

[54] YARN HANDLING

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[58] Field of Search. 57/34 R, 78, 80,
57/83, 86, 87, 53; 242/19, 35.5, 37

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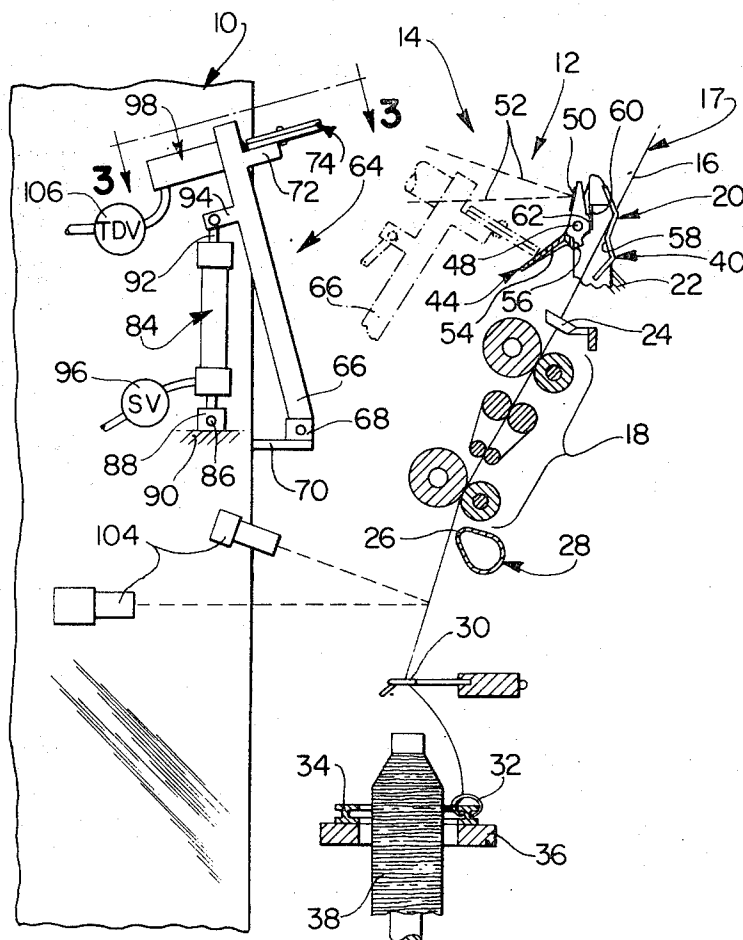
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[57] ABSTRACT

Automatic servicing apparatus for spinning stations of

one or more spinning frames includes provision for severing and clamping roving to stop feeding of the roving and to present a cleanly severed supply end of the roving in convenient position for subsequent thread-up. A carriage patrols the spinning stations and stops at any station requiring servicing, whereupon mechanism on the carriage doffs the bobbin being wound at the station, donns an empty bobbin core and normally starts the yarn spun from the roving winding onto the empty bobbin. If a station cannot be adequately serviced by the carriage mechanism a signal initiates operation of a scissor on the carriage and as the scissor is moved to an operative position for cutting the roving upstream of the drafting roll stand a roving clamp clamps the severed end of the roving extending from the roving supply. The scissor is then retracted and the station is rendered inoperative by the prior movement of a target on the clamp to a position in which a photo responsive sensor is not actuated so that the carriage subsequently by-passes the station.

7 Claims, 4 Drawing Figures



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3,751,896

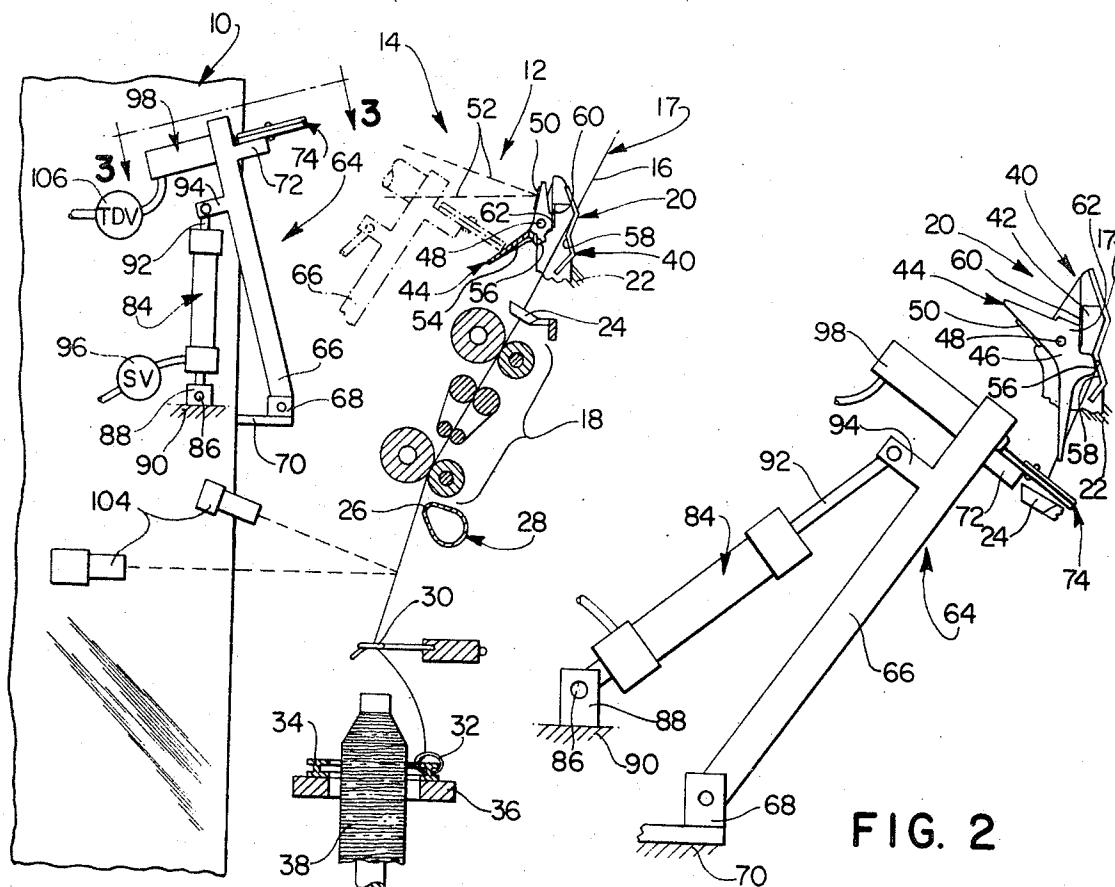


FIG. 1

FIG. 2

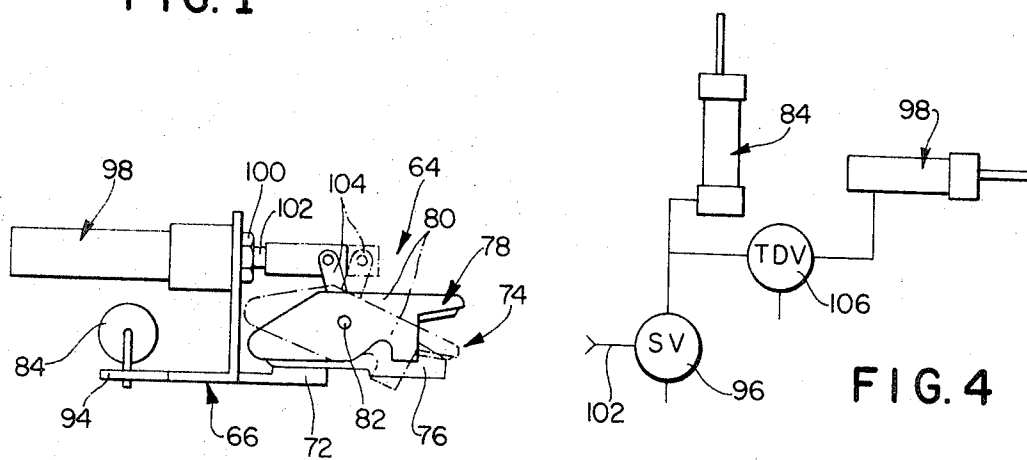


FIG. 3

FIG. 4

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YARN HANDLING

This invention relates to strand handling and, more particularly, to apparatus for severing and clamping strands of yarn on a textile machine.

BACKGROUND OF THE INVENTION

The general environment of a spinning frame and a patrolling carriage with mechanism for doffing and donning bobbins and threading-up spinning stations is disclosed in a Leeson Corporation U.S. Pat. No. 3,403,866, granted Oct. 1, 1968, and incorporated by reference. As disclosed in this patent, a knife blade 282 on the carriage is extended by a double-acting operating cylinder 274 to cut the roving prior to its entry into a drafting roll stand 34. A lower severed end of the roving is disposed of through a port in a suction pipe 64 while the severed end of the roving extending from a supply package R may be subsequently threaded-up by an attendant. The operating cylinder is actuated through a solenoid operated valve 800 shown in FIG. 30 and actuated by a suitable signal as disclosed in the aforementioned patent.

SUMMARY OF THE INVENTION

The present invention, in brief, is directed to a severing mechanism on the previously discussed patrolling carriage for severing the roving upstream of the drafting roll stand, and to retaining devices, one for each of the spinning stations, to hold the severed end of the roving extending from a roving supply package at the associated station. More particularly, the severing mechanism includes a scissor movable from a retracted position on the carriage to an extended, operational position for severing the roving at a station being serviced by the carriage. The retaining devices are in the form of roving clamps mounted on a fixed portion of the spinning frame, each at its associated station.

It is an object of this invention to provide a new and useful strand handling apparatus.

Another object is provision of new and useful apparatus for severing and clamping a strand.

A more specific object is provision of apparatus for handling strands, the apparatus including a plurality of stations, one for handling each of the strands, with retaining apparatuses, one for each of the stations, each retaining apparatus being operable for releasably holding the strand at the associated station, and severing apparatus for patrolling the stations and operable for severing the strand and any station, and operating mechanism for operating the severing and retaining apparatuses.

These and other objects and advantages of the invention will be apparent from the following description and the accompanying drawing.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a fragmentary, schematic, elevational view illustrating a preferred embodiment of the invention in a normal position, and in phantom lines in a traveling position;

FIG. 2 is an enlarged, fragmentary, schematic elevational view of the apparatus shown in FIG. 1, in an operational position, with parts omitted for clearer illustration;

FIG. 3 is an enlarged, fragmentary, schematic view taken generally along the line 3—3 in FIG. 1 and look-

ing downwardly on a portion of the apparatus, with parts omitted for clearer illustration; and

FIG. 4 is a pneumatic diagram of a system for operating the apparatus shown in FIGS. 1-3.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIG. 1 of the drawing, a carriage 10 is mounted and driven in any suitable manner, for example as shown in the previously noted patent, for patrolling a plurality of spinning stations 12 (only one shown) of one or more spinning frames 14, and for stopping to service any of the stations 12 requiring servicing.

With continued reference to FIG. 1 an unwinding end 16 of a strand 17 of roving from a supply package (not shown) is normally advanced downwardly by a drafting roll stand 18. Between the supply package and the stand 18 the strand 17 normally passes through an open or released retainer clamp 20 fixedly mounted on a fixed portion 22 of the spinning frame 14. The strand 17 then passes through a trumpet guide 24 and the drafting roll stand 18, past a yarn guide 30 and a traveler 32 on a traveler ring 34 fixed on a vertically reciprocating ring rail 36 of the spinning frame 14, from which the resultant spun yarn is wound onto a rotating bobbin 38. Should the strand 17 break downstream of the drafting roll stand 18 the end of the roving emerging from the drafting roll stand is sucked in through the port 26 in the suction line 28 and is carried to a suitable disposal location.

The roving clamp 20 includes a base member 40 which is suitably fixed to the fixed portion 22 of the spinning frame 14 and has a pair of spaced apart ears 42 (only one shown) between which the roving strand 17 passes downwardly and through the trumpet guide 24 to the drafting roll stand 18.

A clamp member 44 has opposed flanges 46 (FIG. 2) adjacent to the ears 42 which are pivoted thereon by a generally horizontal pivot pin 48. Upper ends of these flanges carry therebetween a target 50 for reflecting a beam of light 52 (FIG. 1) from a suitable source (not shown) to a photo responsive cell (not shown) when the station is operational at which time the clamp member 44 is in a released position, as shown in FIG. 1, so that the carriage 10 will stop at the station when the station requires servicing, as is described in U.S. Pat. No. 3,498,039. Lower ends of the clamp member flanges 46 are attached to a web 54 extending therebetween and providing a clamping surface 56 for engaging the roving strand 17 and urging it against a cooperating clamping surface 58 on the base member 40 as the clamp member 44 moves from its released position (FIG. 1) to a clamping position (FIG. 2).

An overcenter mechanism retains the clamp member 44 in either its released position or its clamping position and includes a leaf spring 60 (FIG. 2) on the base member 40 cooperating with a cam 62 on the clamp member 44. Both the base and the clamp members may be a suitable resilient, injection molded plastic such as an acetal resin. When the web 54 is urged slightly counterclockwise from the released position shown in FIG. 1, the cam 62 moves overcenter on the leaf spring 60 and causes the clamping surface to be snapped against the roving strand 17 to clamp the roving against the clamping surface on the base member. A sufficiently light force holds the roving clamped so that it may continue to be advanced by the drafting roll stand so that

a clean severed end is provided by the severing apparatus.

As the machine attendant looks down the row of spinning stations 12 any clamp members 44 which are in the clamping position as shown in FIG. 2 are easily detected from the clamp members in the released position shown in FIG. 1. Thus the attendant may easily locate stations which have been rendered non-operational, and may promptly provide these stations with such attention as is necessary.

With reference to FIGS. 1-3 a severing mechanism 64 is mounted on the carriage 10 for patrolling movement therewith and includes a supporting arm 66 pivoted at its lower end to a bracket 68 fixedly secured to a frame portion 70 of the carriage 10. At its upper end the arm 66 has an outwardly extending tab 72 (FIG. 3) to which is fixedly secured, in any suitable manner (not shown), a severing head 74 and, more particularly to a fixed blade 76 of a scissor 78. A movable blade 80 of the scissor 78 is pivoted to the fixed blade 76 by a pivot pin 82. The arm 66 and scissor 78 are mounted for pivotal movement from a retracted or first position (FIG. 1) to an operational or second position (FIG. 2) in which position the open blades 76 and 80 of the scissor 78 embrace the roving strand 17 extending from the clamp 20 to the trumpet guide 24 and are then operated to cut the roving strand.

An operating mechanism for moving the arm 66 and the scissor 78 between the retracted and operational positions, for operating the scissor to cut the roving strand 17 and for operating the clamp 20 includes a pneumatic operating cylinder 84 having its lower end pivotally connected by means of a pin 86 to a bracket 88 on a fixed portion 90 of the carriage 10, and having its piston rod 92 pivotally connected to a finger 94 extending outwardly from the arm 66. This cylinder may be either double acting cylinder or a spring return cylinder as illustrated, and is connected with a normally closed solenoid operated valve 96 (FIGS. 1 and 4). When the valve 96 is opened the arm 66 is swung from its retracted or first position (FIG. 1) to its operational or second position (FIG. 2).

The operating mechanism also includes a second pneumatic operating cylinder 98 fixedly secured to an upper portion of the arm 66 by a nut 100 (FIG. 3). This cylinder may also be a double acting cylinder or, as illustrated, a spring return cylinder. The piston rod 102 of the cylinder 98 is pivotally connected with a tab 104 on the movable blade 80 of the scissor 78 to close the blades 76 and 80 (phantom lines in FIG. 3) and cut the roving strand 17. After the roving strand is cut a free end of about 2 inches extends downwardly from the clamp 20 toward the trumpet guide 24 so that the machine attendant may easily grasp the severed end and release the clamp by pressing the target area 50 inwardly (clockwise) and thereupon proceed with threading the strand through the trumpet guide 24 and the drafting roll stand 18, and so forth.

During movement of the arm 66 and the scissor 78 between the positions shown in FIGS. 1 and 2 an abutment, here in the form of the outer ends of the scissor blades 76 and 80, engages the clamp member web and trips the clamp member 44 which moves overcenter to clamp the roving strand 17 as the scissor 78 continues to move to its second position as shown in FIG. 2.

The portion of the operating mechanism shown in FIG. 4 is part of a more extensive pneumatic and elec-

trical control system, for example as noted in the two previously mentioned patents. As illustrated in FIG. 4 a source of air pressure 102 is applied to the normally closed solenoid valve 96, which is connected in the overall pneumatic circuit shown in previously noted U.S. Pat. No. 3,403,866 in the position of the previously discussed solenoid operated valve 800 therein. After one or more servicing attempts by the mechanism on the carriage 10 the presence of the strand between the drafting roll stand 18 and the guide 30 is sensed by a photo responsive sensor system 104 (FIG. 1), as shown in the previously noted U.S. Pat. No. 3,498,039, or in any other suitable manner. If the strand is present the servicing operation has been successful and the carriage 10 resumes its patrolling movement. If the servicing attempt was not successful a signal (a lack of a light transmission) is provided by the photo responsive system 104 whereupon the solenoid valve 96 is energized and pass operating air to the arm actuating cylinder 84, thereby swinging the arm 66 clockwise from the position shown in FIG. 1 to the position shown in FIG. 2. When the solenoid valve is open operating air pressure passes to any suitable type of pneumatic time delay valve 106, and after a sufficient delay to permit the scissor 78 to move to the position shown in FIG. 2 embracing the roving, the valve 106 opens for passage of operating air pressure to the scissor operating cylinder 98, whereupon the roving strand 17 is cut. Both the solenoid valve 96 and the time delay valve 106 are vented and upon the solenoid valve closing, the operating pressure is vented from the arm operating cylinder 84. Thus, arm 66 is retracted back to the position shown in FIG. 1 and operating pressure is vented through the time delay valve 106 from the scissor operating cylinder 98 so that the scissor 78 is opened.

While this invention has been described with reference to a particular embodiment in a particular environment, various changes may be apparent to one skilled in the art and the invention is therefore not to be limited to such embodiment or environment except as set forth in the appended claims.

What is claimed is:

1. Apparatus for servicing at least one strand processing station of a plurality of such stations comprising, strand holding means operable to hold a strand at said one station, severing means, means for moving said severing means past said plurality of stations, said severing means being operable to sever the strand at said one station, and means for actuating said holding means at said one station and said severing means to hold and sever said strand at said station.

2. Apparatus as set forth in claim 1 wherein said holding means comprises means for clamping a severed end of a strand which has been severed.

3. Apparatus as set forth in claim 2 wherein said clamping means includes a base member, a clamp member mounted on said base member and movable from an open to a closed position, and overcenter means for alternately retaining said clamp member in the open position to permit movement of the strand past the clamping means and in the closed position to clamp said strand.

4. Apparatus as set forth in claim 3 wherein said overcenter means comprises a spring on one of said members to retain said clamp member in one of said open and closed positions.

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5. Apparatus as set forth in claim 4 wherein said severing means is movable from an inoperative position to an operative position for cutting said strand in response to operation thereof by said actuating means.

6. Apparatus as set forth in claim 5 wherein said severing means includes a cutter having at least one movable blade, and including piston means for operating said blade to sever said strand when said severing

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means is in said operative position.

7. Apparatus as set forth in claim 5 wherein said severing means includes an abutment, said abutment being engageable with said clamp member as said severing means moves to said operative position to thereby urge said clamp member to its closed position.

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