

[54] **OPEN-END SPINNING MACHINES PROVIDED WITH TIMING DEVICES**

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[51] Int. Cl. **H02j**

[58] Field of Search 307/149, 154

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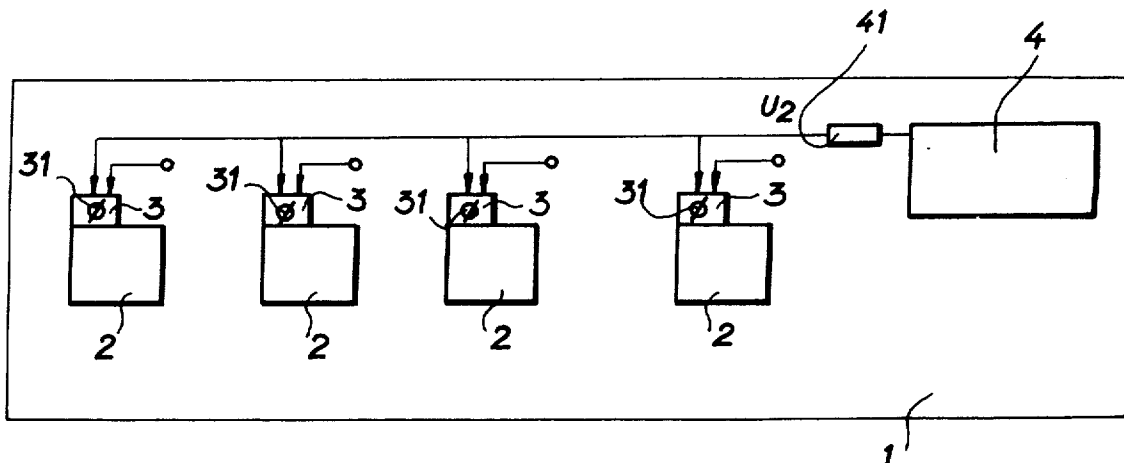
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[57] ABSTRACT

Open-end spinning machine with spinning units each provided with a timing device for timing the spinning units in case of removal of temporary conditions, for instance, in remedying thread breakages. Said timing device comprises correcting regulating elements for the individual adjustment of the time constants of each spinning units; a common regulating element for the simultaneous adjustment of the time constants of all the spinning units according the currently required spinning conditions of the spinning machine is preconnected to the timing devices of individual spinning units.

3 Claims, 3 Drawing Figures



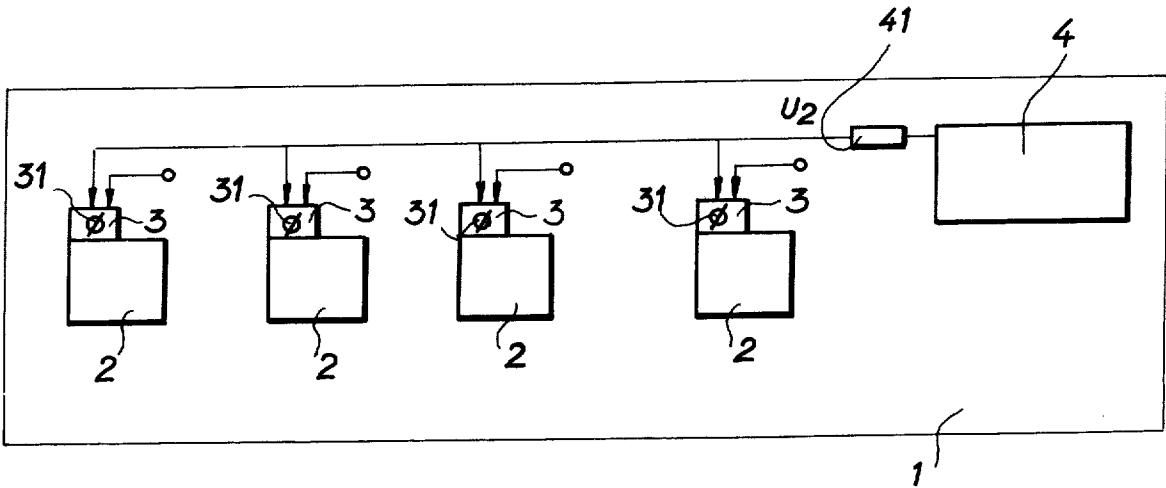


Fig-1

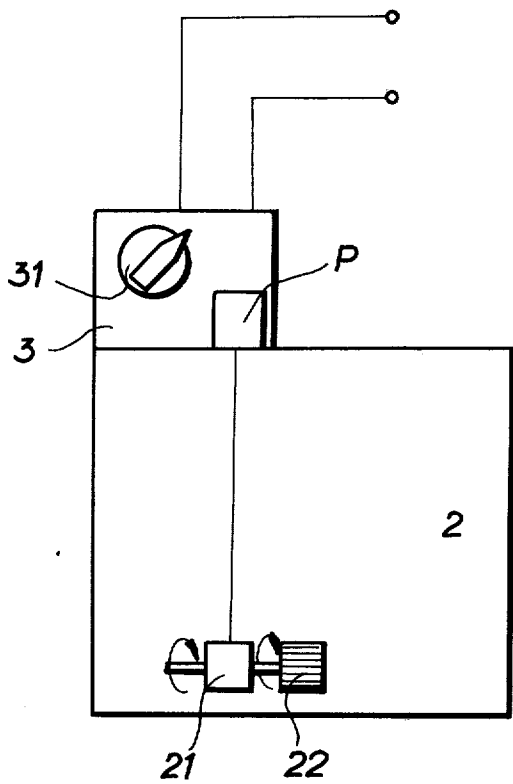


Fig-2

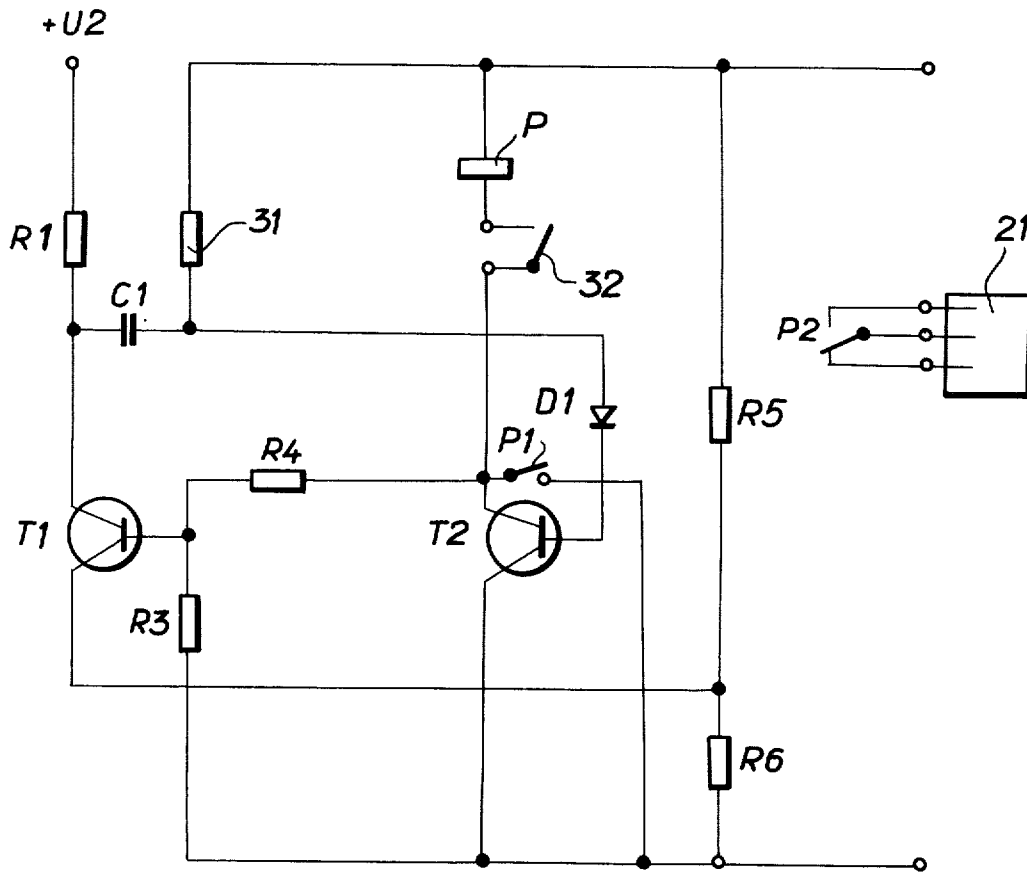


Fig-3

OPEN-END SPINNING MACHINES PROVIDED WITH TIMING DEVICES

This invention relates to open-end spinning machines equipped with spinning units each provided with a timing device for timing the spinning units in case of the removal of some temporary condition, such as, for instance, remedying thread breakage.

In open-end spinning machines, particularly those with automated thread breakage remedying systems, the removal of a temporary condition, i.e. the spinning-in process, requires a number of individual operation steps such a stopping the sliver supply and the yarn take-off, starting the yarn return etc., to be undertaken in specific time relationship. Among such temporary conditions are the automatic or manual remedying of thread breakages, the stoppage of the machine, its starting, and the like. The better the time sequence of the individual operations is maintained by means of a convenient timing device, the higher reliability and reproducibility of the individual operational steps can be achieved in case of yarn spinning-in.

The adjustment of the required time constants varies, of course, for different working conditions of the machine, for different yarn counts, take-off and feeding speeds, etc. In addition, the individual spinning units have never exactly equal parameters, such as, for instance, the time constant of the feed roller clutch, the sensor sensibility and the like, due to tolerances in manufacture, adjustment of clutches, different characteristics of various materials, and so forth.

It is an object of this invention to provide an openend spinning machine with spinning units, wherein each individual spinning unit has its own timing device for the time control of the spinning unit in the course of removal of a temporary condition; such condition for instance, may be the remedying of thread breakages, enabling an individual adjustment of time constants of each spinning unit according to the different character of each spinning unit, and enabling, in addition, a common adjustment of the spinning units required according to changes in the working conditions of the open-end spinning machine.

In accordance with the invention, timing devices include correcting regulating elements for the separate, individual adjustment for the time constants of each spinning unit, and a common regulating element pre-connected to the timing devices of individual spinning units, for the simultaneous adjustment of the time constants of all spinning units according to the current spinning conditions of the spinning machine.

The time control circuit according to this invention comprises a voltage-dependent transistor circuit fed by a common supply source, with a correcting and with an operating relay to which the time controlled operating elements of spinning units are connected, while the time control circuit together with the other time control circuit of the spinning units are connected to a common regulating element of a common supply source.

An exemplary embodiment which, of course, is not the only solution according to this invention will be described in the following with reference to the accompanying drawings, in which

FIG. 1 is a simplified block wiring diagram of spinning units on the machine, their timing devices and their common source of the supply voltage;

FIG. 2 is a block wiring diagram of a spinning unit; and

FIG. 3 is a wiring diagram of a time control circuit.

An open-end spinning machine 1 is provided with a number of spinning units 2 including well-known, devices (not shown) for separating fibers, such as a feed roller, a combing-out cylinder, a channel for conveying separated fibers and a twisting mechanism such as, for instance, a spinning chamber; further, there is provided some arrangement for yarn take-off and wind-up, control sensors and operating devices 21 for removal of a temporary condition of the spinning unit, for instance for remedying thread breakage, comprising clutches controlled in a predetermined time sequence by timing devices 3 interconnected to the sliver feeding drive, to the yarn take-off, and to the device for reversing the yarn take-off and wind-up. The spinning units 2 are further provided with respective drives, such as the drive for the feed roller, the drive for the combing-out cylinder, the drive for the twisting mechanism and the drive for other elements such as cleaning devices for removal of dirt and the like.

The timing device 3 of each spinning unit 2 comprises a correction regulating element 31, such as, in the case given, a variable resistor designed individually to adjust the time constant of each spinning unit 2.

To the timing devices 3, of which an exemplary time control circuit based on the semiconductor principle is shown in FIG. 3, there is preconnected a common regulating element 41, through which all the time control circuits of the spinning units 2 are supplied from a common supply source 4. As the time constant of the time control circuit depends not only on the magnitude of the variable resistor 31, but also on the magnitude of the feeding voltage U2, the time constants of all the time control circuits can be adjusted by the common regulating element 41 which can be for instance, a multiposition switch for adjustment of the voltage U2 in steps, or a potentiometer of a regulating supply circuit of the common supply source 4.

Turning now to FIG. 3, the contacts P2 of an operating relay P connected in the course of operation of the time control circuit within the time interval determined by the time constants, are connected to time controlled operating elements 21 of the spinning unit 2, as for instance to a clutch interposed in the drive of the feed roller 22 and designed to interrupt, while removing temporary conditions, such as during the automatic correction of thread breakages, the feeding of the sliver to the combing-out cylinder for an exactly predetermined time interval in an exact time sequence with other switching operations.

The transistors T1 and T2 of the time control circuit are non-conductive under stationary conditions. The capacitor C1 is charged to the voltage U2. By closing a starting contact 32, of, for instance, a sensor (not shown) or of a program transmitter for removing temporary conditions controlled by the sensor, the time control circuit starts its operation. The transistor T1 becomes conductive and the capacitor C1 charged to the voltage U2 is discharged through the transistor T1 and the variable resistor 31 and is again charged to the voltage U1 of opposite polarity via said variable resistor 31. After a sufficiently high value of the voltage on the capacitor C1 is reached, the diode D1 is opened and thus also the transistor T2 becomes conductive, the relay P is attracted and is held in this condition by its

own contact P1. The transistor T1 becomes non-conductive and the capacitor C1 is again charged to the voltage U2 the relay P is released by disconnection of the starting contact 32 and the time control circuit is again ready for operation.

The supply source U1 is a source of constant voltage, designed to feed the operating section of the timing device. The supply source U2 is a source of a variable voltage, feeding the regulating section of the timing device. It is possible simultaneously to control, by way of the common regulating element 41, all the timing devices and thus also the operating of all spinning units, and also to control the timing device of each spinning unit individually by way of the regulating element 31.

Although the invention is illustrated and described with reference to a plurality of preferred embodiments thereof, it is to be expressly understood that it is in no way limited to the disclosure of such a plurality of preferred embodiments, but is capable of numerous modifications within the scope of the appended claims.

What is claimed is:

1. In an open-end spinning machine with spinning units each provided with a timing device for timing the

spinning units in case of removal of temporary conditions, said timing device comprising a time control circuit including correcting regulating elements for the individual adjustment of the time constants of each spinning unit, and a common regulating element pre-connected to the timing devices of the individual spinning units for the simultaneous adjustment of the time constants of all the spinning units according to the currently required spinning conditions of the spinning machine.

2. The combination claimed in claim 1, wherein the time control circuit thereof comprises a voltage-dependent transistor circuit with a correcting regulation element in the form of a variable resistor and an operating relay to which time controlled operating elements of the spinning units are connected.

3. The combination claimed in claim 2, comprising a common current supply source, a common regulating element connected to said common supply source, and wherein said time control circuit together with the other time control circuits of the spinning units are connected to said regulating element.

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