Oct. 10 1967 J. R. WHITEHURST 3,345,696

CALENDER ROLL LOADING AND KNOCK-OFF

Filed June 7, 1965 2 Sheets-Sheet 1

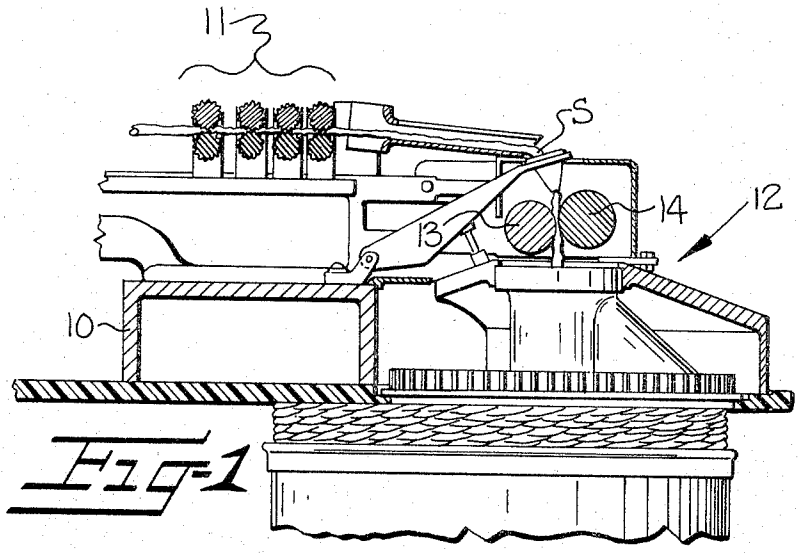

Fig-1

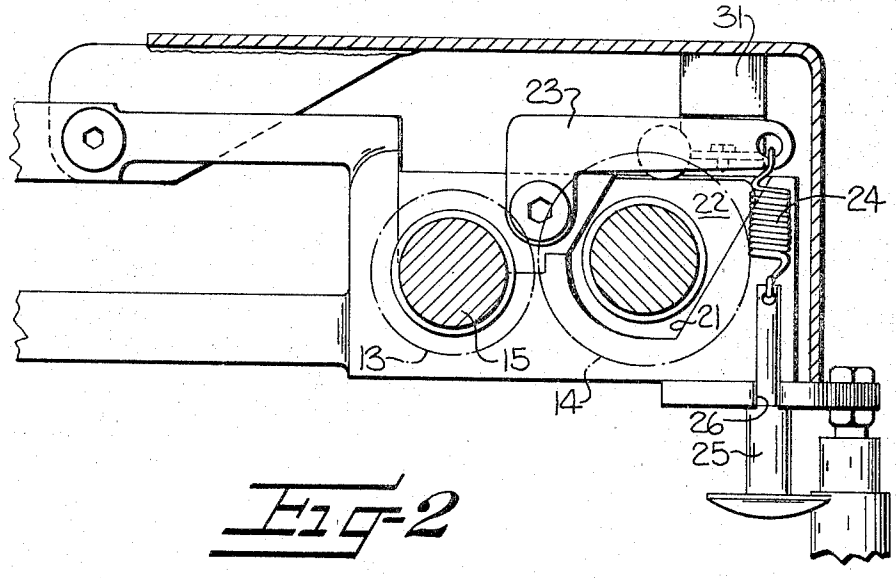

Fig-2

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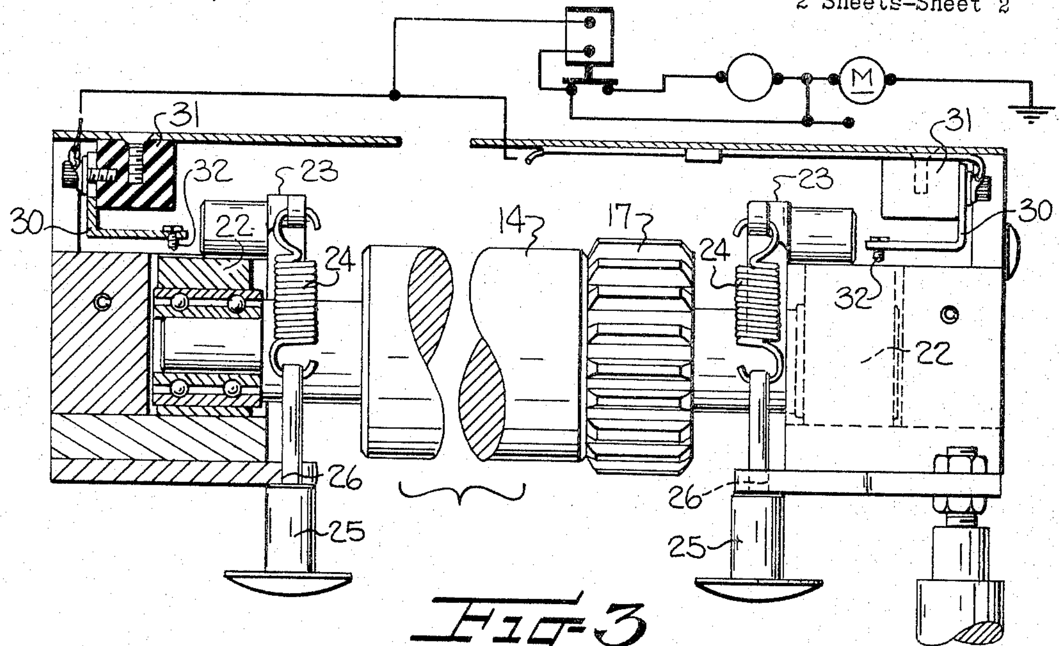

Fig-3

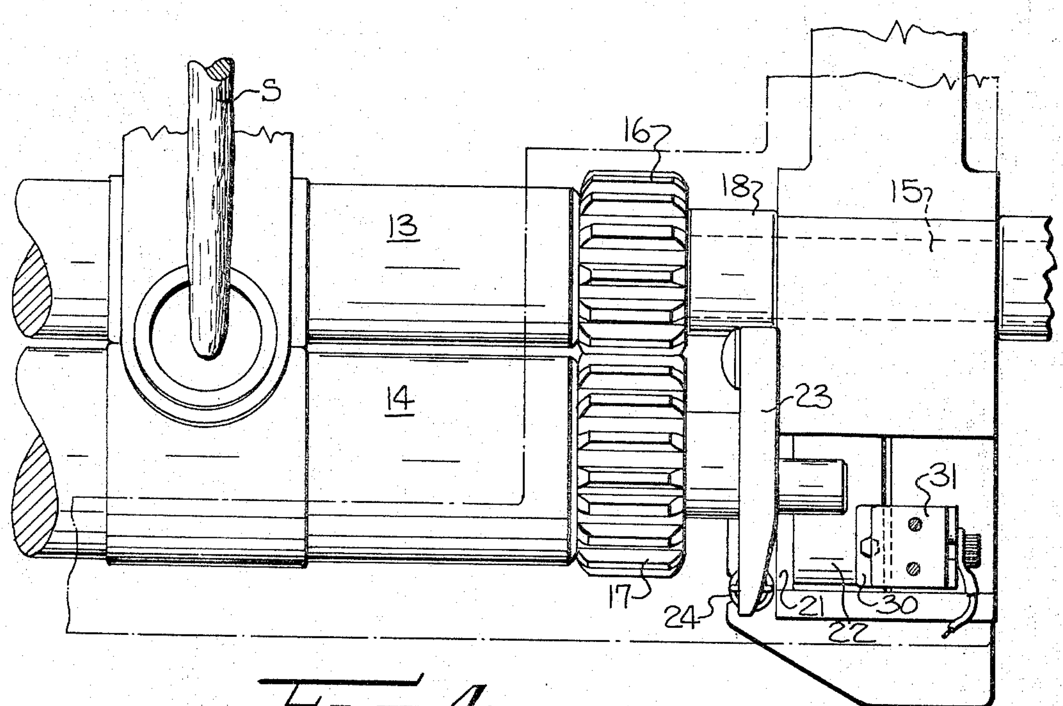

Fig-4

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CALENDER ROLL LOADING AND KNOCK-OFF

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ABSTRACT OF THE DISCLOSURE

A pair of calender rolls for a textile machine wherein one of the rolls is resiliently urged toward the other roll and can move away from the other roll as when a lap-up condition occurs around one of the rolls, with such displacing movement of the roll energizing an electrical circuit for stopping the operation of the textile machine.

This invention pertains to a machine for processing textile fiber, and more particularly to a calender roll weight loading and knock-off means for use in combination with such a machine.

Various machines for processing textile fiber, as generally well known, employ drafting instrumentalities to draft textile sliver, which is then passed to a coiler mechanism and packaged for transfer to a subsequent processing operation. The coiler mechanism, in preparing the sliver delivered from the instrumentalities for packaging and in packaging that sliver, condenses the sliver to a certain degree in order to obtain a higher density packaging. The condensing of the sliver is performed, in part, by calender rolls mounted to form a nip through which the sliver passes. The calender rolls are so supported or urged together as to apply a considerable compressive force to the textile sliver, and obtain the desired results. Typically, one calender roll is fixed to a driven shaft which carries a driving gear, and a second calender roll is mounted adjacent the first calender roll and carries a driven gear which engages the driving gear fixed to the shaft of the first calender roll. Fluted calender rolls which cooperate by meshing of their fluted surfaces are also known, and are mounted similarly to gear driven rolls.

In processing textile fibers, sliver passing through calender rolls will on occasion adhere to the surface of a calender roll and is not delivered from the nip of the calender rolls but will lap-up or choke-up on a calender roll by winding around the calender roll as it rotates. In conventional textile machines, such a lap-up or choke-up of sliver will severely damage the machine, if the same is not promptly stopped, or at the very least require that substantial portions of the machine be dismantled in order to clear the lap-up before operation may again be resumed. Damage to the machine results when the quantity of sliver wrapped around a calender roll becomes such as to force the calender rolls apart to such a degree that the driving and driven gears or rolls are no longer in proper engagement, so that, if the machine is not stopped, they are so damaged by chipping or stripping as to require that they be replaced. Further, in conventional machines in which the compressive force exerted by the calender rolls is determined by the fixed position of the calender rolls, it has been necessary to dismantle the portions of the machine supporting the calender rolls in order to gain access to a calender roll and remove a lap-up. In prior art machines employing loading forces to obtain the desired compressive effect of the calender rolls, it has been necessary to dismantle and/or remove the loading mechanism in order to gain access and clear a lap-up. Understandably, even in those conventional machines provided with knock-off or stop motions to avoid damage, dismantling either a portion

of the frame of the machine or the loading mechanism is a time-consuming task.

The calender roll loading means of this invention avoids these deficiences of conventional mechanisms used with textile machines by significantly reducing the effort required to clear a lap-up, once such a lap-up occurs.

Accordingly, it is an object of this invention to provide an improved mechanism for use in combination with a textile machine which stops the operation of the machine on occurrence of a lap-up of sliver around a calender roll and significantly reduces the effort required to clear such a lap-up.

A further object of this invention is to provide a weight loading mechanism for a calender roll used in combination with a drawing machine which is easily removable to permit access to a calender roll to clear a lap-up of sliver from around the calender roll.

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

FIGURE 1 is a side view, in section, through a drawing machine incorporating the present invention;

FIGURE 2 is a side view, in section, showing a detail of the drawing machine of FIGURE 1;

FIGURE 3 is a front view, in partial section, showing the calender roll section of the drawing machine of FIGURE 1; and

FIGURE 4 is a top view of the calender roll section illustrated in FIGURE 3.

Referring to the drawings, one type of textile machine, which is a drawing machine for textile fibers, has a frame **10** on which are supported drafting instrumentalities defining a drafting zone **11** in which textile slivers are processed, and coiling mechanism indicated generally at **12** to which a textile sliver is delivered from the drafting zone **11**. The coiling mechanism includes a first calender roll **13** and a second calender roll **14** mounted adjacent each other to form a nip through which a textile sliver S passes, as shown in FIGURE 1. The first calender roll **13** is fixed to a roll shaft **15** which is driven by a gear train (not shown) from the drive for the drafting instrumentalities. Fixed to and carried by the roll shaft **15** is a driving gear **16**, which engages a driven gear **17** carried by the second calender roll to drive the two calender rolls **13, 14** in coordinated movement.

In order to provide the desired compressive force on the sliver S passing through the nip between the calender rolls **13, 14**, the calender rolls are supported on the frame for rotation on normally predetermined axes. The first calender roll **13** is supported by fixed bearings **18** positioned on the frame **10** to receive the roll shaft **15** and hold the first calender roll **13** against movement with respect to the frame. The frame **10** carries upwardly inclined surfaces **21** and floating bearings **22** are positioned in engagement with these inclined surfaces and include bearings which receive and support the second calender roll **14** for rotation about an axis spaced from and parallel to the axis of rotation of the first calender roll **13**. Thus, when the second calender roll **14** is in its normal position and the sliver S is passing through the nip of the calender rolls without lapping up about either calender roll, the second calender roll **14** is supported for rotation on an axis at a predetermined distance from the axis of the first calender roll **13** by floating bearings, formed by the bearing blocks **22** which are supported on the inclined surfaces **21** formed in the drawing machine frame **10**.

In order to assure that the proper compressive force is exerted against the sliver S passing through the nip between the calender rolls and yet permit easy removal of a calender roll in order to clear a lap-up of sliver about a roll, this invention provides an improved calender roll

loading mechanism. This mechanism is best shown in FIGURES 2–4, where a loading lever **23** is shown to be pivotally attached to a fixed part of the machine rearwardly of the second calender roll **14** and adjacent the first calender roll **13**. From the point of pivotal attachment, the loading lever **23** extends forwardly to overlie the floating bearings **22** which support the second calender roll **14**. The forward end of the loading lever **23** is engaged by a yieldable means including a resilient means, which is, for example, a loading spring **24**, and a slip catch **25** to which the opposite end of the spring is attached. As best shown in FIGURES 3 and 4, the slip catch **25** has an enlarged lower portion and is adapted to be received within a transverse notch **26**, provided in the frame **10** beneath and forwardly of the second calender roll **14**. When the slip catch **25** is pulled downwardly and caught within the slot **26**, the resilient means or spring **24** is tensioned and applies a resilient downward force to the loading lever **23**, which by its engagement with the floating bearings **22**, urges the floating bearings downwardly against the inclined surfaces **21**, and retains the second calender roll **14** against movement away from its desired position under normal operating forces. However, on lap-up of sliver about one or the other calender roll, a force is developed which tends to separate the calender rolls. When the component of this separating force operating at the inclined surfaces **21** develops a sufficient upward force to overcome the resilient urging force of the yieldable means, the floating bearings **22** ride upwardly on the inclined surfaces and displace the second calender roll **14** from its normal position in accommodation to the separating force.

In order to avoid damage to the textile machine on occurrence of a lap-up about a calender roll, this invention provides a knock-off mechanism which stops the operation of the associated machine in response to the occurrence of a lap-up. This knock-off mechanism is most clearly shown in FIGURES 3 and 4. As there shown, an electrical contact arm **30** is supported on a fixed part of the machine in a position overlying the floating bearings **22**. The contact arm **30** is insulated from the drawing machine by the mounting block **31** of an electrical insulating material to which it is secured. The contact arm **30** is connected, by suitable wiring, to electrical means shown schematically in FIGURE 3, operative to stop the machine drive on electrical contact between the contact means **30** and the grounded frame **10** of the drawing machine. Such electrical contact occurs when, on lap-up of the sliver S about one calender roll, the second calender roll **14** moves upwardly in overcoming the resilient urging force of the spring **24**, as discussed above, and the floating bearings **22** ride upwardly on the inclined surfaces **21** to engage the contact arm **30**. Whenever bearings **22** engage contact arms **30** the machine is stopped as the electrical circuit is completed through the grounded machine frame, either by engagement of the bearings with inclined surfaces **21** or by virtue of the fact that levers **23** may be metallic and in conductive relation with the metallic frame **10**. Thus, contact arm **30** functions as a normally inactive or normally open switch which is activated or closed to stop the machine upon abnormal separation of calender rolls **13**, **14** due to a lap-up or an abnormally large and dense object passing between the calender rolls.

In order to assure proper electrical contact of arms **30** with floating bearings **22** under all conditions, arm **30** may include a depending sharpened projection **32** overlying the bearings. Experience has shown that waste textile fiber will collect on the surface of the bearings and, as such fiber is electrically non-conductive, so insulate the surfaces that substantial difficulty may be encountered in proper operation of the electrical knock-off. The depending sharpened projection **32** penetrates such as accumulation of textile fiber to positively contact the bearings **22**.

In operation, when a lap-up of sliver S about one calender roll occurs, the build-up of silver about one calender roll operates to force the calender rolls apart. This force develops a component which causes the second calender roll **14** and the floating bearings **22** to move upwardly and away from the first calender roll **13**, along the inclined surfaces **21**. When sufficient sliver S is built up to overcome the resilient urging force of the yieldable means, the floating bearings **22** are moved upwardly sufficiently to engage the contact arm **30**, and knock-off or stop the associated machine. Before production may again be resumed, it is necessary to clear the lap-up from around the calender roll. This is facilitated by the positioning of the loading lever **23** and slip catch **25** at the forward portion of the machine, where they are available for easy access. To clear the calender rolls, the slip catch **25** is pulled inwardly out of engagement with the slot **26**, which releases the loading lever **23** for pivotal movement away from the position overlying the floating bearings **22**. Then, the second calender roll **14** may be lifted, with the floating bearings **22**, from the machine frame **10** to provide access to both calender rolls for the removal of a lap-up of sliver. Production may be resumed by replacing the second calender roll **14**, re-engaging the loading lever **23** and slip catch **25**, and again initiating operation of the drawing machine.

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

I claim:

1. In a textile machine having a frame supporting a coiler and a pair of calender rolls for directing textile sliver thereto and wherein one of the calender rolls has its opposite ends mounted in substantially vertically movable floating bearings for permitting the same to move upwardly away from the other roll upon a lap-up of sliver occurring around either of the rolls; the combination therewith of

lever means pivotally connected to fixed parts of the machine and overlying and engaging the respective floating bearings of the one calender roll,

yieldable means operably connected to said lever means for normally applying a resilient downward force to said lever means and in turn to the floating bearings to yieldably urge said one calender roll toward the other calender roll, and

electrical means including contact means overlying at least one floating bearing and responsive to a predetermined displacement of the same as when a lap-up condition occurs for stopping the operation of the machine.

2. The combination as claimed in claim **1** in which said yieldable means comprises:

a depressible catch, and

means are provided on fixed parts of the machine below the floating roll for removably receiving said catch to normally secure said yieldable means while readily permitting disengagement of the catch to release said lever means and said floating bearing means to facilitate removal of lap-up of sliver about one calender roll.

3. The combination as claimed in claim **1**, further comprising:

said contact means having a depending sharpened protrusion adapted to penetrate any accumulation of waste textile fiber for assuring electrical contact with the floating bearings.

4. In a textile machine having a frame supporting a coiler and a pair of calender rolls for directing textile sliver thereto and wherein one of the calender rolls has its opposite ends mounted in substantially vertically movable floating bearings for permitting the same to move upwardly away from the other roll upon a lap-up of sliver occurring around either of the rolls: the combination therewith of

lever means pivotally connected to fixed parts of the machine intermediate the calender rolls and extending therefrom to overlie the floating bearings of the one calender roll,

resilient means connected to said lever means on the opposite side of the floating calender roll from the pivot connection of said lever means for normally applying a resilient force to said lever means and in turn to the floating bearings to maintain the axis of the floating calender roll at a predetermined distance from the axis of the other calender roll,

depressible catch members having an enlarged lower end portion and being connected to said resilient means,

means on fixed parts of the machine below the floating calender roll for removably receiving the enlarged lower end portion of said catch members to normally secure said resilient means while readily permitting disengagement of the same to release the lever means and floating bearings and facilitate removal of lap-up of sliver about one calender roll, and

electrical means including contact means overlying said floating bearings and responsive to a predetermined displacement of the same as when a lap-up condition occurs for stopping the operation of the machine.

5. In a textile machine having a frame supporting a coiler and a pair of calender rolls for directing textile sliver thereto and wherein one of the calender rolls has its opposite ends mounted in substantially vertically movable floating bearings for permitting the same to move upwardly away from the other roll upon a lap-up of sliver occurring around either of the rolls; the combination therewith of

lever means pivotally connected to fixed parts of the machine adjacent the other calender roll and extending therefrom to overlie and engage the floating bearings of the one calender roll,

yieldable means operably connected to said lever means on the opposite side of the floating calender roll from the pivot connection of the lever means for normally applying a resilient force to said lever means and in turn to floating bearings to maintain the axis of the floating calender roll at a predetermined distance from the axis of the other calender roll, and

fixed contact arms supported on and electrically insulated from fixed parts of the machine and overlying each floating bearing to electrically contact the same on a predetermined displacement as when a lap-up condition occurs, and

electrical means electrically connected to said fixed contact arms and the machine for stopping the operation of the machine in response to electrical contact of said contact arms and the floating bearings.

6. The combination as claimed in claim 5 further comprising:

said fixed contact arms having a depending sharpened protrusion adapted to penetrate any accumulation of waste textile fiber for assuring electrical contact with the floating bearings on displacement of the same.

7. In a textile machine having a frame supporting a coiler and a pair of calender rolls for directing textile sliver thereto and wherein one of the calender rolls has its opposite ends mounted in substantially vertically movable floating bearings for permitting the same to move upwardly away from the other roll upon a lap-up sliver occurring around either of the rolls; the combination therewith of

lever means pivotally connected to fixed parts of the machine and overlying and engaging the respective floating bearings of the one calender roll,

yieldable means operably connected to said lever means for normally applying a resilient downward force to said lever means and in turn to the floating bearings to yieldably urge said one calender roll toward the other calender roll,

normally inactive electrically controlled means for stopping operation of the machine, and

switch means interposed in an electrical circuit to said electrically controlled means and being responsive to a predetermined upward displacement of at least one of said floating bearings, as when a lap-up condition occurs, for activating said normally inactive electrically controlled means to stop the operation of the machine.

8. A structure according to claim 7, wherein said switch means at least partially overlies said one floating bearing and is engaged by said one floating bearing upon said predetermined displacement thereof.

9. In a textile machine having a frame supporting a coiler and a pair of calender rolls for directing textile sliver thereto and wherein one of the calender rolls has its opposite ends mounted in substantially vertically movable floating bearings for permitting the same to move upwardly away from the other roll upon a lap-up of sliver occurring around either of the rolls, and wherein means are provided which limits the extent of movement of the floating bearings such as to limit the extent of movement of said one calender roll toward the other calender roll; the combination therewith of

lever means pivotally connected to fixed parts of the machine adjacent the other calender roll and extending therefrom and overlying and engaging the respective floating bearings of said one calender roll,

yieldable means connected to said lever means adjacent the opposite side of said one calender roll from that side adjacent which said other calender roll is positioned and being operable to apply a yieldable downward force to said lever means and in turn to the floating bearings to yieldably urge said one calender roll toward the other calender roll, and

said yieldable means comprises a tension spring connected to and extending downwardly from the lever means associated with each floating bearing, a slotted member carried by said frame and spaced below said spring, a catch member connected to the lower end of said spring and having an enlarged lower portion adapted to engage the lower surface of said slotted member when the catch is positioned in said slotted member, and said slotted member being so located that said spring is under tension when said catch member is positioned in said slotted member.

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