Sept. 29, 1964 J. McCREARY 3,150,432

FEEDING DEVICE FOR TENTER FRAMES

Filed June 11, 1963 3 Sheets-Sheet 1

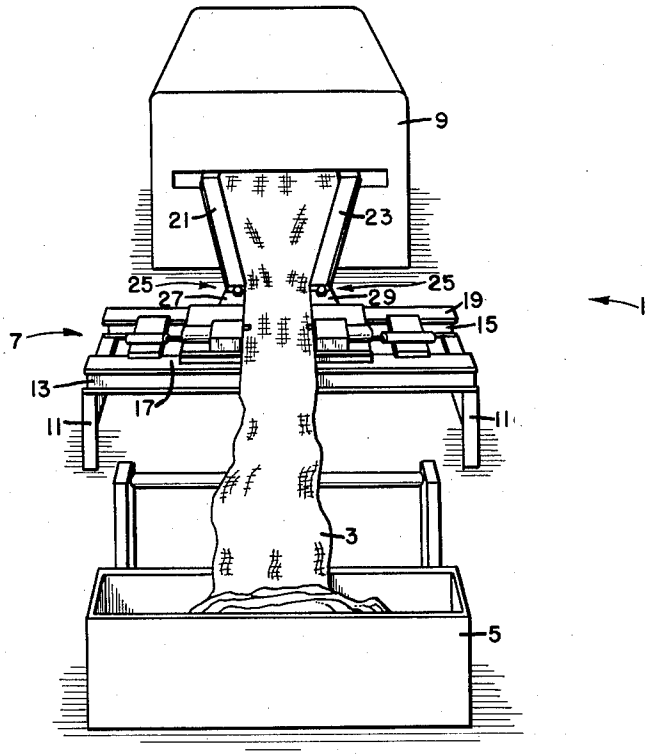


FIG. 1.

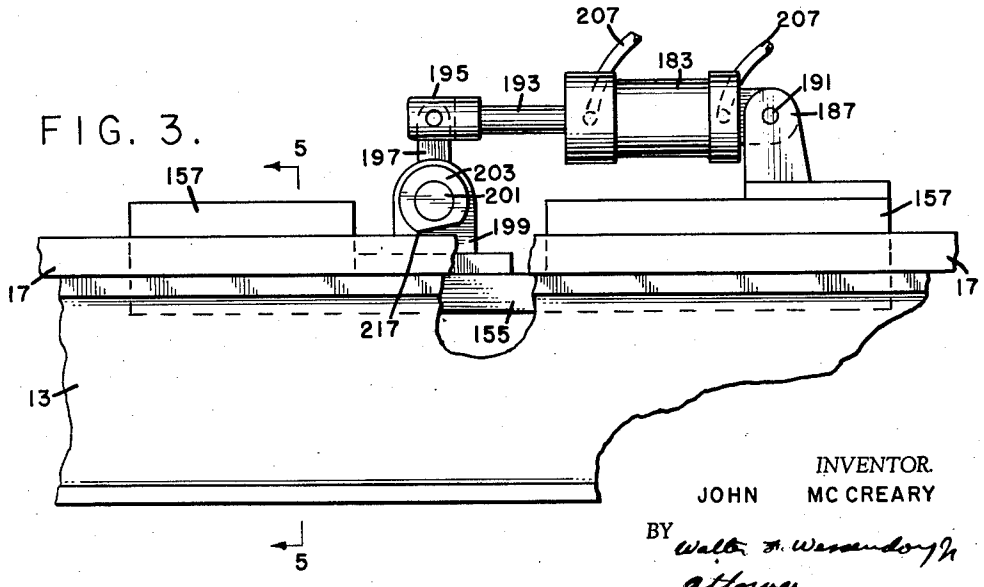


FIG. 3.

INVENTOR.
JOHN MC CREARY

BY Walter H. Wesendorf Jr.
attorney

Sept. 29, 1964 J. McCREARY 3,150,432

FEEDING DEVICE FOR TENTER FRAMES

Filed June 11, 1963 3 Sheets-Sheet 2

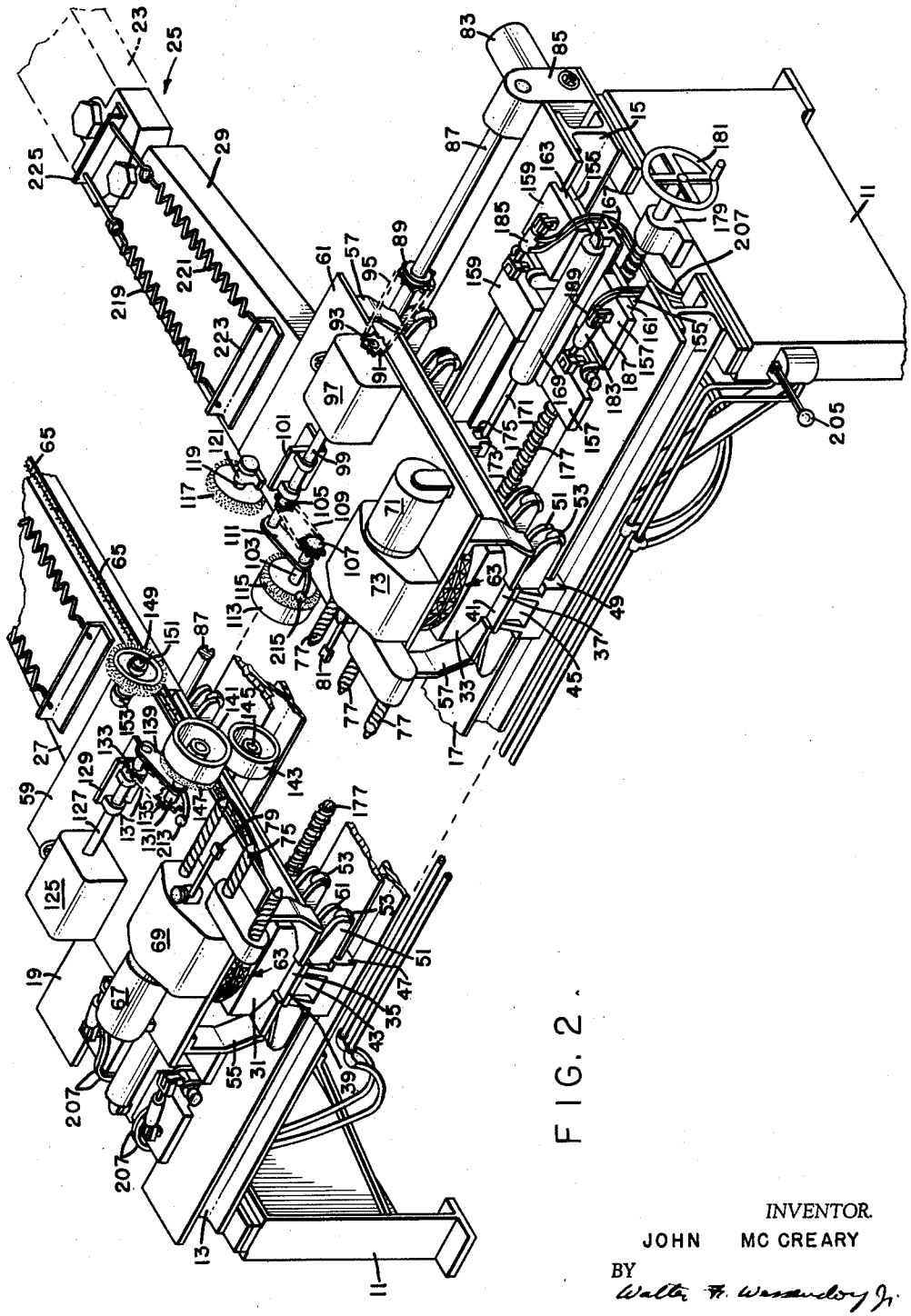


FIG. 2.

INVENTOR.
JOHN MC CREARY
BY
Walter H. Wasserbly Jr.
attorney

Sept. 29, 1964 J. McCREARY 3,150,432

FEEDING DEVICE FOR TENTER FRAMES

Filed June 11, 1963 3 Sheets-Sheet 3

FIG. 4.

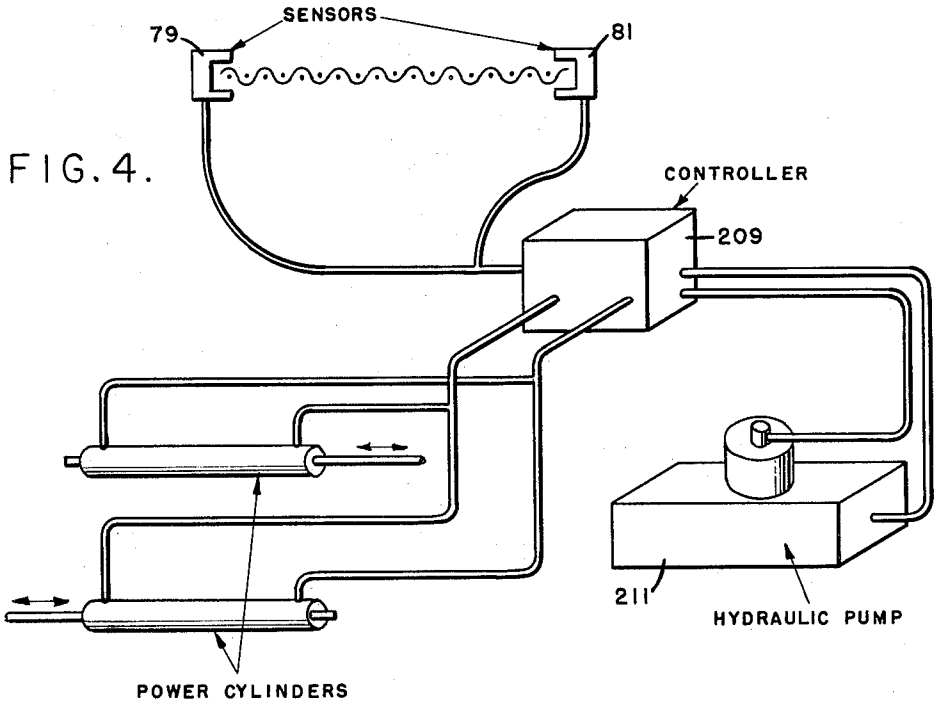
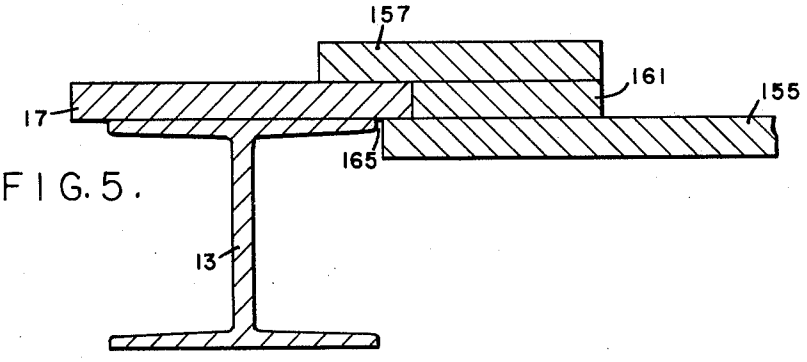


FIG. 5.



INVENTOR.
JOHN MC CREARY

BY
Walter J. Wesenberg Jr.
Attorney

United States Patent Office 3,150,432 Patented Sept. 29, 1964

3,150,432

FEEDING DEVICE FOR TENTER FRAMES

John McCreary, Newtonville, N.Y., assignor to McCreary Machine Works, Inc., Cohoes, N.Y., a corporation of New York

Filed June 11, 1963, Ser. No. 286,986
1 Claim. (Cl. 26—57)

This invention relates to a feeding device inclusive of which is tentering, one of the finishing operations performed on fabric after its manufacture.

The manufactured length of fabric is either disposed loosely folded in a feed box and therefrom fed onto tenter pins, or the manufactured length of fabric is wound on a cylindrical roll and this roll of fabric is disposed for feeding onto tenter pins.

After a length of fabric has been fed onto the tenter pins the front edge of another length of fabric is joined to the end of the first length of fabric and the feeding operation continued. The number of lengths of fabric depends of course upon the number of lengths of fabric that is to constitute the complete roll.

When joining a length of fabric to a preceding length of fabric for continuation of the feeding operation, longitudinal misalignment of the joined lengths of fabric sometimes arises with the result that the lateral edges of both the joined length and the preceding length will be dimensionally offset from each other. Hence, one lateral edge of the joined length will not be in position relative to the tenter pins of one of the lower tenter beds to have these tenter pins engage this lateral edge of the joined length. This is commonly referred to as "skipping of the tenter pins." Lateral edge tears in the fabric also result in skipping of the tenter pins.

This skipping of the tenter pins results in fabric of non-uniform width and weight if the tentering mechanism cannot be manually stopped in time to manually pin the skipped lateral edge of fabric onto the skipped tenter pins.

Further problems are encountered when the lateral edges of the fabric curl or are otherwise folded under. For the most part, however, the uncurlers utilized in uncurling the lateral edges for feeding same onto the tenter pins solve these latter problems.

This invention substantially solves the problems of the prior art with respect to the feeding of the fabric onto the tenter pins automatically. In this connection an object of the invention is to provide tenter beds that manually can be preset to the width of the fabric. A consecutive object of the invention is to provide a sensory control device in conjunction with the tenter beds whereby the tenter beds are moved and positioned automatically during the feeding and tentering operation so that each bed will be parallel to its respective lateral edge of fabric.

These objects and other objects of the invention should be appreciated from the detailed specification taken in conjunction with the drawings, wherein like reference numerals refer to similar parts throughout the several views, in which:

FIG. 1 is a perspective view of the invention in its prior art setting;

FIG. 2 is a perspective view of the feeding device of this invention;

FIG. 3 is a fragmentary side elevational view of the mechanism to preset the tenter beds to the width of the fabric;

FIG. 4 is a diagrammatic view of the control system utilized in this invention;

FIG. 5 is a fragmentary, sectional view taken along the line 5—5 of FIG. 3.

In FIG. 1 of the drawings, reference numeral 1 generally refers to the invention.

Manufactured fabric 3, loosely folded, is shown being fed from feed box 5 to the feeding device assembly 7 and thence to the dryer 9.

Framing structure 11 has secured at the top portion thereof and transversely disposed therewith two H-frames 13 and 15 with their respective sliding ways 17 and 19 secured therewith and disposed as shown.

Upper tenter beds 21 and 23 are disposed in the upper portion of the feeding device assembly 7. In operation of the feeding device, upper tenter beds 21 and 23 are rigid at their upper ends. Double pivot connections, generally referred to by reference numeral 25, are utilized to connect upper tenter beds 21 and 23 to their respective lower tenter beds 27 and 29. The structure of the double pivot connections 25 utilized in this invention are the same structure of double pivot connections for which the same inventor John McCreary was granted Patent No. 2,729,874 on January 10, 1956 for Tenter.

Not shown are the rigid mountings of the lower tenter beds 27 and 29 to their respective feed end castings 31 and 33 which are reciprocable in ways 35 and 37 formed by sliding plates 39 and 41 of respective saddles 43 and 45 slidable by means of gibs 47 and 49 on sliding ways 17 and 19.

It should be noted that there are two gibs 47 and two gibs 49 utilized to slidably mount their feed end castings 31 and 33 on the sliding ways 17 and 19, but only the lower gibs are shown.

Four sets of double legs 51 laterally extending from each of the saddles 43 and 45, with each set of double legs mounting therebetween a roller 53, are further utilized to slidably mount the saddles 43 and 45 on the sliding ways 17 and 19.

Four mounting plate brackets designated 55 and 57 are secured to each of the sliding plates 39 and 41. Overfeed mounting plates 59 and 61 are secured to respective brackets 55 and 57.

Utilized in this invention is the same High Speed Tenter Chain Device for which the same inventor John McCreary was granted Patent No. 3,050,816 on August 28, 1962. In this connection double chains generally referred to by reference 63 are trained around each of the double idler sprockets (not shown) that are each mounted by and between feed end casting 31 and overfeed mounting plate 59, and feed end casting 33 and overfeed mounting plate 61. The double chains 63 carry the tenter pins 65. Not shown are the drive sprockets disposed at the upper portions of the upper tenter beds 21 and 23 and which are utilized to drive the double chains 63.

Motor 67 with associated gear box 69 and motor 71 with associated gear box 73 are mounted on the overfeed mounting plates 59 and 61, respectively, and are utilized to drive the conventional uncurlers 75 and 77, respectively. Disposed from the gear boxes 69 and 73 are the sensory devices 79 and 81 which will be described hereinafter.

In FIG. 2, a motor 83 and main gear box 85 are shown mounted on the right hand side of the framing structure 11. Extending from main gear box 85 is the main drive shaft 87. Slide sprocket 89 keyed to shaft 87 transmits drive to sprocket 91 fixed to stub shaft 93 by chain 95 engaged with and trained around sprockets 89 and 91. Gear box 97 mounted on overfeed mounting plate 61 has a jack shaft 99 laterally extending therefrom. Jack shaft 99 is journalled in bushings of journal bracket 101 mounted on overfeed mounting plate 61, and transmits drive to counter shaft 103 by a sprocket 105 fixed to jack shaft 99 and a sprocket 107 fixed to countershaft 103 by means of the chain 109 engaged with and trained around sprockets 105 and 107. Shafts 99 and 103 are journalled in bushings of arm 111.

A feed cylinder 113 fixed to countershaft 103 is frictionally engaged with an idler cylinder (not shown) that is fixed to a stub shaft journalled in a journal bracket mounted beneath the overfeed mounting plate 61. A brush 115 is carried on the feed cylinder 113 as shown. An idler pinion brush 117 is fixed to a stub shaft 119 which is journalled in a journal bracket 121 mounted on the overfeed mounting plate 61.

It should be noted that main drive shaft 87 extends substantially across the length of sliding way 19 and at the left hand side of sliding way 19 the main drive shaft 87 is journalled in a journal bracket (not shown) extending laterally from the left hand side of sliding way 19. There is also a similar arrangement and disposition of the structure of sprocket 89, sprocket 91, stub shaft 93 and chain 95 on the left hand side.

Gear box 125 mounted on overfeed mounting plate 59 has a jack shaft 127 laterally extending therefrom. Jack shaft 127 is journalled in bushings of journal bracket 129 mounted on overfeed mounting plate 59 and transmits drive to countershaft 131 by a sprocket 133 fixed to jack shaft 127 and a sprocket 135 fixed to countershaft 131 by means of the chain 137 engaged with and trained around sprockets 133 and 135. Shafts 127 and 131 are journalled in bushings of arm 139.

A feed cylinder 141 fixed to countershaft 131 is frictionally engaged with an idler cylinder 143 that is fixed to a stub shaft 145 journalled in a journal bracket (not shown) mounted beneath the overfeed mounting plate 59. A brush 147 is carried by the feed cylinder 141 as shown. An idler pinion brush 149 is fixed to a stub shaft 151 which is journalled in a journal bracket 153 mounted on the overfeed mounting bracket plate 59.

Shown more discernably on the right hand side of the framing structure 11 and with reference thereto is the mechanism to manually preset the lower tenter bed 29 to the width of the fabric along its right lateral edge and thereafter to automatically move the lower tenter bed 29 during the feeding and tentering operation in order that the tenter pins 65 of the lower tenter bed 29 will be maintained parallel to the right lateral edge of the fabric.

A lower cylinder mounting plate 155 is slidably mounted on sliding ways 17 and 19 by means of respective upper cylinder mounting plates 157 and 159 and spacer plates 161 and 163 integral with mounting plate 155 and providing a sliding clearance 165. A bracket 167 fixed to lower cylinder mounting plate 155 pivotally mounts at one end thereof the hydraulic cylinder 169 having a piston rod 171 extending therefrom with the end of the piston rod 171 pivotally mounted to ears 173, and 175 depending from feed end casting 33 and carrying therebetween a cross pin for such pivotal mounting.

A nut (not shown) depends from the lower cylinder mounting plate 155 and is drivingly engaged by the worm 177 mounted on the journal bracket 179 upstanding from the framing structure 11 and manually operated by the wheel 181 fixed to the end thereof.

Disposed on each side of the hydraulic cylinder 169 are the air cylinders 183 and 185. Air cylinder 183 is pivotally mounted at one end by ears 187 and 189 carrying a cross pin 191 therebetween and upstanding from upper mounting plate 157. The piston rod 193 extending laterally from air cylinder 183 is clevis mounted at 195 to the arm 197. Upstanding from lower cylinder mounting plate 155 is a bracket 199 which journals therein shaft 201 fixed to arm 197 and carrying in fixed relationship locking cam 203. It should be noted that upper cylinder mounting plate 157 is formed in two sections, as shown.

It should be noted that there is a similar arrangement and disposition of structure for air cylinder 185 of ears 187 and 189, cross pin 191, piston rod 193, clevis mount 195, arm 197, bracket 199, shaft 201 and locking cam 203 in cooperation with the lower cylinder mounting plate 155 and upper cylinder mounting plate 159 formed likewise in two sections.

Also on the left hand side of the framing structure 11 are similar arrangements and disposition of the structure of the mechanism to manually preset the lower tenter bed 27 to the width of the fabric along its left lateral edge and thereafter to automatically move the lower tenter bed 27 during the feeding and tentering operation in order that the tenter pins 65 of the lower tenter bed 27 will be maintained parallel to the left lateral edge of the fabric.

The four air cylinders are actuated by a separate control (not shown) by means of control handle 205. Air hoses 207 to each of the four air cylinders are in communication therewith and with the separate control.

The sensory devices 79 and 81 may be of any of the conventional types such as photoelectric cells, jets of air or sensing fingers. The sensory devices 79 and 81 utilized herein are of the photoelectric cell type whereby a separate signal is transmitted from the sensory device 79 and sensory device 81 to the controller 209.

The hydraulic pump 211 pumps fluid under pressure to each of the hydraulic power cylinders. The controller upon signal from either of the sensory devices actuates the valves controlling the fluid flow to the respective hydraulic power cylinders associated with the sensory devices.

In operation of the feeding device the left and right lateral edges of the fabric are initially engaged upon the tenter pins 65 of the left lower tenter bed 27 and the right lower tenter bed 29. In the course of pinning the left and right lateral edges of the fabric onto the tenter pins 65, the left lateral portion of the fabric is emplaced between the feed cylinder 141 and idler cylinder 143 by raising the handle 213 fixed to arm 139 upwardly and returning same downwardly thereafter, and the right lateral portion of the fabric is emplaced between the feed cylinder 113 and its idler cylinder by raising the handle 215 fixed to the arm 111 upwardly and returning same downwardly thereafter.

Prior to the pinning of the left and right lateral edges of the fabric onto the tenter pins, the control handles for manual movement of the worms have been manipulated sufficiently to establish the approximate width of the fabric that is to be tentered. Thereafter the control handles for the worms are manipulated to establish the width between the tenter pins 65 of the lower tenter beds 27 and 29 to correspond to the width of the fabric.

Next the control handle 205 for the locking cams 203 is appropriately manipulated. With reference to FIGS. 3 and 5 it should be appreciated that leftward movement of piston rod 193 will effect a counterclockwise rotation of shaft 201 and locking cam 203 and locking cam 203 will engage sliding way 17 at point 217 thereby effecting upward movement of lower mounting plate 155. The upper surface of lower mounting plate 155 frictionally engages the lower surface of sliding way 17.

The locking cam of the air cylinder 185 functions in a similar manner to constrain the upper surface of lower mounting plate 155 into frictional engagement with the lower surface of sliding way 19.

The two air cylinders disposed on the left hand side of the framing structure 11 similarly function to frictionally lock their respective lower cylinder mounting plate to the sliding ways 17 and 19.

Inasmuch as the upper tenter beds 21 and 23 are articulated outwardly with reference to their connections at 25 with their respective lower tenter beds 27 and 29, the fabric will be stretched to a width greater than the initial width of the fabric. Hence compensation must be afforded in the length of the feed of the fabric for tentering. This compensation is accomplished by overfeeding an amount of fabric through the feed cylinders and idler cylinders.

Accordingly, the initial amount of overfeed of the fabric is established and preset for both the left and

right portions of the fabric by adjustment of the overfeed speed at the main gear box 85. Next the overfeed of the left or right portions of the fabric may be independently adjusted at respective gear boxes 125 or 97.

Thereafter in the operation of the feeding of the fabric and the pinning of the lateral edges of same onto the tenter pins 65 when the situation arises, particularly when there is misalignment of the lateral edges of the lengths of fabric that have been joined together, of that lateral edge which is not in alignment with the preceding lateral edge on the same side, that sensory device associated with the particular edge will immediately transmit a signal to the controller 209 which actuates the particular valve to allow fluid to be pumped from hydraulic pump 211 to that hydraulic power cylinder associated with such lateral edge to thereby move the particular lower tenter bed into parallel relationship with the misaligned lateral edge of the fabric. A lateral edge tear in the fabric effects a similar movement of the particular lower tenter bed.

The springs 219 and 221 shown arranged and disposed on the lower tenter bed 29 have their tail portions mounted by spring brackets 223 and 225 and have their structural counterparts arranged and disposed similarly on the lower tenter bed 27. The function and purpose of springs 219 and 221 as disposed is to provide stability in disposition of lower tenter bed 29 in the normal operation of same and to provide a mechanical advantage assist in movement of the lower tenter bed in response to signals from the sensory device.

It should be noted further that the indirect, preset positioning of the lower tenter beds by the worms and the locking of the positioned lower tenter beds by the locking cams produces desirable results over the prior art. Heretofore the tenter beds were initially positioned by the worms engaging nuts that were directly fixed to portions of the lower tenter bed structure or associated fixed structure. The vibratory movements attendant upon the feeding and tentering operation were transmitted directly to the worms engaged with their nuts resulting in wear of the nuts and frequent replacement of same along with the worms. Replacement of the worms and nuts operatively associated therewith were necessary to maintain the lower tenter beds in their positioned disposition conforming to the width of the fabric. With the indirect, preset positioning of the lower tenter beds achieved in this invention, the vibratory shocks attendant upon and arising out of the operation of feeding and tentering are of course taken up directly by the hydraulic power cylinders.

Further it should be appreciated that by arrangement and disposition of the initial pinning of the lateral edges of the fabric onto the tenter pins at the location of the uncurlers, there is no lateral action of tension on the

fabric other than the action of the uncurlers in uncurling the lateral edges of the fabric. Hence, upon parallel movement of the lower tenter beds in response to signals from the sensory devices, the factor of lateral tension on the fabric sufficient to effect skipping of the tenter pins is obviated.

Having thusly described my invention, I claim:

In a feeding device for feeding fabric onto tenter pins for tentering of same; framing structure, sliding ways, upper and lower tenter beds, air cylinders, upper cylinder mounting plates, lower cylinder mounting plates, piston rods, and locking cams, said framing structure carrying said sliding ways, said sliding ways having said upper cylinder mounting plates slidably mounted thereon, said sliding ways mounting said lower tenter beds, said upper and lower tenter beds having driven chains disposed therealong, said driven chains carrying thereon said tenter pins for engagement of the lateral edges of said fabric, first means for indirect, preset positioning of said lower tenter beds, second means operatively connected to said first means for locking said lower tenter beds, said second means having said air cylinders operatively associated with said lower tenter beds, said air cylinders being operatively mounted on said upper cylinder mounting plates, said upper cylinder mounting plates being fixed to said lower cylinder mounting plates, said air cylinders having said piston rods operatively connected to said locking cams such that upon movement of said piston rods in one direction said locking cams engage said sliding ways to effect frictional engagement of the upper surfaces of said lower cylinder mounting plates with the lower surfaces of said sliding ways to lock said lower tenter beds in position as positioned by said first means, sensory means for transmitting a signal when there is misalignment of the lateral edges of said fabric or when there is a tear in a lateral edge of said fabric, control means for receiving such signal when transmitted by said sensory means to thereby control said first means for repositioning of said lower tenter beds.

References Cited in the file of this patent

UNITED STATES PATENTS

2,088,984	Tandel	Aug. 3, 1937
2,252,832	Brown et al.	Aug. 19, 1941
2,557,492	Young	June 19, 1951

FOREIGN PATENTS

220,348	Australia	Sept. 12, 1957
496,608	Great Britain	Dec. 2, 1938
746,386	Great Britain	Mar. 14, 1956
760,424	Great Britain	Oct. 31, 1956