Sept. 3, 1963 E. F. WALKER, JR 3,102,378

TEXTILE STRAND CONTROL DEVICE

Filed Feb. 28, 1961 2 Sheets-Sheet 1

Fig. 1.

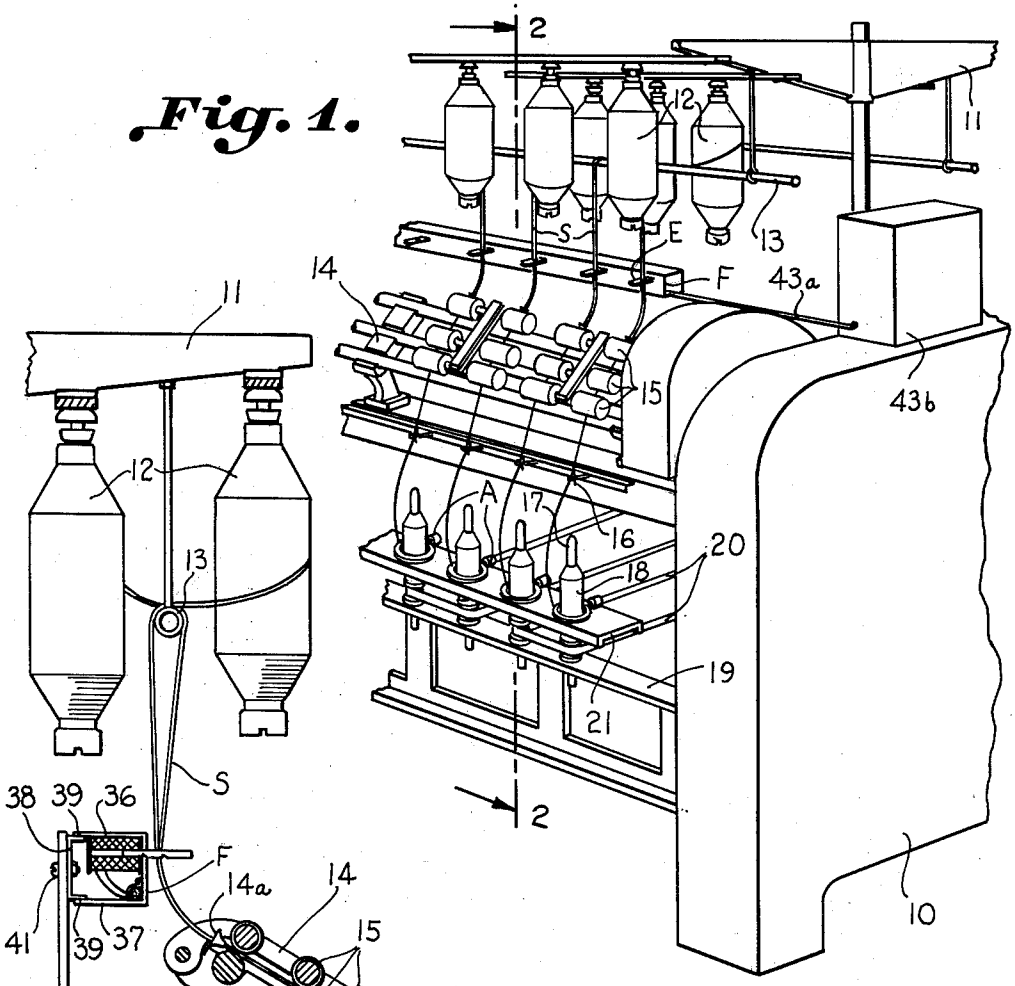
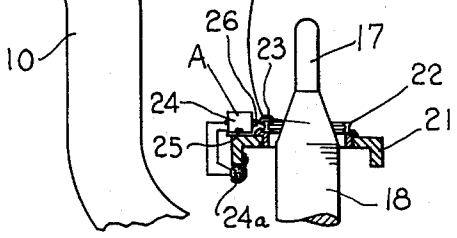


Fig. 2.



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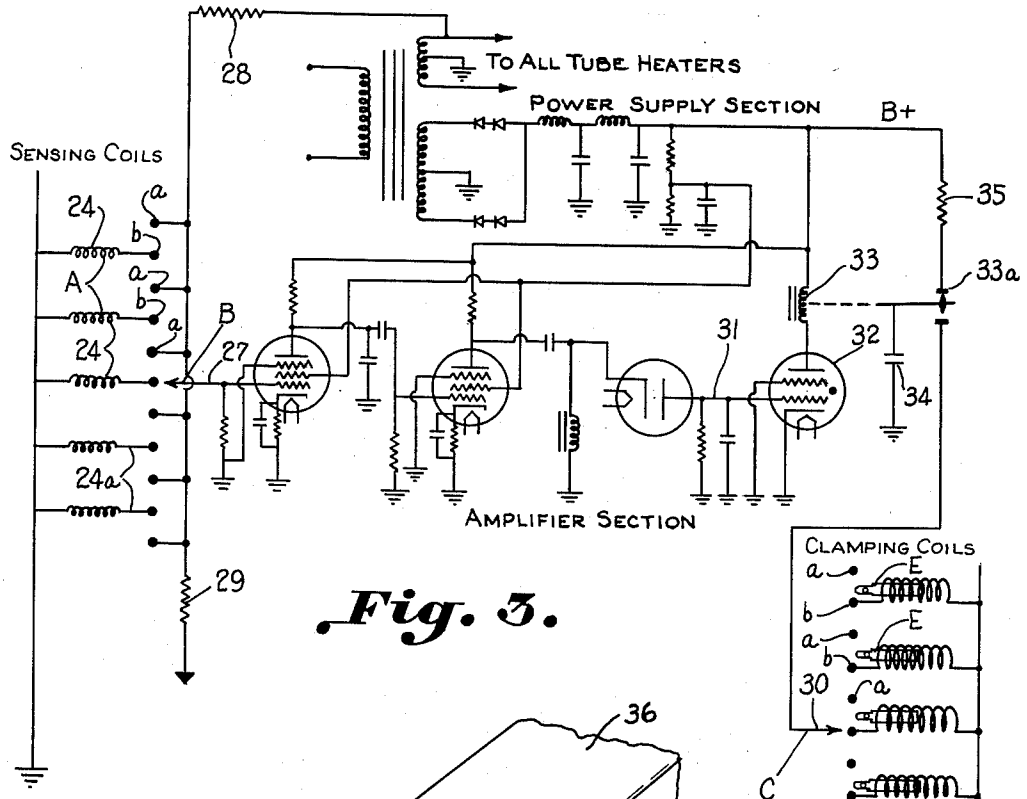

Fig. 3.

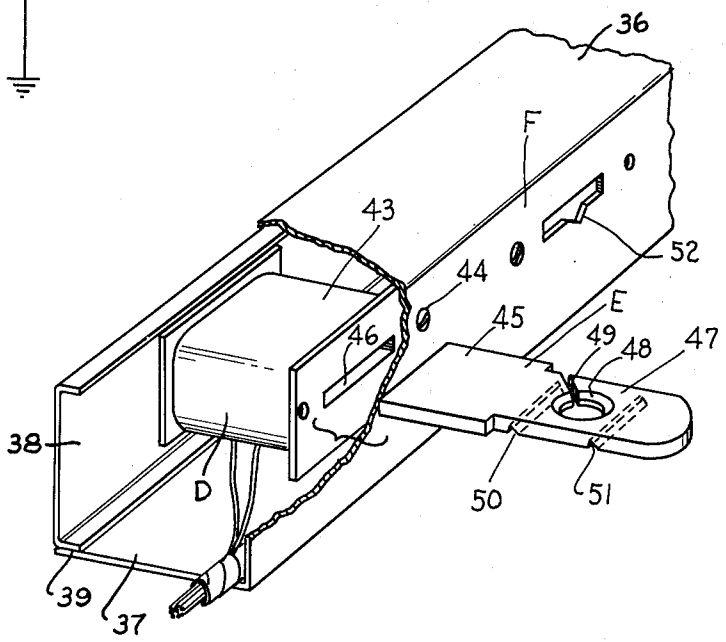

Fig. 4.

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United States Patent Office 3,102,378 Patented Sept. 3, 1963

3,102,378

TEXTILE STRAND CONTROL DEVICE

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Filed Feb. 28, 1961, Ser. No. 92,353
7 Claims. (Cl. 57—81)

This invention relates to a textile control device and particularly a device suitable for use with a textile machine in which a plurality of textile strands are supplied from a first package and then placed on a second package.

During such processes the textile strand often becomes broken with resultant loss of production and increased maintenance cost. This is particularly true in the case of a spinning or twisting frame having a drafting system in which the supply of roving is passed through a drafting process. Where an ends down condition occurs in such a system the roving often laps up upon the rolls of the drafting system causing damage to the rolls, aprons and auxiliary parts. Often where such a strand becomes broken and the supply continues to feed roving and the like to the drafting system, adjacent strands become damaged by becoming entangled with the excess fibers fed to the drafting system. The invention, therefore, especially involves the detecting and arresting of the supply of yarn after an end comes down or becomes otherwise faulty.

Accordingly, it is an object of this invention to arrest the feeding of roving and the like from the supply after an end comes down or becomes excessively slack.

An important object of this invention is to save waste and especially to avoid damage to adjacent strands when an end of roving comes down or becomes defective.

Another object of the invention is to reduce maintenance cost by avoiding damage to the drafting system resulting from the continued feeding of roving from its supply.

Another object of the invention is to provide an electrically operated device which, upon sensing that a strand is defective, will break back the defective strand.

Still another object of the invention is to provide an automatically operable means for arresting the yarn supply when an end comes down in a textile machine, thus avoiding the wasting of stock.

Yet another object of the invention is to provide a means to arrest the supply of a moving strand by clamping, thus causing the strand to part without the necessity of shearing same.

A further object of the invention is to provide a clamping means having the above advantages which is positively positioned and will not interfere with the normal passage of the strands but which, when actuated, will positively clamp same until the defect is repaired and the clamp reset.

The construction designed to carry out the invention will be hereinafter described, together with other features thereof.

The invention will be more readily understood from a reading of the following specification and by reference to the accompanying drawings forming a part thereof, wherein an example of the invention is shown and wherein:

FIGURE 1 is a perspective view illustrating a preferred embodiment of the invention in use with a spinning frame,

FIGURE 2 is a transverse sectional view taken on the line 2—2 in FIGURE 1,

FIGURE 3 is a circuit diagram schematically showing the various electrical components used in operating the preferred embodiment of the invention illustrated, and

FIGURE 4 is an enlarged perspective view illustrating a clamping device constructed in accordance with the present invention.

In the preferred embodiment of the invention sensing means A are illustrated in the form of variable reluctance pick up coils of the type shown in United States Letters Patent No. 2,930,180 entitled, Control System for Textile Machines in the name of Felton B. Bailey. A first scanning device B, schematically shown in FIGURE 3, has means detecting the signal produced by the variable reluctance pick up A. This signal is amplified and used by the movable member of an output or second scanner C to energize the coils D. The coils D operate clamping mechanisms E mounted in conjunction with a clamping plate F to arrest the supply when a signal is received from corresponding sensing coils A. It will be noted that the clamping plate F forms a part of a housing carrying a plurality of such coils and that the clamping mechanisms E are provided with threading means as well as means in the form of transverse grooves for positively positioning same when in inoperative position and when clamping yarn.

Referring more especially to the drawings, FIGURES 1 and 2 illustrate a spinning frame 10 provided with an overhead or "umbrella" creel 11 from which a number of packages of roving 12 are suspended. The roving supply from the packages 12 passes over the guide rail 13 and through the clamping means E. The clamping means E are carried adjacent and project through the clamping plate F. The strands are then fed to a drafting system 14 which includes a plurality of the usual drafting rolls 15 through suitable trumpets 14*a*. The drafted textile strand then passes through pigtail guides 16 onto a spinning bobbin 17 to form a yarn package 18. The spindles 17 are mounted in the usual bolster rail 19 and driven by suitable spindle tape 20. The ring rail 21 carries spinning rings 22 having a movable traveler 23 for distributing the yarn on the bobbin 17 to form the package 18.

The variable reluctance type pick ups A or any other suitable sensing devices for detecting faulty strands may be used. The variable reluctance pick up devices A are shown in the form of coils 24 and each is suitably fastened by means including the screw 25 to the ring rail 21. The sensing coils have permanent magnets 26, as described in the above mentioned patent, for generating a small electric current responsive to the movement of the traveler about the ring 22. The variable reluctance coils 24 are connected to a suitable cable 24*a* for making the necessary electrical connections.

Referring now especially to FIGURE 3, the inspection or scanning of the sensing coils is accomplished by a scanning device B which includes two sets of contacts "*a*" and "*b*." When the rotor 27 is positioned contacting an "*a*" contact, a reset voltage is fed into the input of the amplifier section from the power supply section through a voltage divider in the form of resistors 28 and 29. This voltage is so adjusted in amplitude as to closely correspond to an actual signal from the sensing devices A and the purpose of this reset voltage will be described further below.

It will be noted that the rotor 30 of the output scanner or switch A which actuates the clamping mechanism is on an idle point for all its "*a*" positions. Corresponding contacts "*a*" and "*b*" are thus contacted by the rotor 30 of the mechanism C so that corresponding pick up coils A will actuate corresponding coil D and clamps E. Assuming, therefore, that the rotor 27 of the input scanner B is positioned contacting one of its points "*b*" at this same time the output arm 30 of the output scanner C is on its corresponding "*b*" point. A sensing coil A from one of the spindles is thus operably connected to a cutting coil D governing the supply of the same spindle.

In the absence of a defective strand there is a signal generated responsive to the movement of the traveler at

the particular spindle being scanned and, a bias voltage appears across the resistance capacitance circuit **31** in the amplifier section. This bias on the grid of the tube **32** will prevent the tube **32** from firing and therefore the relay **33** will not operate.

However, in the case of a defective strand no signal is received by the corresponding contacts "*b*" from the respective sensing coil A. No signal will be fed to the amplifier and no bias will appear across the circuit **31**. Therefore, the tube **32** will fire and the relay **33** will be operated. It will be noted that the relay **33** normally supplies a voltage from the power supply section to charge the condenser **34** through the resistor **35** and that the relay **33** controls the switch **32***a*. Thus when the relay **33** is actuated by an ends down condition it moves its contacts so that the electrical charge in the condenser **34** is discharged through the appropriate cutting coil D. A capacitor such as **34** is used here to prevent arcing because it is completely discharged within a very short period of time and because, should a component of the amplifier circuit fail, there will be no danger of initiating improper cutter actuations.

It should be pointed out that after an end is clamped, the capacitor **34** is discharged and if the next succeeding end is down, it is impossible to cut same until the capacitor is recharged. This is the purpose of the reset points "*a*" on the input scanner B. Immediately after each scanning of a "*b*" contact, the rotor **27** is returned to an "*a*" contact. This is the final phase of the operation of the amplifier and the reset voltage returns the contacts of the relay **33** to their normal position as shown.

The clamping plate F has a pair of rearwardly extending legs **36** and **37** for holding a back plate **38** as by a pressed fit at **39** to form an elongated closed housing. The housing is positioned on a bracket **40** behind the drafting system **14**. The housing formed by the clamping plate F is attached to the bracket **40** as by suitable fastening means such as the bolt and nut **41**. The bracket is secured to the frame **10** by suitable means including the bolt **42**. It will be noted that the clamping coils D are suitable means including the bolt **42**. It will be noted that the clamping coils D are in the form of solenoid coils **43** and that the solenoid coils are spaced within the housing and fixed to the cutting plate F by suitable means such as the mounting screws **44**. A suitable cable **43***a* is provided for energizing the solenoid coils **43** and the electronic gear described above is housed in a suitable control box **43***b* mounted on the frame **10**.

It will be noted that the clamping member E has a core **45** formed of magnetic material which is secured within the core **46** of the coil winding. The forwardly projecting portion or clamping member **47** is provided with a yarn or strand aperture **48** and a threading slot **49**. An abutment means is provided by the first slot **50** for normally holding the clamping member or yarn guide **47** in a positive strand guiding position and a second slot **51** provides an abutment means positioned forwardly of the yarn aperture **48** to fix same when in clamping position. It will be noted that a recessed clamping portion in the form of a substantially V-shaped slot **52** is provided to accommodate roving which is clamped between the clamping member E. The V-shaped slot **52** serves to wedge the strand, thus facilitating breaking the strand. Room is also provided to accommodate the strand so that the clamping member E may drop down engaging the slot **51** in clamping position.

While a preferred embodiment of the invention has been described using specific terms, such description is for illustrative purposes only, and it is to be understood that changes and variations may be made without departing from the spirit or scope of the following claims.

What is claimed is:

1. A control device for a textile machine having a plurality of ends of textile strands moving from respective sources of supply including, a sensing device operated responsive to faulty ends of yarn, a first scanning device actuated responsive to the sensing device, electrically operable means arresting the feeding of yarn from the supply, electronic means actuated response to said first sensing device, and a second scanning device actuated by said electronic means operating the means arresting the feeding of yarn from the supply.

2. A control device for a textile machine having a plurality of ends of textile strands moving from respective sources of supply including, a sensing device normally giving a signal when the strand is moving properly and giving no signal responsive to a faulty end, a first scanning device actuated responsive to the sensing device, electrically operable means arresting the feeding of yarn from the supply, electronic means actuated responsive to said first sensing device, and a second scanning device actuated by said electronic means operating the means arresting the feeding of yarn from the supply.

3. A control device for a textile machine having a plurality of ends of textile strands moving from a supply to a drafting system including, an elongated clamping member positioned between the supply and the drafting system into which each strand is threaded, a clamping plate positioned adjacent said clamping member, electrically operable means actuated responsive to broken and excessively slack ends moving said clamping member into clamping relation to said plate, and mechanical means positively maintaining said clamping member in clamping position.

4. In a control device for a textile machine having a moving textile strand, a clamping means for arresting broken and excessively slack strands including, an elongated strand guide having an aperture for said strand, a threading slot connected to said aperture, a clamping plate positioned adjacent said strand guide, an abutment engaging said plate carried by the strand guide to positively position said guide with respect to said plate, and electrically operable means actuated responsive to broken and excessively slack ends retracting said strand guide into clamping relation to said plate.

5. In a control device for a textile machine having a moving textile strand, a clamping means for arresting broken and excessively slack strands including, an elongated strand guide having an aperture for said strand, a threading slot connected to said aperture, a clamping plate positioned adjacent said strand guide, a recessed clamping portion in said plate, an abutment engaging said plate carried by the strand guide to positively position said guide with respect to said plate, and electrically operable means actuated responsive to broken and excessively slack ends retracting said strand guide into clamping relation to said plate.

6. In a control device for a textile machine having a moving textile strand, a clamping means for arresting broken and excessively slack strands including, an elongated strand guide having an aperture for said strand, a threading slot connected to said aperture, a clamping plate positioned adjacent said strand guide, a substantially V-shaped clamping portion in said plate, a first abutment formed by a transverse slot engaging said plate carried by the strand guide to positively position said guide with respect to said plate, electrically operable means actuated responsive to broken and excessively slack ends retracting said strand guide into clamping relation to said plate, and a second abutment formed by a transverse slot engaging said plate carried by the strand guide to positively position said guide in clamping position.

7. In a control device for a textile machine having a moving textile strand, a clamping means for arresting broken and excessively slack strands including, elongated strand guides each having an aperture for said strand, a threading slot connected to each aperture, a clamping plate positioned adjacent said strand guides, an abutment engaging said plate carried by each strand guide to posi-

tively position said guides with respect to said plate, a housing formed with said plate, and a plurality of spaced coils carried within said housing each carrying a strand guide, said coils being actuated responsive to broken and excessively slack ends for retracting respective strand guides into clamping relation to said plate.

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