

(19)



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11)

EP 1 178 137 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:
10.11.2004 Bulletin 2004/46

(51) Int Cl.7: **D01H 1/244**, D01H 1/34

(21) Application number: **01113303.0**

(22) Date of filing: **31.05.2001**

(54) **Motor-driving system for an individual-spindle-drive type textile machine**

Motorantriebssystem für Textilmaschinen mit Einzelspindeltrieb

Système d'entraînement d'un moteur pour des machines textile de type à entraînement de broche individuelle

(84) Designated Contracting States:
DE

(30) Priority: **02.08.2000 JP 2000234599**

(43) Date of publication of application:
06.02.2002 Bulletin 2002/06

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

(72) Inventor: **Oshiumi, Koichiro**
Kyoto-shi (JP)

(74) Representative: **Liedl, Christine, Dipl.-Chem. et al**
Hansmann & Vogeser
Patentanwälte
Postfach 70 08 60
81308 München (DE)

(56) References cited:
EP-A- 0 950 735 **EP-A- 0 989 498**
US-A- 4 408 447

- **PATENT ABSTRACTS OF JAPAN** vol. 2000, no. 08, 6 October 2000 (2000-10-06) & JP 2000 144536 A (TOYOTA AUTOM LOOM WORKS LTD), 26 May 2000 (2000-05-26)

Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

EP 1 178 137 B1

Description

Field of the Invention

[0001] The present invention relates to a motor-driving system which is concerned with an individual-spindle-drive type textile machine to control an individual drive motor in each unit.

Background of the Invention

[0002] An individual-spindle-drive type textile machine, e.g. an individual-spindle-drive type multi-twisting machine, which provides exclusive drive motor for each unit of the multi-spindle unit, is known so far. This twisting machine controls each drive motor individually by a plurality of motor drivers fitted in every unit or a plurality of units.

[0003] In the twisting machine like this configuration, it is required to have even rotational control over drive motors in respective units because a rotational speed on each driving motor affects the quality of twisted yarn from one unit to another. Therefore, in the twisting machine, a rotational speed command signal, which controls a rotational speed of each drive motor at an intended speed, is separated from a parameter command signal to set an operating condition and command signals to drive or stop each drive motor to transmit individually to each motor driver. This rotational speed command signal is transmitted from a signal setting device via a transmission line of the rotational speed to each driver. The parameter command signal is transmitted driver from the signal setting machine via a serial transmission line to each motor, and the "DRIVE" or "STOP" signals are also transmitted driver from the signal setting device via a drive transmission line to each motor.

[0004] Then, these respective motor drivers accurately monitor the rotational speed of each drive motor while having an optimal control over the rotation of each drive motor according to respective command signals transmitted from the setting device via three transmission lines.

[0005] Each command signal transmitted from a signal setting device, as stated above, is transmitted via three transmission lines to each motor driver. Thus, an individual-spindle-drive type multi-twisting machine which is composed of a plurality of units must have three transmission lines wired to cover a plurality of units, so that a high cost and man-hour of wiring are problems.

[0006] Accordingly, the object of the present invention is to provide a motor driving system for an individual-spindle-drive type textile machine which delivers a reduction in the cost and the man-hour of wiring for a plurality of spindle units by reducing the number of transmission lines to transmit each command signal to respective drivers.

Summary of the Invention

[0007] The motor drive system of the present invention, to achieve the object as mentioned above, the motor driving system for an individual spindle-drive-type textile machine provided with a plurality of drivers which individually control drive motors mounted in respective units and a setting device which is connected to a plurality of drivers via a common command signal transmission line, is comprised of said setting device providing a means for forming a rotational speed command signal of a frequency corresponding to an intended rotational speed of said respective drive motors and a parameter command signal which indicates parameter to set an operational condition and transmitting respective command signals via said common command signal transmission line to said respective drivers in various signal forms and said respective drivers distinguishing rotational speed command signals from said setting device and parameter command signals and controlling said respective drive motors according to the recognition.

[0008] A rotational speed command signal and a parameter command signal are transmitted individually by using the common command signal transmission line so that it is not necessary to install another transmission line to transmit parameter command signals. A motor drive system with a common transmission line is known from JP-A-2 000 144 536. This line however, only transmits the signal for the rotational speed to the motor drivers.

[0009] The motor driving system of the present invention, said setting device is to transmit said parameter command signals to said respective drivers during the non-transmission period of said rotational speed command signals.

[0010] It is possible to set an operational condition for each driver without affecting rotation in each driving motor, since parameter command signals are transmitted to respective drivers during the non-transmission period of rotational speed command signals.

[0011] The motor driving system of the present invention, provided with a power line connected to said a plurality of drivers in order to supply driving power to said respective drive motors and a means for overlaying each command signal in said setting device on said power line, is to share said power line for said transmission line of command signals by connecting said setting device to said power line by using a means for overlaying.

[0012] Command signals of the rotational speed and parameter transmitted from the setting device are overlaid on the power line to transmit to respective drivers, therefore, it is unnecessary to install another transmission line for transmitting command signals of the rotational speed and parameter besides the power line.

[0013] The motor driving system of the present invention, in an individual-spindle-drive type textile machine,

provided with a plurality of drivers individually controlling drive motors installed in each spindle unit and a setting device connected to a plurality of drivers via a common command signal transmission line is comprised of said setting device providing a means for forming rotational speed command signals represented as a frequency according to an intended rotational speed of said respective drive motors and transmitting command signals via said common command signal transmission line to said respective drivers and said respective drivers providing a means for driving or stopping said drive motors according to the presence or absence of rotational speed command signals from said setting device.

[0014] As respective drive motors may be driven or stopped according to the presence or absence of rotational speed command signals, it is not necessary to install another transmission line to transmit command signals to drive or stop respective drive motors.

[0015] The motor driving system of the present invention is comprised of said respective drivers fitted with an operating switch to individually drive or stop said respective drive motors.

[0016] With the operation switch for unnecessary driving motors of spindle units selected "STOP", only necessary drive motors of spindle units may be operated even though rotational command signals are transmitted to all spindle units simultaneously.

Brief Description of the Drawings

[0017]

Figure 1 is an elevational schematic diagram showing a twisting machine employing a motor driving system for an individual-spindle-drive type textile machine applied the present invention in the implementation form.

Figure 2 is a structural diagram showing the motor driving system in Figure 1.

Figure 3 is a flow sheet showing a signal receiving process of a parameter command signal in respective motor drivers of the motor driving system in Figure 1.

Figure 4 is a flow sheet showing a signal receiving process of a command signal of a rotational speed in respective motor drivers of the motor driving system in Figure 1.

Figure 5 is a structural diagram showing an another example of the motor driving system.

Detailed Description of the Preferred Embodiments

[0018] The present invention will now be explained with reference to the accompanying drawings that show the implementation forms of the present invention applied to the motor driving system for the individual-spindle-drive type textile machine.

[0019] To begin with, the schematic configuration of

the twisting machine in this implementation form is explained as follows. In Figure 1, 1 is a machine body of the twisting machine, 2 is a plurality of speed-adjustable drive motors placed side by side in the machine body 1, and 3 is spindles rotated on the same shaft by respective drive motors 2. Detachable supply yarn packages, mounted on the same shaft of respective spindles 3, are indicated as numeral 4 and to be kept standing still regardless of the rotation of respective spindles 3 with an appropriate braking means. 5 is a yarn guide to lead a yarn Y released from the supply yarn packages 4 to a winding apparatus, 6 is feed rollers to send the yarn Y to the winding apparatus while adjusting the tension of the yarn Y, 7 is traverse guides to traverse the yarn Y, and 8 is winding drums to make a winding packages 9 rotate by making contact with the surface. The traverse guide 7 is fitted on a traverse shaft 10 in each spindle unit and the traverse shaft 10 is reciprocated in such a direction as to point the shaft according to a driving mechanism beside a control box 15 mounted on the left side of the machine body 1. The winding drum 8 makes all spindle units rotate simultaneously.

[0020] In the above configuration of the twisting machine, the movement of twisting yarn in respective spindle units is to be done as follows.

[0021] The yarn Y, released from the supply yarn package 4, is led to downward from the tip of the spindle 3 through the inner part to be released from the lower part of spindle 3 rotating at high-speed. As the released yarn Y from the supply yarn package 4 is released while rotating, one twist is to be given in this stage. Furthermore, the yarn Y, released from the lower part of the spindle 3, is led to the feed roller 6 through the yarn guide 5 while rotating around the perimeter of the supply yarn package 4 according to the rotation of the spindle 3. In this stage, as the released yarn Y from the spindle 3 is spun around the supply package 4, it is given another twist. The twisted yarn Y, consequently twisted twice, is sent to the traverse guide 7 by the feed roller 6. The twisted yarn Y, adjusted tension to a designated level by the feed roller 6, is wound on the winding package 9 which is rotated by the winding drum 8, while being traversed by the traverse guide 7.

[0022] In this implementation form, as set forth in Figure 1, for instance, eight twisted yarn spindle units, mounted on the drive motor 2 to the winding drum 8, are arranged in a line in the sideward direction of the machine body 1 to comprise one group. In the practical twisting machine, a plurality of group are installed and operated under the host computer which is not shown in the figure.

[0023] Since the quality of the count of twist and so on for the twisted yarn Y wound by these respective spindle units varies according to the rotational speed of respective spindles 3, the rotation speed of the drive motor 2 in each spindle unit is to be controlled accurately according to command signals from a signal setting device 50 and also monitored accurately the rotational

speed of the drive motors 2 in respective spindle units in order to avoid dispersion between respective spindle units and maintain the quality of the twisted yarn Y uniformly.

[0024] The control of respective driving motors 2 is carried out by a plurality of motor drivers 30. Respective motor drivers 30 control respective driving motors 2 according to command signals from the signal setting machine 50, moreover, the signal setting device 50 is operated under the host computer. These respective motor drivers 30, connected to an AC/DC transducer 45 fitted in the control box 15, supply respective drive motors 2 with drive power and generate control power.

[0025] The following is the description regarding the configuration of the motor driving system in the implementation form.

[0026] In Figure 2, said signal setting device 50, fitted inside of the control box 15, is to transmit command signals to respective motor drivers 30 with the instruction from a host computer and comprised of a microcomputer with a timer circuit and so on. This signal setting device 50, with a microcomputer, forms the rotational speed command signals configured with pulse train of frequency according to an intended rotational speed of respective drive motors 2 and parameter command signals (code signals) of a designated bit showing the parameter to set the operational condition, then transmit respective command signals individually to respective motor drivers 30. One example of parameter to set the operational condition is rotational directions to perform S-twist or Z-twist on twisted yarn Y in case of using a multi-twisting machine.

[0027] Said each motor driver 30, which is an inverter module controlling respective drive motors 2, is comprised of a microcomputer, an inverter circuit, and so forth. These respective motor drivers 30 are connected to the signal setting device 50 with a common command signal transmission line 40. Each motor driver 30 distinguishes the rotational speed command signal from a parameter command signal with reference to the formation of a command signal received from the signal setting machine 50 via the common command signal transmission line 40, furthermore, it controls the rotation of respective drive motors 2 according to command signals of the rotational speed and parameter and monitors the rotational speed of drive motors 2 with reference to the detected data of the a rotation sensor 35. Each motor driver 30 is connected to the AC/DC transducer 45 with a common power line 46. Each motor driver 30 decompresses direct current voltage, converted by the AC/DC transducer 45 from an alternating current power source 47, to generate a control power. Moreover, each motor driver 30 is provided with an operating switch 60 to respectively select to drive or stop each drive motor 2. Regarding the drive motors 2 of spindle units which are not necessary to operate, with the operational switch 60 selected in the "STOP" position, only necessary drive motors 2 of spindle units may be operated even though

each command signal is transmitted via the common command signal transmission line 40 to all the spindle units (all drive motor 2) simultaneously. In addition, in this implementation form, as one motor driver 30 controls each drive motor 2 individually, the motor driver 30 can be installed at every plural spindle units when respective drive motors 2 are controlled individually. When one drive motor 2 is connected for one motor driver 30, one operating switch 60 is supposed to be installed for each motor driver 30. In the case of connecting "n" pieces of the drive motor 2 for one motor driver 30, "n" pieces of the operating switch 60 are to be installed for respective motor drivers 30.

[0028] The following is the description regarding the transmission process in said motor driving system, referring Figure 3 and Figure 4 in addition to Figure 2.

[0029] In the motor driving system, supposing all of the operating switches 60 are selected in the drive position and respective drive motors 2 are ready for an operation. This motor driving system, for instance, drives and controls the rotation of respective drive motors 2 after setting the operational condition for each motor driver 30 before starting to operate all spindle units in the twisting machine.

[0030] Referring first to Figure 2, as for setting the operational condition, the signal setting device 50 forms and transmit the parameter command signal matching the designated number of bits indicated the parameter to set the operational condition. Then, as shown in Figure 3, each motor driver 30 confirms the input of the pulse train for the rotational speed command signals in the process of S1. In the case of this input number failed to be confirmed, each motor driver 30 confirms the input level for the parameter command signals in the process of S2. If the input level is in high-level (H), it receives the serial transmitted parameter command signal from the signal setting device 50 in the process of S3. This parameter command signal represented as the designated bit number is generally started to transmit from high-level. Therefore, selecting the input level for each motor driver 30 high-level (H) changes the mode which allows each motor drivers 30 to accept parameter command signals. In the process of S4, respective motor drivers 30 carry out data processing on received parameter command signals to set an operational condition and send the confirmation for received parameter command signals to the signal setting device 50 in the process of S5. This parameter command signal, as shown in Figure 2, is serial-transmitted to each motor driver 30 via the common transmission line of command signals 40. Once input of each pulse train is confirmed in the process of S1, each motor driver 30 select the mode to drive and control the rotation of each drive motor 2. If the input level is in low-level (L) in the process of S2, each motor driver 30 is in stand-by state, ready to start for the rotation of respective motor drivers 30.

[0031] Therefore, with transmitting parameter command signals via the common command signal line 40

to each motor driver 30 before starting to operate a twisting machine, it is possible to set an operational condition without affecting the rotation of each drive motor 2. The transmission of parameter command signals is not limited to be done before the operation of a twisting machine and it is possible to transmit except for the duration of the rotational speed command signals transmitted from the signal setting device 50, i.e. except when each drive motor 2 rotates.

[0032] The following is the description regarding the rotational control of each drive motor 2 by each motor driver 30. When an operational condition is set for each motor driver 30, the signal setting device 50, as shown in Figure 2, forms and transmit the rotational speed command signal of pulse train frequency according to the intended rotational speed of each drive motor 2. As shown in Figure 2, this rotational speed command signal is transmitted to each motor driver 30 via the common command signal transmission line 40. Then each motor driver 30 confirms the input of pulse train of the rotational speed command signal in the process of S1' as stated in Figure 4. Once this input is confirmed, the rotational speed command signal is gone through the data processing in the process of S2' and the pulse train frequency is counted in the process of S3'. In the process of S4', respective motor driver 30 set the counted pulse train frequency as a setting speed variable. In the process of S5', respective motor drivers 30 start to drive each drive motor 2 according to the confirmation for received the pulse train and control the rotation of each drive motor 2 in order to meet the operational condition of parameter command signals and the rotational speed according to the pulse train. In the process of S6', when each motor driver 30 receives the pulse train continuously, each drive motor 2 continues driving. When it stops receiving the pulse train, each drive motor 2 stops in the process of S7'. In the case each motor driver 30 fails to confirm the pulse train in the process of S1', it is switched to the mode for receiving parameter command signals.

[0033] Thus, each motor driver 30 is capable of receiving command signals of parameter and the rotational speed individually via the common command signal transmission line by selecting the mode of receiving command signals of parameter or the mode of driving and controlling the rotation of each drive motor 2, so that another transmission line to transmit parameter command signals is not necessary to be installed.

[0034] As each motor driver 30 drives or stops respective drive motors 2 in accordance with the presence or absence of receiving pulse train of rotational speed command signals, it is not necessary to install transmission line to transmit command signals to drive or stop each drive motor 2.

[0035] The pulse train frequency, formed and transmitted by the signal setting device 50, is to be high in order to increase the rotational speed while each drive motor 2 is rotating. As shown in Figure 2, the high pulse

train frequency is transmitted via the common command signal transmission line 40 to each motor driver 30. As each motor driver 30 goes through the process of S1' to S5' shown in Figure 4, it speeds up the rotation of the drive motor 2 in accordance with high pulse train frequency.

[0036] Thus, it is possible to change the rotational speed of each drive motor 2 at the same speed, if high pulse train frequency is transmitted simultaneously to each motor driver 30 via the common command signal transmission line 40.

[0037] Furthermore, regarding the drive motors 2 of spindle units which are not necessary to operate in a twisting machine, with the operational switch 60 of the motor driver 30 according to drive motors 2 selected in the "STOP" position, only necessary drive motors 2 of spindle units may be operated, even though each command signal is transmitted via the common command signal transmission line 40 to all the spindle units (all of motor drivers 30) simultaneously.

[0038] The following is the description regarding another example of the motor driving system in this implementation form.

[0039] In Figure 5, the motor driving system is to share the power line 46 for the transmission line of command signals 40 and overlay each command signal from the signal setting device 50 upon the power line 46 to transmit. In the Figure 5, the same signs in Figure 1 and Figure 2 show the same parts and the explanation is omitted.

[0040] As shown in Figure 5, 55 is an overlay device comprising a transformer 56, a modulator 57, and so forth. A primary side coil 56a in the transformer 56 is connected to the modulator 57 in a control box 15 and a secondary side coil 56b is connected to the power line 46 in the control box 15. The modulator 57, connected to the signal setting device 50 in the control box 15, modulates command signals of parameter and the rotational speed from the signal setting device 50 to an alternating-current voltage according to each command signal. In this motor driving system, each command signal transmitted from the signal setting device 50 is modulated to an alternating-current voltage by the modulator 57 to induce the alternating-current voltage according to each command signal on the power line 46 by the transformer 56. As a result of this, the alternating-current voltage according to each command signal is overlaid on the direct-current voltage from the AC/DC transducer 45 on the power line 46 and the alternating-current voltage according to each command signal is transmitted to each motor driver 30 via the common power line 46. Each motor driver 30 demodulates and extracts contents of the alternating-current voltage corresponded to each command signal by a demodulate circuit and so forth to receive command signals of parameter and the rotational speed. In the case of receiving a parameter signal, a signal may be binarized according to the difference in frequency of an alternating-current voltage, for exam-

ple, a code showing the parameter signal can be recognized by identifying frequency higher than the designated frequency as 1 and lower frequency as 0. In the motor driving system seen in Figure 5, respective motor drivers 30 implement a signal receiving process in the same manner as Figure 3 and Figure 4.

[0041] Thus, since command signals of the rotational speed and parameter, transmitted from the signal setting device 50, overlays on the power line 46 to transmit to respective motor drivers 30, it is not necessary to install another transmission line to transmit command signals of the rotational speed and parameter besides the power line 46.

[0042] As mentioned above, a multi-twisting machine is taken as an example in the implementation form of this invention. The present invention is also applicable to a motor driving system for a false twist processing machine and all sorts of the individual-spindle-drive type textile machine.

[0043] As described above, in accordance with the present invention, on the grounds of sharing a common command signal transmission line to transmit command signals of the rotational speed and parameter to each driver, it is not necessary to install another transmission line to transmit parameter command signals. As a consequence, the number of transmission lines to transmit each command signal from the signal setting device may be reduced, therefore, in the case of an individual-spindle-type textile machine which comprises multi-spindle units, the man-hour and the cost of wiring for a plurality of spindle units can be reduced.

[0044] In accordance with the present invention, since parameter command signals are transmitted to each driver before starting to operate each drive motor, it is possible to set an operational condition without interfering the rotation of each drive motor.

[0045] In accordance with the present invention, as command signals of the rotational speed and parameter, transmitted from a setting machine, overlay upon a power line to transmit to each driver, there is no need to install another transmission line to transmit command signals of the rotational speed and parameter and the man-hour and the cost of wiring may be reduced by decreasing the number of transmission lines.

[0046] In accordance with the present invention, as each drive motor may be driven or stopped according to the presence or absence of rotational speed command signals, it is not necessary to install another transmission line to transmit command signals to drive or stop each drive motor. As a consequence, the number of transmission lines to transmit each command signal from the signal setting device can be reduced, resulted in reducing the man-hour and the cost of wiring for a plurality of spindle units in an individual-spindle-drive type textile machine.

[0047] In accordance with the present invention, with the operational switch selected in the "STOP" position for drive motors of spindle units which are not necessary

to operate, only necessary drive motors of spindle units may be operated, even though the rotation command signal is transmitted to all the spindle units simultaneously.

Claims

1. A motor driving system for an individual-spindle-drive type textile machine, provided with a plurality of drivers individually controlling drive motors (2) fitted in respective spindle units and a setting device (50) connected to a plurality of drivers (30) via a common transmission line (40) of command signals, comprising:

said setting device (50) providing means for forming a rotational speed command signal having a frequency according to an intended rotational speed of said respective drive motors and parameter command signals which indicate a parameter to set an operational condition and transmitting respective command signals in different signal forms via said common transmission line (40) to said respective drivers; and said each driver (30) providing means for distinguishing between the rotational speed command signal and the parameter command signal received from said setting device (50) and controlling said respective drive motors (2) according to the recognition.

2. A motor driving system according to claim 1 **characterized in that** said setting device (50) transmits said parameter command signal to said respective drivers (30) during a non-transmission period of said rotational speed command signal.
3. A motor driving system according to claim 1 or 2, **characterized by** a power line (40, 46) connected to a plurality of said drivers (30) in common to supply driving power to said respective drive motors (2) and means (55) for overlaying each command signal from said setting device on said power line, said setting device (50) being connected to said power line via said means for overlaying to share said power line for said transmission line of command signals.

4. A motor driving system according to one of the claims 1 to 3, **characterized in that** said setting device (50) provides the rotational speed command signal represented as a frequency according to an intended rotational speed of said respective drive motors (2) and transmitting the command signal via said common transmission line (40) of command signals to said respective drivers (30); and

said respective drivers (30) provide means for driving or stopping said drive motors according to the presence or absence of rotational speed command signals from said setting device.

5. A motor driving system according to claim 4 **characterized in that** said each driver (30) is provided with an operational switch (60) to individually select to drive/stop said each drive motor.
6. A motor driving system according to one of claims 1 to 5 **characterized in that** said drive motors (2) is to drive spindles for a twisted yarn and **in that** said each driver (30) is an inverter module to control said drive motors.
7. A motor driving system according to one of the claims 1 to 6 **characterized in that** said parameter includes the rotational direction of said drive motors (2).

Patentansprüche

1. Motorantriebssystem für eine Textilmaschine mit Einzelspindelantrieb und mit mehreren Antrieben, die Antriebsmotoren (2) individuell steuern, die in jeweilige Spindeleinheiten eingesetzt sind, und mit einer Einstellvorrichtung (50), die mit mehreren Antriebssteuerungen (30) über eine gemeinsame Übertragungsleitung (40) für Befehlssignale verbunden ist, wobei die Einstellvorrichtung (50) eine Einrichtung bildet, die ein Drehgeschwindigkeits-Befehlssignal mit einer Frequenz entsprechend einer Soll Drehgeschwindigkeit der jeweiligen Antriebsmotoren und Parameterbefehlssignale erzeugt, die einen Parameter angeben, um einen Betriebszustand einzustellen, und um jeweilige Befehlssignale in unterschiedlichen Signalformen über die gemeinsame Übertragungsleitung (40) zu den jeweiligen Antrieben zu übertragen, und jede Antriebssteuerung (30) eine Einrichtung bildet, um zwischen dem Drehgeschwindigkeits-Befehlssignal und den Parameterbefehlssignalen, die von der Einstellvorrichtung (50) empfangen werden, zu unterscheiden und die jeweiligen Antriebsmotoren (2) entsprechend der Unterscheidung zu steuern.
2. Motorantriebssystem nach Anspruch 1 **dadurch gekennzeichnet, daß** die Einstellvorrichtung (50) das Parameterbefehlssignal zu den jeweiligen Antriebssteuerungen (30) während einer Übertragungsunterbrechungsperiode des Drehgeschwindigkeits-Befehlssignals überträgt.
3. Motorantriebssystem nach Anspruch 1 oder 2 **gekennzeichnet durch** eine Versorgungsleitung (40),

46), die mit mehreren Antriebssteuerungen (30) gemeinsam verbunden ist, um die jeweiligen Antriebsmotoren (2) mit Energie zu versorgen, und eine Einrichtung (55), um jedes Befehlssignal der Einstellvorrichtung der Versorgungsleitung zu überlagern, wobei die Einstellvorrichtung (50) mit der Versorgungsleitung über die Überlagerungseinrichtung verbunden ist, um die Versorgungsleitung als die Übertragungsleitung von Befehlssignalen zu nutzen.

4. Motorantriebssystem nach einem der Ansprüche 1 bis 3 **dadurch gekennzeichnet, daß** die Einstellvorrichtung (50) das Drehgeschwindigkeits-Befehlssignal in Form einer Frequenz entsprechend einer Soll Drehgeschwindigkeit der jeweiligen Antriebsmotoren (2) liefert, und das Befehlssignal über die gemeinsame Übertragungsleitung (14) der Befehlssignale zu den jeweiligen Antriebssteuerungen (30) überträgt, und die jeweiligen Antriebssteuerungen (30) Einrichtungen zum Antrieb oder zum Stopp der Antriebsmotoren entsprechend dem Vorhandensein oder dem Fehlen von Drehgeschwindigkeits-Befehlssignalen der Einstellvorrichtung bilden.
5. Motorantriebssystem nach Anspruch 4 **dadurch gekennzeichnet, daß** jeder Antriebssteuerung (30) mit einem Funktionsschalter (60) zum individuellen wählen des Antriebs/Stopps jedes Antriebsmotors versehen ist.
6. Motorantriebssystem nach einem der Ansprüche 1 bis 5, **dadurch gekennzeichnet, daß** die Antriebsmotoren (2) Spindeln für einen verdrehten Faden antreiben, und daß jede Antriebssteuerung (30) ein Invertermodul zur Steuerung der Antriebsmotoren ist.
7. Motorantriebssystem nach einem der Ansprüche 1 bis 6, **dadurch gekennzeichnet, daß** der Parameter die Drehrichtung der Antriebsmotoren (2) umfaßt.

Revendications

1. Système d'entraînement moteur pour une machine textile du type à commande individuelle de broche munie d'une pluralité d'entraînements contrôlant des moteurs d'entraînement (2) placés dans des unités de broche respective et un dispositif de réglage (50) connecté à une pluralité d'entraînement (30) par une ligne de transmission commune (40) de signaux de commande comprenant ledit dispositif de réglage (50) fournissant des moyens pour former un signal de commande vitesse de rotation ayant une fréquence selon une vitesse de rotation recherchée desdits moteurs d'entraînement.

nement respectifs et de signaux de commande de paramètre qui indiquent un paramètre pour régler une condition opérationnelle et pour la transmission des signaux de commande respectifs sous différentes formes de signaux respectifs par ladite ligne de transmission commune (40) auxdits entraînements respectifs ; et

Chaque entraînement (30) prévoyant des moyens pour distinguer entre le signal de commande de vitesse de rotation et les signaux de commande de paramètre reçus dudit dispositif de réglage (50) et pour la commande desdits moteurs d'entraînement respectif (2) selon la détection.

2. Système d'entraînement moteur selon la revendication 1, **caractérisé en ce que** ledit dispositif de réglage (50) transmet ledit signal de commande de paramètre auxdits entraînements respectifs (30) pendant une période de non transmission dudit signal de commande de vitesse de rotation. 15
20

3. Système d'entraînement moteur selon la revendication 1, **caractérisé par** une ligne de puissance (40, 46) connectée à une pluralité desdits entraînements (30) en commun pour alimenter la puissance motrice aux dits moteurs d'entraînement respectifs (21) et des moyens (55) pour superposer chaque signal de commande depuis le dit dispositif de réglage sur ladite ligne de puissance, ledit dispositif de réglage (50) étant connecté à ladite ligne de puissance par desdits moyens de superposition pour partager ladite ligne de puissance pour ladite ligne de transition de signaux de commande. 25
30

4. Système d'entraînement moteur selon l'une des revendications 1 à 3 **caractérisé en ce que** Ledit dispositif de réglage (50) fournit le signal de commande vitesse de rotation représenté comme une fréquence selon une vitesse de rotation recherchée desdits moteurs d'entraînement respectifs (21) et transmet le signal de commande par ladite ligne de transmission commune (40) auxdits entraînements respectifs (30) ; et chaque entraînement (30) fournissant des moyens pour entraîner ou stopper lesdits moteurs d'entraînement selon la présence ou l'absence de signaux de commande de vitesse de rotation provenant dudit dispositif de réglage. 35
40
45

5. Système d'entraînement moteur selon la revendication 4, **caractérisé en ce que** chaque dit entraînement (30) est muni d'un commutateur opérationnel (60) pour sélectionner individuellement l'entraînement ou l'arrêt de chaque dit moteur d'entraînement. 50
55

6. Système d'entraînement moteur selon l'une des revendications 1 à 5, **caractérisé en ce que** lesdits

moteurs d'entraînement (2) entraînent des broches pour un fil torsadé et **en ce que** chaque entraînement (30) est un module inverseur pour commander lesdits moteurs d'entraînement.

7. Système d'entraînement moteur selon l'une des revendications 1 à 6, **caractérisé en ce que** ledit paramètre comprend la direction de rotation desdits moteurs d'entraînement (2).

FIG. 1

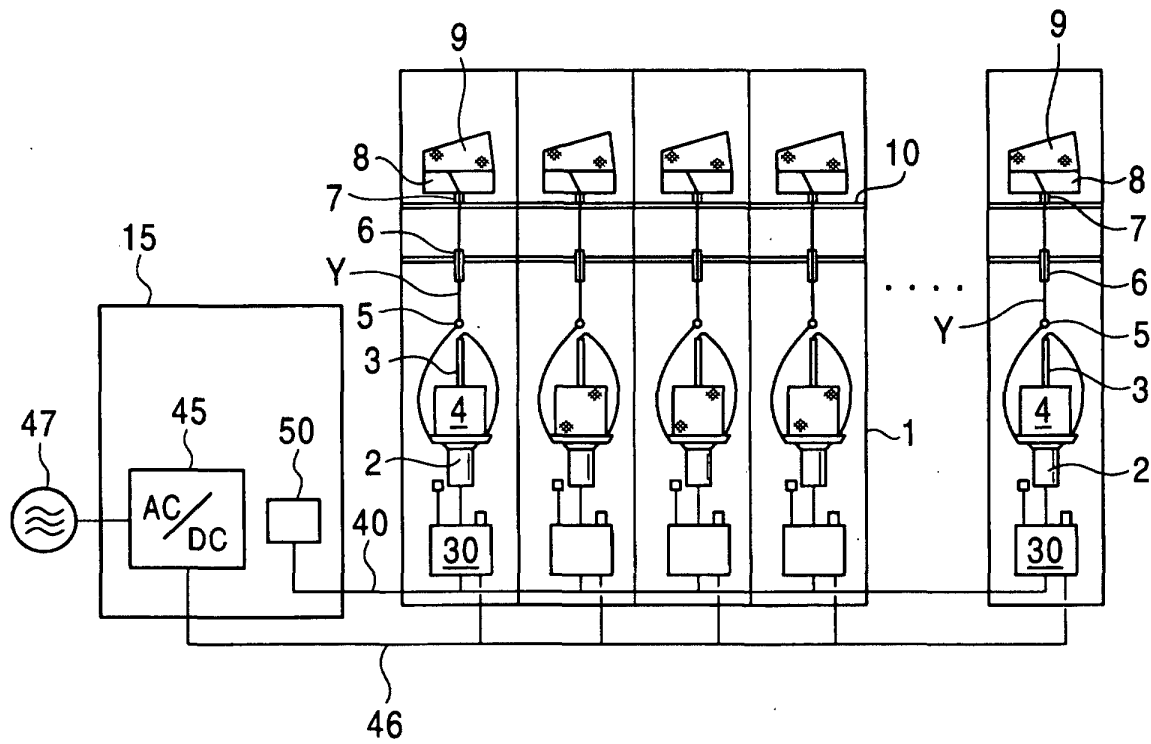


FIG. 2

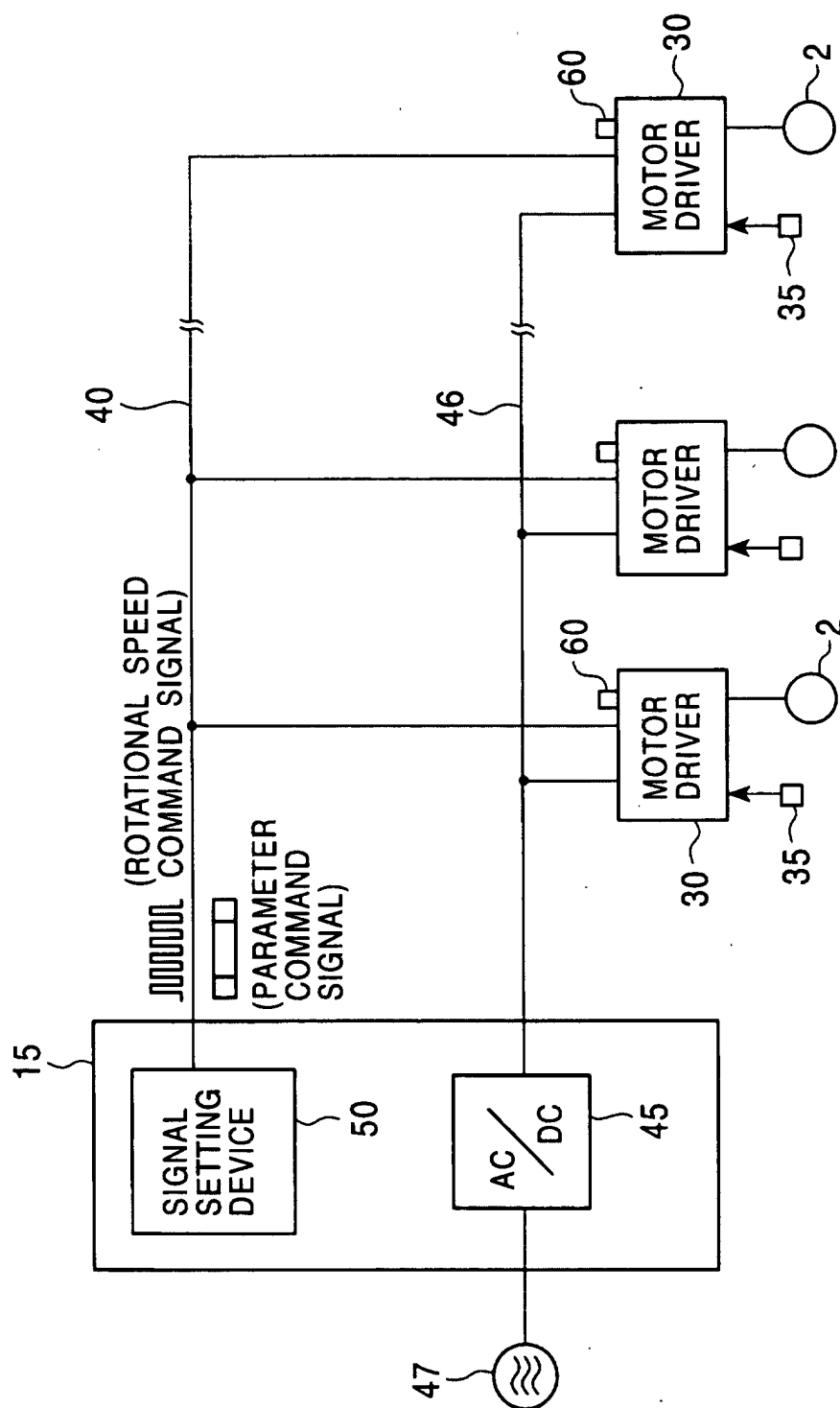


FIG. 3

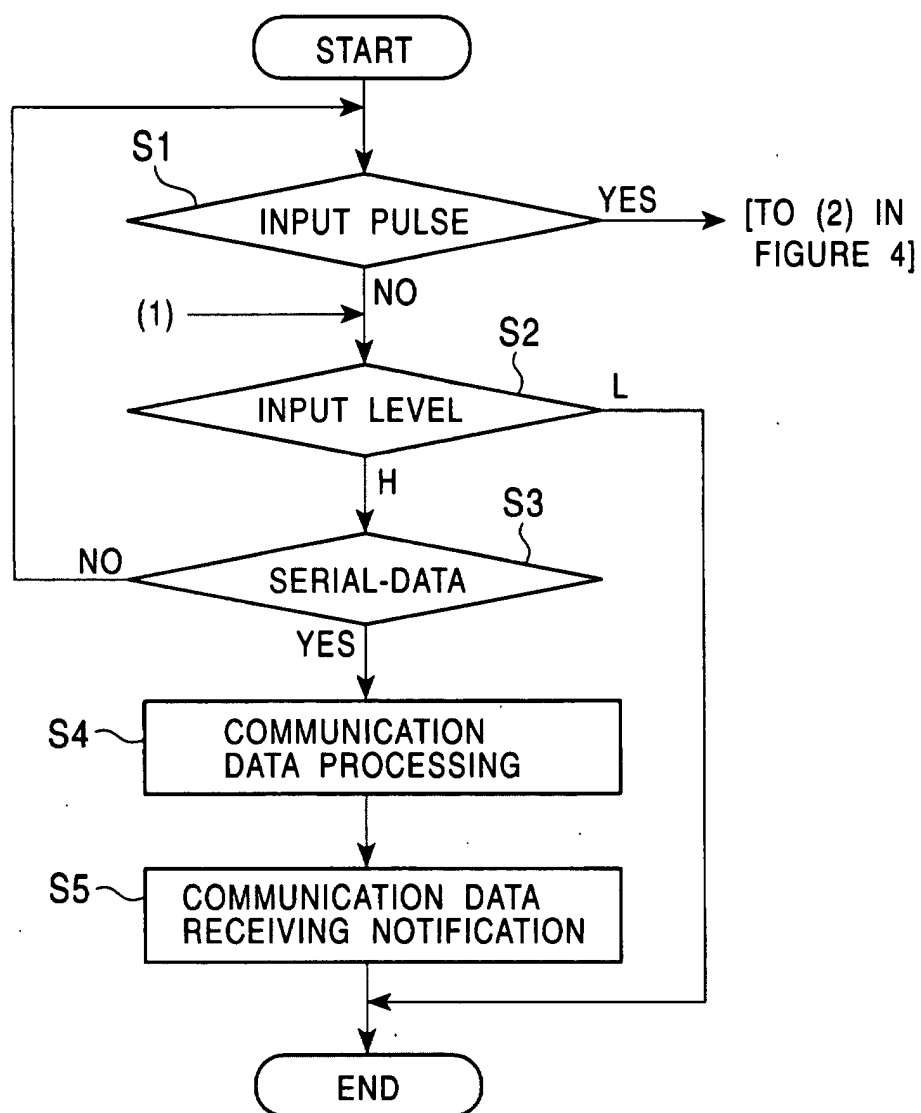


FIG. 4

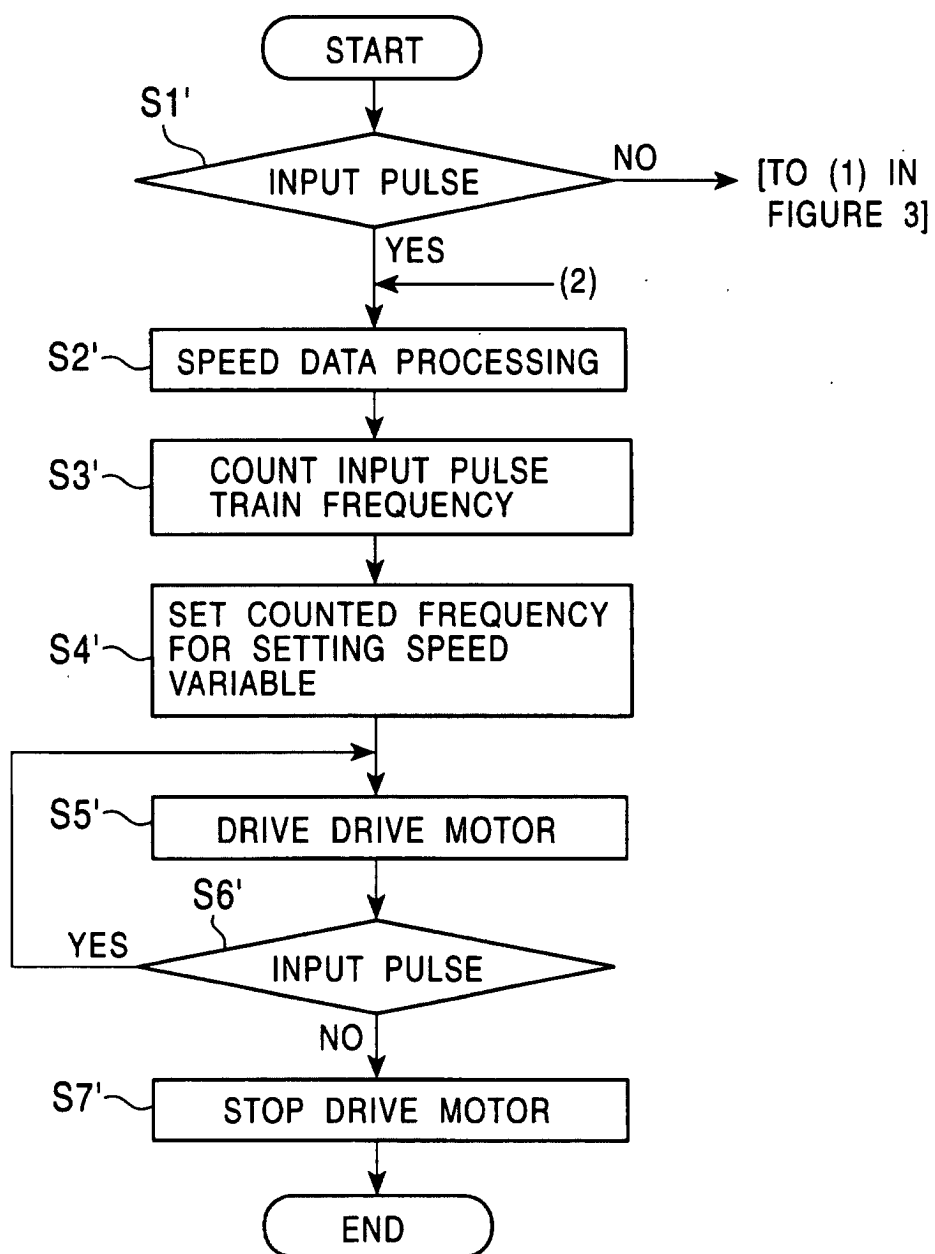


FIG. 5

