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CLOTH OPENING APPARATUS

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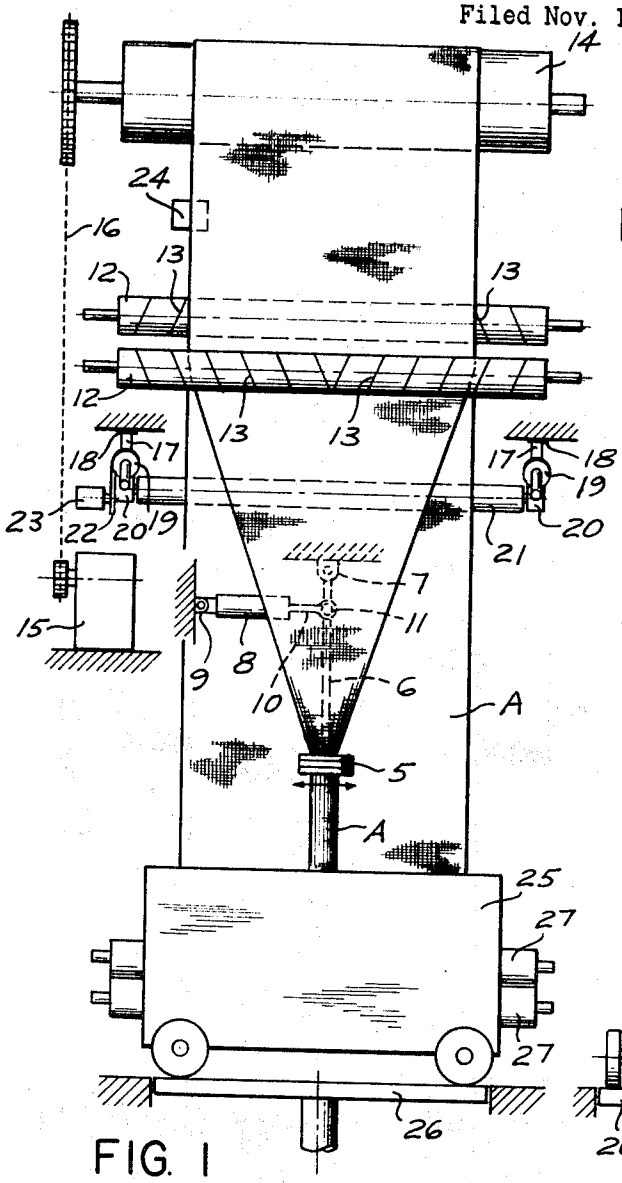


FIG. 1

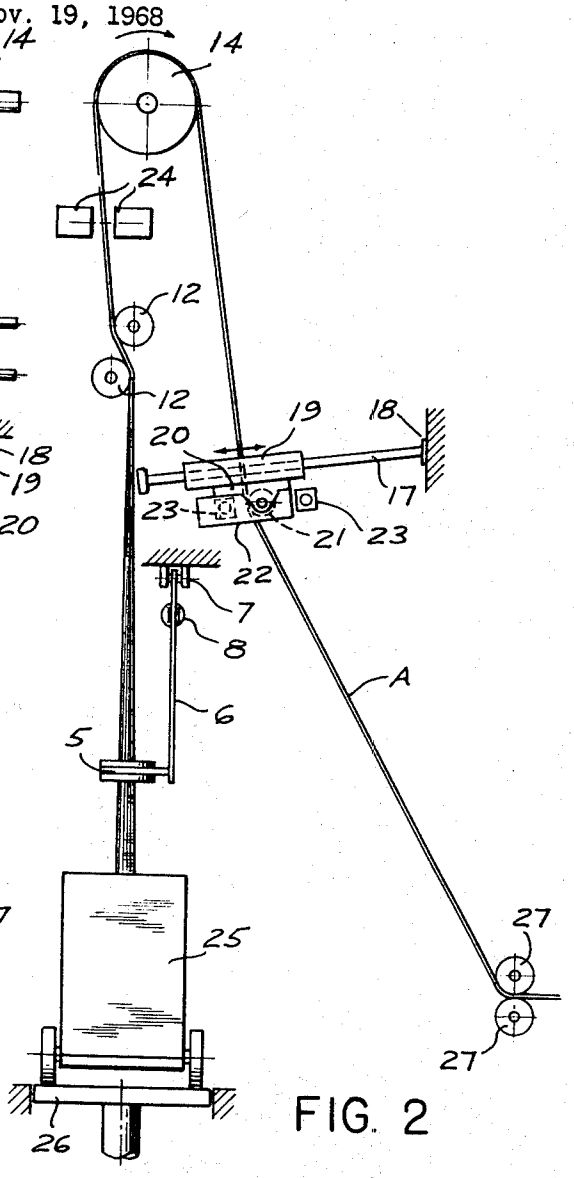


FIG. 2

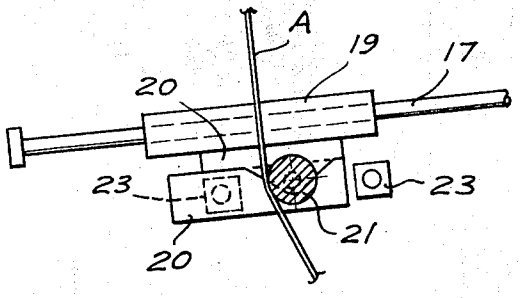


FIG. 3

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CLOTH OPENING APPARATUS

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ABSTRACT OF THE DISCLOSURE

This invention is directed to apparatus for opening wet cloth of varying tightness in rope form and feeding same into a tenter frame as an open flat web at a substantially constant stitch count. A photoelectric edge guide controls lateral oscillation of a poteye to change the lateral position of a fabric rope passing therethrough as it is withdrawn from a supply cart. The opened web is passed over a draw roll whose speed is varied in accordance with changes in web tension which are detected by passing the web past a floating roll that is photoelectrically connected to the speed controller for the draw roll.

THE INVENTION

This invention relates generally to new and useful improvements in tenter frames for textile mills and particularly seeks to provide novel apparatus for opening wet cloth of varying tightness in rope form and feeding same as a web into a tenter frame at a substantially constant stitch count.

One of the problems in feeding a continuous wet fabric rope to a tenter frame arises from the fact that variations in tension may occur as the rope is opened into a flat web as an incident to its introduction into the tenter frame. Another problem arises due to possible twists in the fabric rope, which if uncorrected, may result in a jamming of the feed into the tenter frame. Still another problem arises from tension variations that may occur if the fabric rope is not uniformly withdrawn from its supply cart.

Fabric rope opening and feeding apparatus constructed in accordance with this invention overcomes the above described problems.

Therefore, an object of this invention is to provide novel apparatus for withdrawing a wet fabric rope from a supply cart, opening same into a flat web and feeding same into a tenter frame under substantially uniform tension.

Another object of this invention is to provide apparatus of the character stated that includes an edge guide-controlled poteye that is oscillatable through a path that is transverse to a fabric rope supply cart to change the lateral position of rope withdrawal therefrom in accordance with commands from the edge guide.

Another object of this invention is to provide apparatus of the character stated in which the fabric rope is led upwardly from the positioning poteye between a pair of scroll rolls to spread the rope into a flat web, then over a variable speed lead off or draw roll and thence down past a floating roll whose position changes in response to tension variations in the fabric web and which functions to cause speed changes in the draw roll.

Another object of this invention is to provide apparatus of the character stated that includes photoelectric means for sensing the position of one edge of the fabric as it leaves the scroll rolls and for causing a repositioning of the oscillatable poteye.

A further object of this invention is to provide apparatus of the character stated that includes photoelectric means for sensing the position of the floating roll and

for causing changes of speed of the draw roll in response to changes in position of the floating roll.

With these and other objects, the nature of which will be apparent, the invention will be more fully understood by reference to the drawings, the accompanying detailed description and the appended claims.

In the drawings:

FIG. 1 is a partly schematic front elevation of tenter frame feeding apparatus constructed in accordance with this invention;

FIG. 2 is a right side elevation thereof; and

FIG. 3 is an enlarged fragmentary side elevation showing the mounting of the floating roll in greater detail.

Referring to the drawings in detail it will be seen that the invention, as illustrated, is embodied in apparatus for opening a fabric rope into a flat web and feeding the web into a tenter frame under closely controlled tension conditions and includes a horizontal poteye **5** positioned over the center location of a fabric rope supply cart and affixed to the lower end of a normally vertical arm **6** having its upper end pivotally attached to a frame member as at **7** so that the poteye **5** may be oscillated transversely. Oscillation of the poteye is effected by a double acting air cylinder **8** having one end pivotally attached to a frame member as at **9** and having its piston rod **10** pivotally attached to the upper portion of the arm **6** as at **11**. Operation of the air cylinder **8** is controlled by a photoelectric edge guide for the opened fabric web as will be hereinafter more fully described.

A pair of spaced horizontal scroll rolls **12, 12** each having the usual sets of opposite hand helical ribs **13** for spreading the fabric, are rotatably mounted a substantial distance above the poteye **5** and function to effect the opening of the fabric rope into a flat web.

A relatively large diameter horizontal draw roll **14** is mounted above the scroll rolls **12** and is adapted to be driven from a variable speed drive indicated **15** through sprocket and chain connections indicated **16**.

A pair of downwardly slanting spaced parallel guide rods **17, 17** have their rear ends rigidly affixed to a frame member as at **18** and extend forwardly to positions where their front ends lie substantially in vertical alignment with the rear face of the draw roll **14**. A ball bearing mounted sleeve **19**, having a depending bearing block **20**, is freely mounted on each guide rod **17** and a floating roll **21** extends between and is journalled in the bearing blocks **20**. This manner of mounting the floating roll **21** enables it to be readily displaced by a light force and moved along the guide rods **17** whenever an increase in web tension occurs as will be hereinafter more fully described.

One of the bearing blocks **20** carries a depending plate **22** which serves to interrupt the beams from a pair of front and rear fixed spaced photoelectric cells **23, 23** whenever the floating roll **21** becomes sufficiently displaced and cause a change in the speed of the draw roll **14** as will be more fully understood when the operation of the apparatus is described.

A photoelectric edge guide **24** is positioned adjacent the draw roll **14** at a location corresponding to the path of travel of one edge of the fabric and controls the oscillation of the poteye **5**.

In operation, a cart **25** filled with a fabric rope A, is centered on a turntable **26** positioned beneath the poteye **5**. At startup, the fabric rope is manually threaded upwardly through the poteye **5** and is then spread out and passed up between the scroll rolls **12, 12** and thence over the top of the draw roll **14**. The opened fabric web is then brought down in front of the floating roll **21** and thence downwardly and rearwardly into the nip between a pair of driven press rolls **27, 27** at the entrance to the tenter frame, and is then threaded through the dryer.

The drive is then started, and with the poteye **5** in its normal middle position, the fabric web passing over the draw roll **14** normally would track evenly thereover with no lateral drift. However, as with any continuously advancing web material, some lateral drift does occur and the photoelectric edge guide **24** becomes effective, through suitable wiring and solenoid valve (not shown), to cause operation of the air cylinder **8** to oscillate the poteye **5** in one direction or the other to correct the edge position of the web. Thus, if the web is drifting to the right as viewed in FIG. 1, the poteye will be moved to the left and vice versa.

Under balanced operating conditions the peripheral speed of the draw roll **14** equals the nip speed of the press rolls **27** with the fabric web under uniform tension, and under these conditions the floating roll **21** remains at an intermediate position on the guide rods **17** and simply serves as an idler guide roll.

In this position the plate **22** interrupts the beam from the front photoelectric cell **23**, but not that of the rear photoelectric cell. If the tension of the fabric increases. the floating roll **21** is displaced rearwardly along the guide rods **17, 17** and the plate **22** interrupts the beams from both of the photoeletcric cells **23** to cause an increase in speed of the draw roll **14** and thus reduce tension of the web. After this correction to the web speed (and tension) the floating roll **14** will return to its intermediate position with the beam from the rear photoelectric cell **23** uninterrupted by the plate **22** and the draw roll **14** resumes its normal speed. On the other hand, if the tension of the fabric decreases sufficiently, the floating roll **21** moves forwardly enough so that the plate **22** will clear the beams from both photoelectric cells **23** and thus cause a decrease in the speed of the draw roll **14** and thus increase tension of the web. After this correction to the web speed (and tension) the floating roll **14** will return to its intermediate position with only the beam from the front photoelectric cell **23** interrupted by the plate **22** and the draw roll **14** resumes its normal speed.

It should be noted that the plate **22** is of substantial width, e.g. more than that merely necessary to interrupt the beams of the cells **23** when the floating roll **21** becomes displaced rearwardly, in order to provide a time delay between speed changes of the draw roll **14** so that all of the web that is under increased tension ahead of the floating roll **21** will have time for its tension to be relaxed before it enters the nip between the press rolls **27**. In this manner a remarkably uniform control over the stitch count of the fabric web entering the tenter may be maintained.

Any twists that may be present in the fabric rope may be readily removed simply by rotating the turntable **26** in the proper direction as the twisted portion approaches the poteye **5**. It will also be understood that since this is a continuous operation, the trailing end of the fabric rope in a supply cart being unloaded will, as usual, be chain stitch-sewn to the leading end of the fabric rope in each succeeding supply cart until the end of the entire run has been reached.

It will be understood further that since the various drives, photoelectric cells and wiring therefor, together with the piping and solenoid valves for the air cylinder, are all considered to be standard, it is unnecessary to either illustrate or describe same in detail and that no claim is made to any such elements per se.

It is of course to be understood that variations in arrangements and proportions of parts may be made within the scope of the appended claims.

We claim:

1. In apparatus for opening cloth of varying tightness in rope form and feeding same as a flat web to a tenter frame, means for continuously withdrawing a fabric rope from a supply thereof, means interposed between said withdrawing means and said supply for spreading the fabric of said rope into a substantially flat open web, means for detecting any change of the position of one edge of said opened fabric web after all said fabric web leaves said spreading means, means responsive to said edge position detecting means for changing the path of travel of said fabric rope as it is withdrawn from said supply, and means for receiving said web and feeding same toward said tenter frame.

2. The apparatus of claim **1** additionally including means for varying the speed of operation of said withdrawing means and means associated with said fabric web and interposed between said withdrawing means and said receiving and feeding means for causing increases or decreases in the speed of said withdrawing means in accordance with changes in the tension of said fabric web.

3. The apparatus of claim **2** in which said withdrawing means is a variable speed draw roll; said spreading means comprises at least one scroll roll; and said web receiving and feeding means comprises a pair of press rolls.

4. The apparatus of claim **3** in which said edge position detecting means includes a fixed position photoelectric cell located at the mean path of travel of said fabric edge and in which said edge position responsive means includes a laterally displaceable guide through which said fabric rope passes and means responsive to the operative condition of said photoelectric cell for causing said guide to be laterally displaced in either of two available directions.

5. The apparatus of claim **4** in which said means for varying the speed of operation of said draw roll includes a floating roll maintained in contact with said fabric web and displaceable from its normal position as the consequence of changes in tension of said web and a fixed position photoelectric cell positioned adjacent one end of said floating roll whereby either to detect a change of position of said floating roll in one direction and cause said draw roll to be speeded up or to detect a change of position of said floating roll in the other direction and cause said draw roll to be slowed down.

6. The apparatus of claim **5** in which said means for varying the speed of operation of said draw roll additionally include means for effecting a time delay in the slowing down of said draw roll after it has been speeded up as the result of increased tension in said fabric web whereby to permit all of the over-tensioned web portion to become relaxed prior to entering said press rolls.

References Cited

UNITED STATES PATENTS

7,764	11/1850	Butcher	26—54
430,749	6/1890	Palmer	26—52
2,117,603	5/1938	Dungler.	
2,188,665	1/1940	Sperry	26—66
2,482,270	9/1949	Grundy.	

FOREIGN PATENTS

282,446	3/1915	Germany.
25,637	1910	Great Britain.

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U.S. Cl. X.R.

26—54, 57; 57—1; 226—20, 44