

[54] APPARATUS FOR REMOVING WRAPS OF YARN REMAINING ON TEXTILE SPINDLES

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[58] Field of Search 57/34.5, 56, 57, 57/52, 34 TT, 34 R, 54; 28/19

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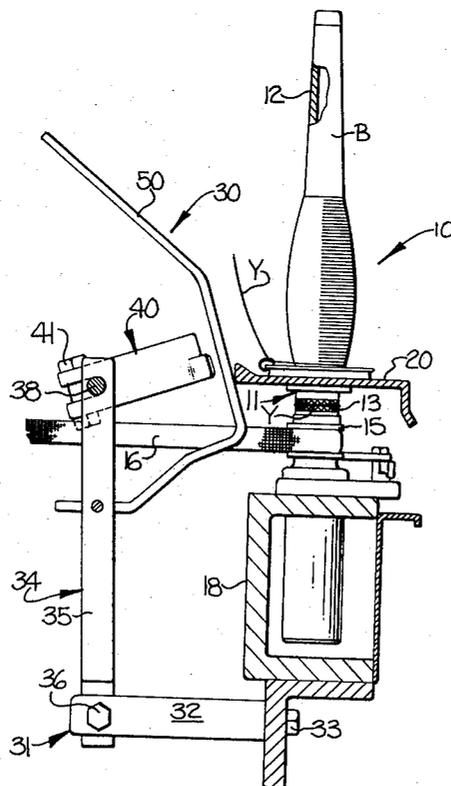
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[57] ABSTRACT

Apparatus for removing the last few wraps of yarn from the lower portion of spindles in a yarn processing machine which are left thereon as a result of doffing full bobbins of yarn. The apparatus comprises blades pivotally mounted for movement toward and away from the lower portion of the spindles in generally a transverse direction with respect to the spindles for assuming an operating position in which the blades are in close proximity to the lower portion of the spindle for removing the wraps during rotation of the spindles in the yarn processing operation and for assuming a non-operation position away from the lower portion of the spindles so that the ring rail mechanism may move to a lower position with respect to the spindles for applying the last few wraps of yarn around the lower portion of the spindle. The apparatus further includes a control device operatively connected with the blades and responsive to movement of the ring rail mechanism for moving the blades to the operating and non-operating positions.

3 Claims, 4 Drawing Figures



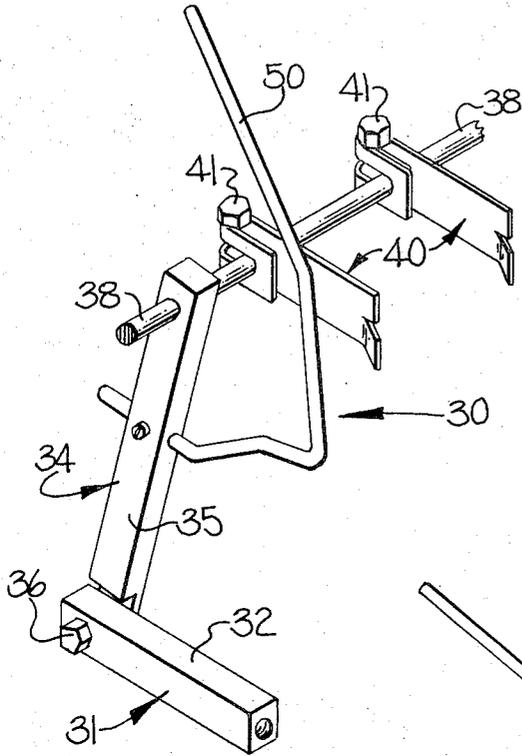


FIG-2

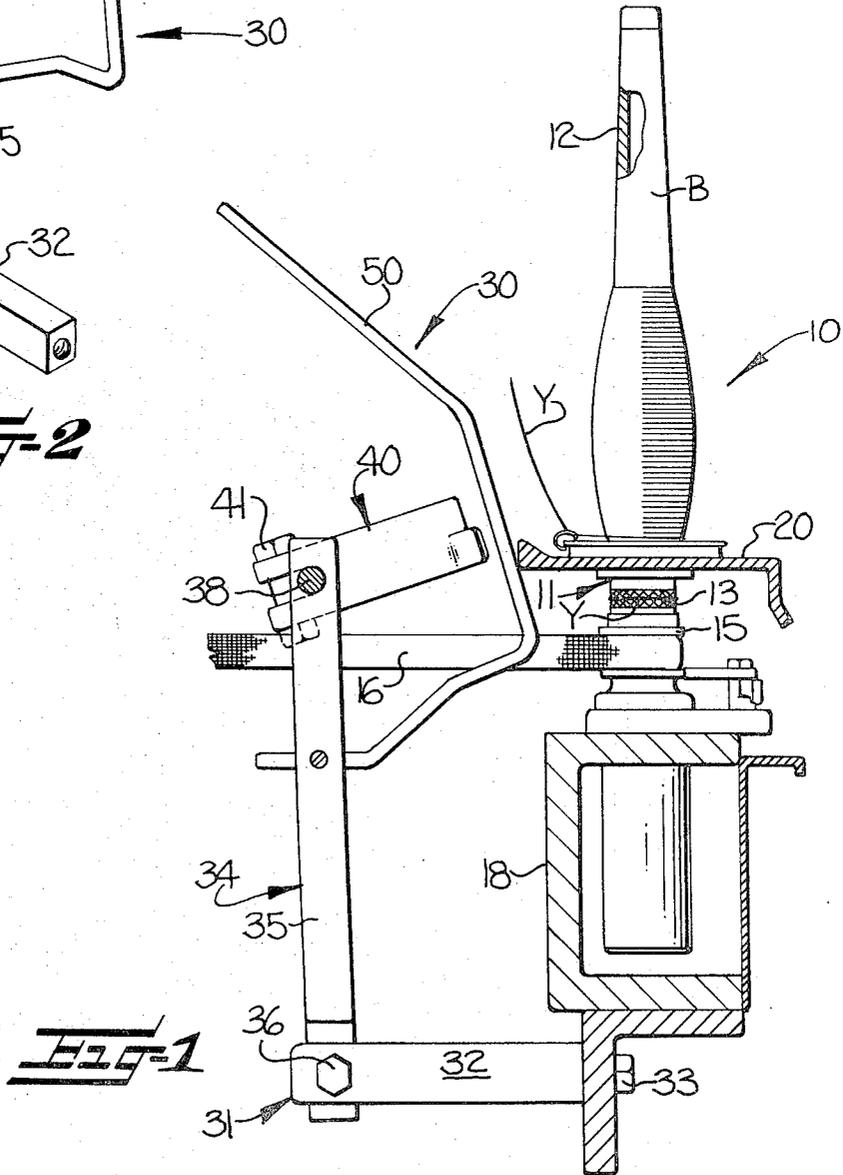
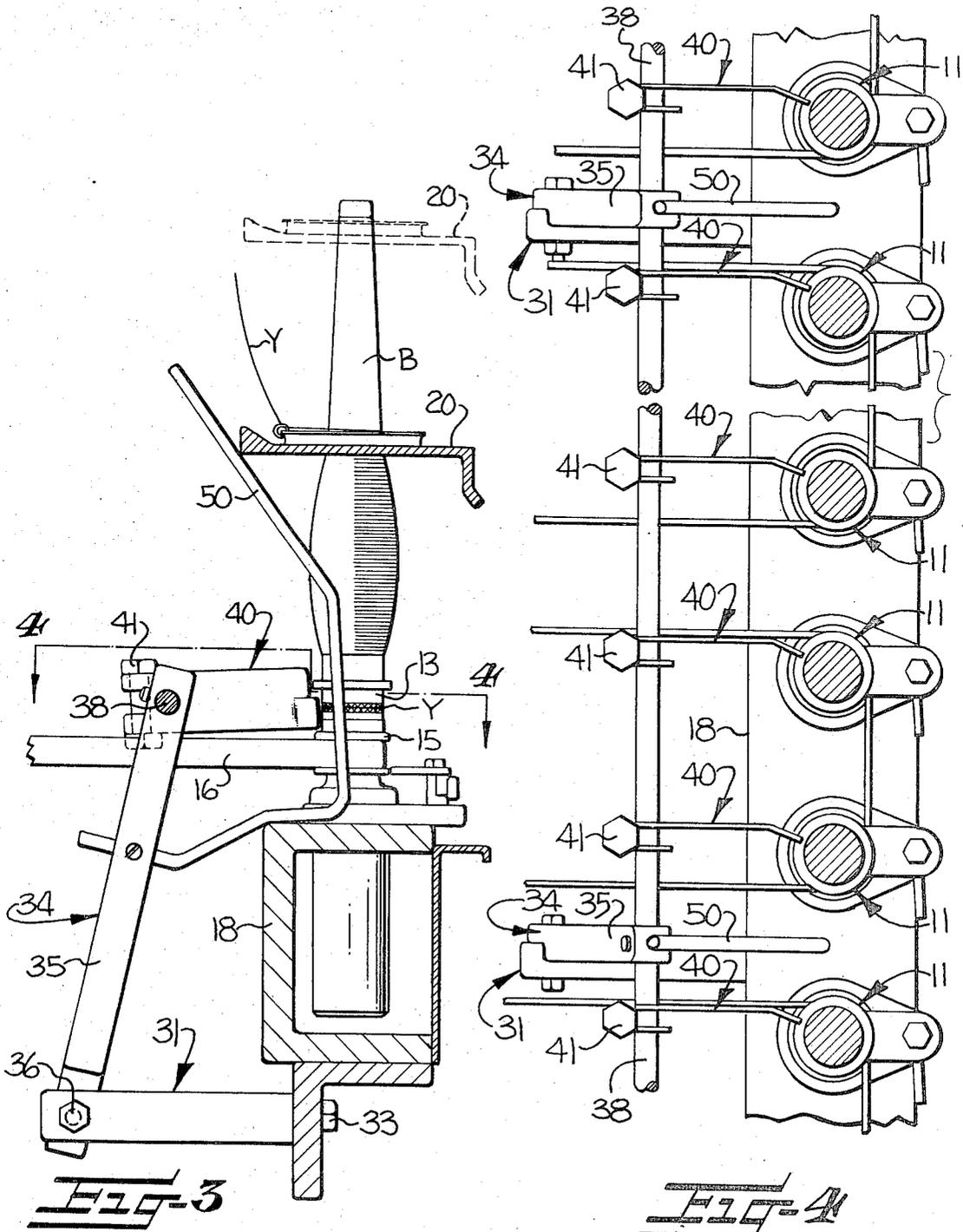


FIG-1



APPARATUS FOR REMOVING WRAPS OF YARN REMAINING ON TEXTILE SPINDLES

This invention relates to apparatus for removing the last few wraps of yarn left on the lower portion of spindles in a yarn processing machine, such as a spinning frame, twister or the like, as a result of doffing of full bobbins of yarn from the spindle.

In yarn processing machines, such as spinning frames, twisters or the like, yarn is processed on bobbins carried by rotating spindles until the bobbins have been filled and are ready to doff. Just prior to the doffing operation, the ring rail mechanism of the yarn processing machine is lowered to a position below the bottom of the bobbin and a few wraps of the yarn are placed around the lower portion of the spindle. The ring rail is then stopped in that position and the bobbins are pulled off or doffed from the spindles, either manually or with automatic doffing equipment. The removal of the bobbins from the spindles causes the yarn to break between the full bobbin and the last few wraps of yarn around the lower portion of the spindle. Empty bobbins are then placed on the spindles and the ring rail is raised for again processing yarn onto the empty bobbins. The above described operation results in accumulation of wraps of yarn around the lower portion of the spindles as a result of each doffing operation. This accumulation of wraps of yarn increases to the point where it must be removed.

Primarily, these accumulated wraps of yarn are removed manually by an operator with a knife or other cutting mechanism. Although various devices have been proposed for automatically removing these accumulated wraps of yarn from the lower portions of the spindles, most of these devices have been unsuccessful and are not widely commercialized. One of the problems existing with any such mechanism for removing the accumulated wraps of yarn is that the mechanism must be moved out of position in close proximity to the lower portion of the spindles when the ring rail mechanism is lowered to the position for applying the last few wraps of yarn around the lower portion of the spindles.

Accordingly, it is the object of this invention to provide apparatus for removing the accumulated wraps of yarn from the lower portion of the spindles of a yarn processing machine which are left on the lower portion of the spindles as a result of doffing operations and which eliminates the problems heretofore presented.

It has been found by this invention that the above object may be accomplished by providing, in a yarn processing machine including elongate rotating spindles each having an upper portion for receiving hollow yarn carrying bobbins thereon and a lower portion for receiving the last few wraps of yarn therearound prior to doffing of a full bobbin of yarn from the spindle and a yarn carrying ring rail mechanism for traversing movement up and down the spindles for processing the yarn on the bobbins, means for removing the last few wraps of yarn from the lower portion of the spindles during rotation of the spindles in the yarn processing operation. This means comprises blade means pivotally mounted for movement toward and away from the lower portion of the spindles in generally a transverse direction with respect to the spindles for assuming an operating position in which the blade means is in close proximity to the lower portion of the spindle for removing during the yarn processing operation the wraps of yarn left thereon after doffing of a full bobbin from the

spindle and for assuming a non-operating position away from the lower portion of the spindle so that the ring rail mechanism may move to a lower position with respect to the spindle for applying the last few wraps of yarn around the lower portion of the spindle. This means further comprises control means operatively connected with the blade means and responsive to movement of the ring rail mechanism for moving the blade means to the operating and non-operating positions.

Some of the objects of the invention having been stated, other objects will appear as the description proceeds when taken in conjunction with the accompanying drawings, in which

FIG. 1 is an elevational view of one spindle assembly of a yarn processing machine including the apparatus of this invention thereon in the non-operating position;

FIG. 2 is a partial perspective view of a portion of the apparatus of this invention disconnected from the yarn processing machine;

FIG. 3 is an elevational view, like FIG. 1, illustrating the apparatus of this invention in the operating position; and

FIG. 4 is a sectional view taken generally along the lines 4-4 of FIG. 3.

Referring now to the drawings, it is to be understood that the apparatus for removing the last few wraps of yarn from the lower portion of spindles in a yarn processing machine is applicable to a plurality of spindles which are normally vertically disposed in spaced apart, side by side relation in such yarn processing machines, e.g., spinning frame, twister or the like. In the drawings, FIGS. 1 and 2 illustrate a single assembly and FIG. 4 illustrates a plurality of spindle assemblies in side by side relation. However, the normal yarn processing machine would utilize many more spindle assemblies in spaced apart, side by side relation. Inasmuch as these yarn processing machines are well known to those with ordinary skill in the art an illustration of a complete yarn processing machine is not deemed necessary.

Each of the spindle assemblies, referred to generally by the reference numeral 10, in a yarn processing machine comprises a driven rotating spindle 11 having an upper portion 12 for receiving hollow yarn carrying bobbins B thereon and a lower portion 13 for receiving the last few wraps of yarn Y therearound, as explained more fully below. The spindle assembly 10 further includes a whorl 15 which receives a drive belt 16 for rotating the spindle assembly 10. Spindle assembly 10 is suitably mounted for rotation on frame 18 of the yarn processing machine, in a manner well known by those with ordinary skill in the art.

For processing yarn Y on bobbins B of spindle assemblies 10, there is provided a ring rail mechanism 20 which carries yarn Y and traverses up and down the rotating bobbins B on the spindle assemblies 10 to apply yarn thereto. These ring rail mechanisms 20 are conventional in textile yarn processing machines and a further description thereof is not deemed necessary herein.

During normal operation of a conventional yarn processing machine, e.g., spinning frame, twister or the like, after the bobbins B have been filled with yarn Y, the ring rail mechanism 25 is designed to drop to a lower position with respect to the spindle assembly 10 than previously utilized in placing the yarn Y on bobbins B. This results in the last few wraps of yarn Y on

bobbins B. This results in the last few wraps of yarn being applied to the lower portion 13 of the spindle assemblies 10. The ring rail mechanism 20 is then stopped in that position and bobbins B are pulled off or doffed from the spindle assemblies 10, either manually or by automatic doffing equipment. This removal of the bobbins from the spindle assemblies causes the yarn to break between the full bobbins and the last few wraps of yarn around about the lower portion 13 of the spindle assemblies 10. This results in an accumulation of wraps of yarn Y around the lower portion 13 of the spindle assemblies 10.

In accordance with the present invention, apparatus generally indicated by the numeral 30 has been added to the yarn processing machine. This apparatus 30 comprises a unitary frame, generally referred to by the numeral 31, consisting of a stationary portion 32 in the form of an arm secured to the frame 18 of the yarn processing machine in any suitable manner such as by a bolt means 33. The frame 31 further comprises a movable portion, generally indicated by 34, which may consist of upstanding arm members 35 pivotally mounted at one end by bolt means 36 to the outer free end of the stationary arm 32 and a shaft 38 extending generally horizontally along the yarn processing machine and each of the spindle assemblies 10 and connected with the arm members 35. Thus, the movable frame portion 34 is pivotally mounted with respect to the stationary frame portion 32.

The apparatus 30 further comprises a plurality of blades 40 connected to the movable frame portion 34 and specifically to the horizontally extending shaft 38 by bolt and nut means 41. A blade member 40 is positioned along the shaft 38 so as to be operatively associated with each of the spindle assemblies 10 in the yarn processing machine. These blade members 40 extend inwardly toward the lower portion 13 of the spindle assemblies 10 so that the movable frame portion 34 and the blade members 40 may assume an operating position in which the blades 40 are in close proximity to the lower portion 13 of the spindle assemblies 10, as shown in FIG. 3, and a non-operating position away from the lower portion 13 of the spindle assemblies 10, as shown in FIG. 1. The bolt and nut means 41 allows vertical adjustment of the blades 40 so that they may be placed in proper relationship to the lower portion 13 of the spindle assemblies 10. Additionally, the blades 40 may be of any suitable configuration and, as illustrated in the drawings, comprise a slightly offset portion on the forward end thereof.

The apparatus 30 further comprises a camming arm 50 which is secured to the upstanding arm 35 of the movable frame portion 34 and may be of any suitable configuration for engagement by the ring rail mechanism 20 of the yarn processing machine upon its downward movement for applying the last few wraps of yarn around the lower portion 13 of the spindle assembly 10 so that the blades 40 will be cammed or moved from the operating position, shown in FIG. 3, to the non-operating position, shown in FIG. 1, and so that the blades 40 will be out of the way of the ring rail mechanism 20 as it moves to the lower position.

In operation, the apparatus 30 normally assumes the position illustrated in FIG. 3 in which the blades 40 are in close proximity to the lower portions 13 of the spindle assemblies 10. This position of the blades 40 is maintained by gravity inasmuch as the arms 35, in this

position, are positioned at an acute angle with respect to the stationary arms 32. In this position of the blades 40, the ring rail mechanism is free to traverse up and down the bobbin for processing of the yarn Y on the bobbins B.

When the bobbins B have been filled and doffing of the bobbins B from the spindle assemblies 10 is desired, the ring rail mechanism 20 moves to a lower position for applying the last few wraps of yarn Y around the lower portion 13 of the spindle assemblies 10. As the ring rail mechanism moves down to this lower position, it will engage the camming arm 50 and pivot the blades 40 and movable frame portion 34 to the non-operating position, illustrated in FIG. 1, so that the ring rail mechanism 20 will be free to move to the lower position and the blades 40 will be out of the way. After doffing of the full bobbins B from the spindle assemblies 10, the ring rail mechanism will raise to its normal operating position for processing yarn Y on the bobbins B. The blades 40 and movable frame portion 35 will move back into the operating position, illustrated in FIG. 3, so that the forward portion of the blade 40 is in close proximity to the lower portion 13 of the spindle assemblies 10. In this position, the blades 40 will contact and abraid or cut the wraps of yarn Y left on the lower portions 13 of the spindle assemblies 10 and these undesirable accumulations of remaining wraps of yarn Y will be removed from the lower portions 13 of the spindle assemblies 10.

Thus it may be seen, that this invention has provided a simple, inexpensive, practical apparatus for removing the undesirable accumulations of the last few wraps of yarn left on the lower portions of spindle assemblies in yarn processing machines and which apparatus does not interfere with the lowering of the ring rail mechanism of the yarn processing machines for applying the last few wraps of yarn around the lower portion of the spindle assemblies.

In the drawing and specification, there has been set forth a preferred embodiment of this invention and, although specific terms are employed, they are used in a generic and descriptive sense only and not for purposes of limitation.

That which is claimed is:

1. In a yarn processing machine including elongate rotating spindles each having an upper portion for receiving hollow yarn carrying bobbins thereon and a lower portion for receiving the last few wraps of yarn therearound prior to doffing of a full bobbin of yarn from said spindle, and a yarn carrying ring rail mechanism for traversing movement up and down said spindles for processing the yarn on the bobbins; the improvement therewith of:

means for removing the last few wraps of yarn from said lower portion of said spindle during rotation of said spindle in the yarn processing operation, said means comprising blade means pivotally mounted for movement toward and away from said lower portion of said spindle in generally a transverse direction with respect to said spindle for assuming an operating position in which said blade means is in close proximity to said lower portion of said spindle for removing during the yarn processing operation the wraps of yarn left thereon after doffing of a full bobbin of yarn from said spindle and for assuming a non-operating position away from said lower portion of said spindle so that said ring rail mechanism

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may move to a lower position with respect to said spindle for applying the last few wraps of yarn around said lower portion of said spindle, said means further comprising control means operatively connected with said blade means and responsive to movement of said ring rail mechanism for moving said blade means to the operating and non-operating positions.

2. In a yarn processing machine, as set forth in claim 1, in which said control means comprises a camming arm operatively connected to said blade means and constructed for engagement by said ring rail mechanism, when said ring rail mechanism moves to its lower position for applying the last few wraps of yarn around said lower portion of said spindle, for moving said blade means against the force of gravity to the non-operating position away from said lower portion of said spindle.

3. In a yarn processing machine, as set forth in claim 1, in which said means for removing the last few wraps of yarn additionally comprises a unitary frame means

including a stationary portion connected to said yarn processing machine and a movable portion pivotally secured to said stationary portion, a part of said movable portion extending generally horizontally along said yarn processing machine and each of said spindles therein, said blade means being secured to said extending part of said movable portion of said frame means and comprising a separate blade operatively associated with each of said spindles, said control means comprising a camming arm connected to said movable portion of said frame and constructed for engagement by said ring rail mechanism, when said ring rail mechanism moves to its lower position for applying the last few wraps of yarn around the lower portion of said spindle, for moving said movable portion of said frame and thus said blades against the force of gravity to the non-operating position away from said lower portion of said spindle.

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