosen input equipment, in the input operation check mode. The unit controller 21 is comprised of having the operation part 23 (display control unit 42) that is capable of executing the program of controlling the display status of the operation check indicator 31 based on the input signal from the input equipment (the signal corresponding to the operation status of the input equipment) chosen by the display switch part 33, as well as the yarn detection sensor 10 (yarn existence detector).

[0048] Actual examples of the input equipment are a traverse detector (photoelectric sensor) and an origin detector (photoelectric sensor) for yarn splicing cam that detect that the yarn is traversed, a specific angle detector (photoelectric sensor) for yarn splicing cam, a balloon control member detector, an operation start detector (micro switch), an origin detector (photoelectric sensor) of the transmission pipe 17, and the other controllers (such as the driver for dram motor and / or the driver for drive motor of the hairiness control unit).

[0049] According to the above configuration, in the input operation check mode, if the operator chooses the input equipment such as the sensor by the operation of the display switch part 33, the input equipment is subject to operation check, and the input equipment to be subject of operation check can be associated with the operation check indicator 31. Thus, the operation status can be checked by the display of lighting the operation check indicator 31 that is activated in response to the

input of the input equipment. Consequently, the respective winding units 1 can be checked by the simple operation of the display switch part 33 and the operation check indicator 31 provided in the winding unit 1, so that the yarn winding machine can be checked completely in short time.

[0050] Additionally, the preferred embodiment of the present invention describes the yarn winding machine wherein the relation of the unit controller 21 and the winding unit body 4 is one-one, however the example is not confined to this, and the relation of the unit controller 21 and the winding unit body 4 may be one to two, or one to N. More specifically, the yarn winding machine is capable of controlling a plurality of the winding unit body. Moreover, the operation check indicator 31 that announces the operation status by lighting it on or off is illustrated as an example in the preferred embodiment of the present invention, however the device is not limited to the operation check indicator 31, and the buzzer can be used for announcing the operation status by voice.

[0051] According to claim 1 of the present invention, in a yarn winding machine having a plurality of winding units that are laid side by side, which is capable of checking operation of output equipment of the respective winding units while choosing the output equipment of the winding units with a unit controller, the respective winding units comprise the output equipment choice means that is capable of switching operation of the output equipment to be subject of operation check and an operation switch means that is capable of controlling the switch for driving and stopping the winding units, and the unit controller comprises an operation check drive means that is capable of activating an output equipment chosen by the output equipment choice means, according to the operation of driving the operation switch means.

[0052] According to the above configuration, if the operator chooses the output equipment with the output equipment choice means, the output equipment is subject to operation check, and only the output equipment to be subject of operation check can be activated by the operation switch means. Thus, the operation status can be checked by the movement such as rotation, etc. of the motor, etc. of the output equipment. Consequently, even if not carrying out a series of conventional operations that the portable check tool is connected to the winding unit for establishing communication and the check is carried out by operating the portable check tool, the output equipment of the respective winding units can be easily checked by the simple operation of the output equipment choice means and the operation switch means of the winding unit, so that there is an effect that the yarn winding machine can be checked completely in short time.

[0053] According to claim 2 of the present invention, in a yarn winding machine having a plurality of winding units that are laid side by side, which is capable of

checking operation of output equipment of the respective winding units while choosing the output equipment of the winding units with a unit controller, the respective winding units comprise an input equipment choice means that is capable of switching operation of the input equipment to be subject of operation check and an operation check indicator, and the controller unit comprises a display control means that controls the display status of the operation check indicator based on the input signal from the input equipment chosen by the input equipment choice means.

[0054] According to the above configuration, if the operator chooses the input equipment such as sensor by operating the choice means, the input equipment is subject to operation check, and the input equipment to be subject of operation check can be associated with the operation check indicator. Thus, the operation status can be checked by the display of lighting, etc. of the operation check indicator that is activated in response to the input of the input equipment. Consequently, even if not carrying out a series of conventional operations that the portable check tool is connected to the winding unit for establishing communication and the check is carried out by operating the portable check tool, the input equipment of the respective winding units can be checked easily by the simple operation of the input equipment choice means provided in the winding unit, so that there is an effect that the yarn winding machine can be checked completely in short time.

[0055] According to claim 3 of the present invention, the yarn winding machine as in claim 1 or claim 2 has a machine control unit that is connected to the unit controller so as to communicate data, and the machine control unit comprises an operation mode setting means that is capable of choosing the operation check mode for checking operation from a plurality of the operation check mode, and the winding unit is capable of setting in the operation check mode in data communication from the machine control unit to the unit controller.

[0056] According to the above configuration, if carrying out the setting operation of the operation mode in one location on the machine control unit side, the necessary winding unit can be set in the requested operation mode through the unit controller as the machine control unit is connected to the unit controller so as to communicate data. Consequently, even if multiple winding units are existed, the operation mode can be easily switched and set completely in short time.

[0057] According to claim 4 of the present invention, in the yarn winding machine as in claim 3, the respective winding units comprise a mode valid/invalid switch means that is capable of switching the set operation mode to be valid or invalid.

[0058] According to the above configuration, even if the winding unit is set to be in the output operation check mode, the operation switch means can be used as the switch for starting and stopping the production (winding) by the manual operation, etc. when the operation mode

is invalid. Moreover, even if the winding unit is set in the input operation check mode, the operation check indicator can be used as the indicator for announcing alarm while winding when the operation mode is kept to be invalid. More specifically, there is an effect that the operation switch means and the operation check indicator can be used for further purposes by having the mode valid/invalid switch means.

Claims

1. A yarn winding machine having a plurality of winding units that are laid side by side, which is capable of checking operation of output equipments of the respective winding units while choosing the output equipments of the winding units with a unit controller,

wherein the respective winding units comprise an output equipment choice means that is capable of switching operation of the output equipment to be subject of operation check and an operation switch means that is capable of controlling the switch for driving and stopping the winding units, and

the unit controller comprises an operation check drive means that is capable of activating output equipment chosen by the output equipment choice means, according to the operation of driving the operation switch means:

2. A yarn winding machine having a plurality of winding units that are laid side by side, which is capable of checking operation of input equipments of the respective winding units while choosing the input equipments of the winding units with a unit controller,

wherein the respective winding units comprise an input equipment choice means that is capable of switching operation of the input equipment to be subject of operation check and an operation check indicator, and

the controller unit comprises a display control means that controls the display status of the operation check indicator based on the input signal from the input equipment chosen by the input equipment choice means.

3. A yarn winding machine as in claim 1 or Claim 2, comprising a machine control unit that is connected to the unit controller so as to communicate data,

wherein the machine control unit comprises an operation mode setting means that is capable of choosing an operation check mode for checking operation from a plurality of the operation check modes, and

a winding unit is capable of setting in the operation check mode in data communication from the

machine control unit to the unit controller.

4. A yarn winding machine as in claim 3, wherein the respective winding units comprise a mode valid/invalid switch means that is capable of switching the set operation mode to be valid or invalid.

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FIG. 1

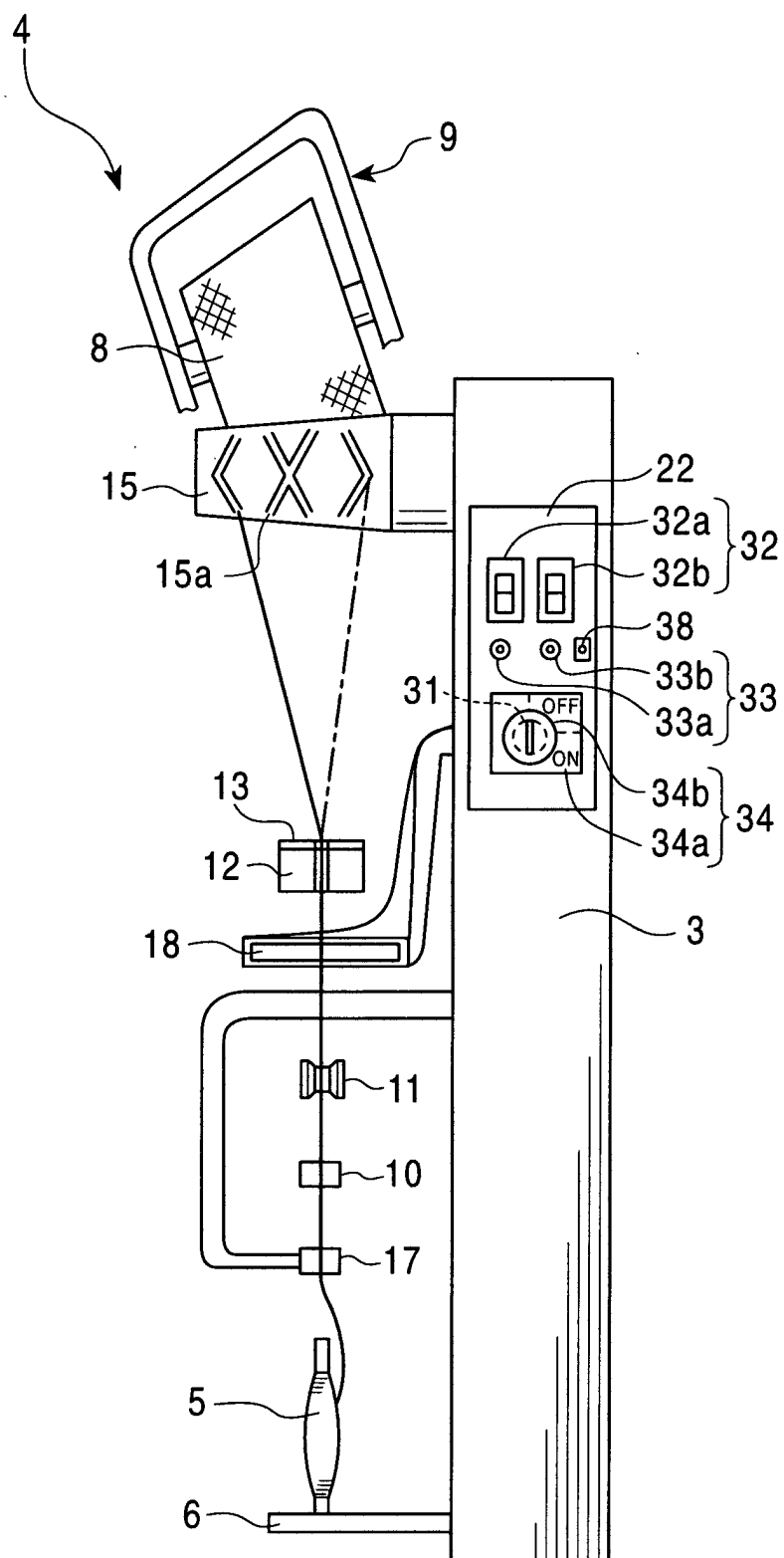


FIG. 2

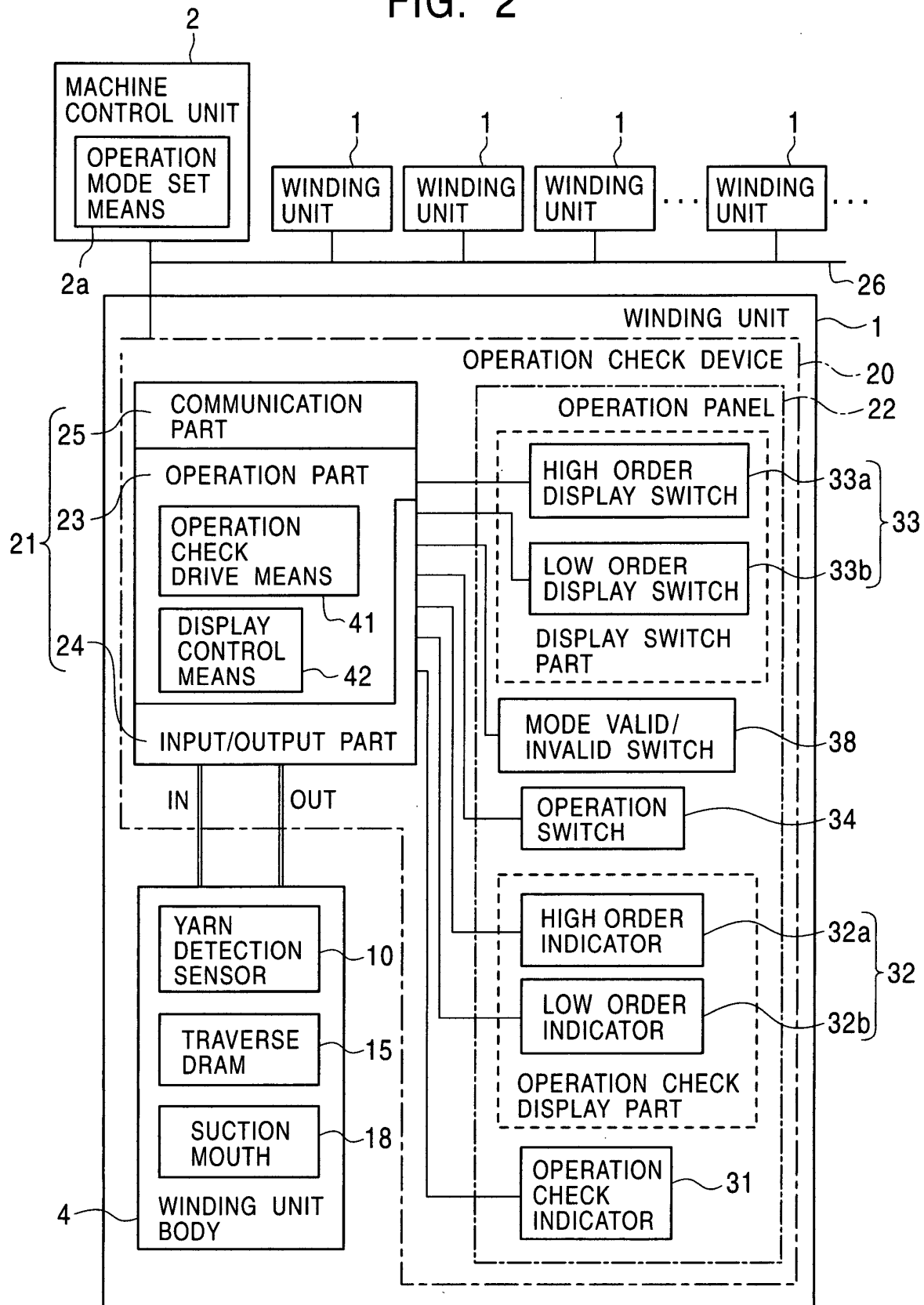


FIG. 3

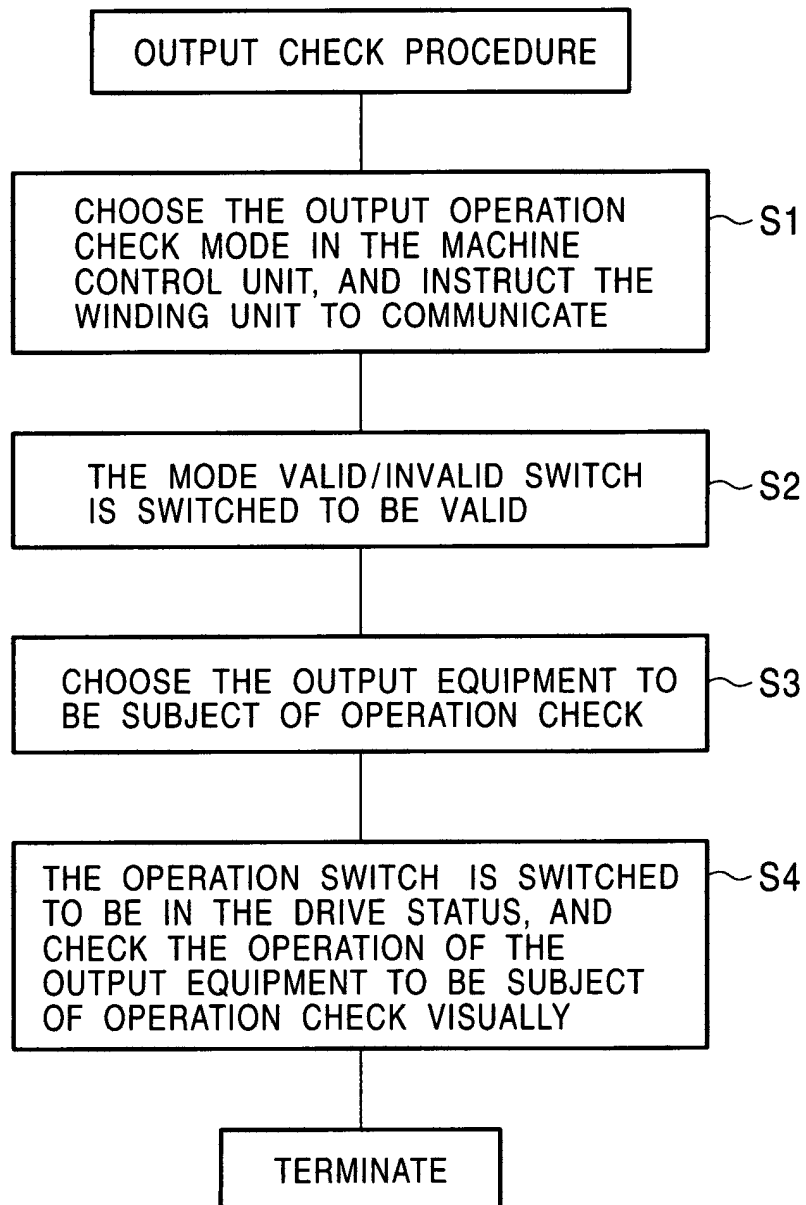


FIG. 4

