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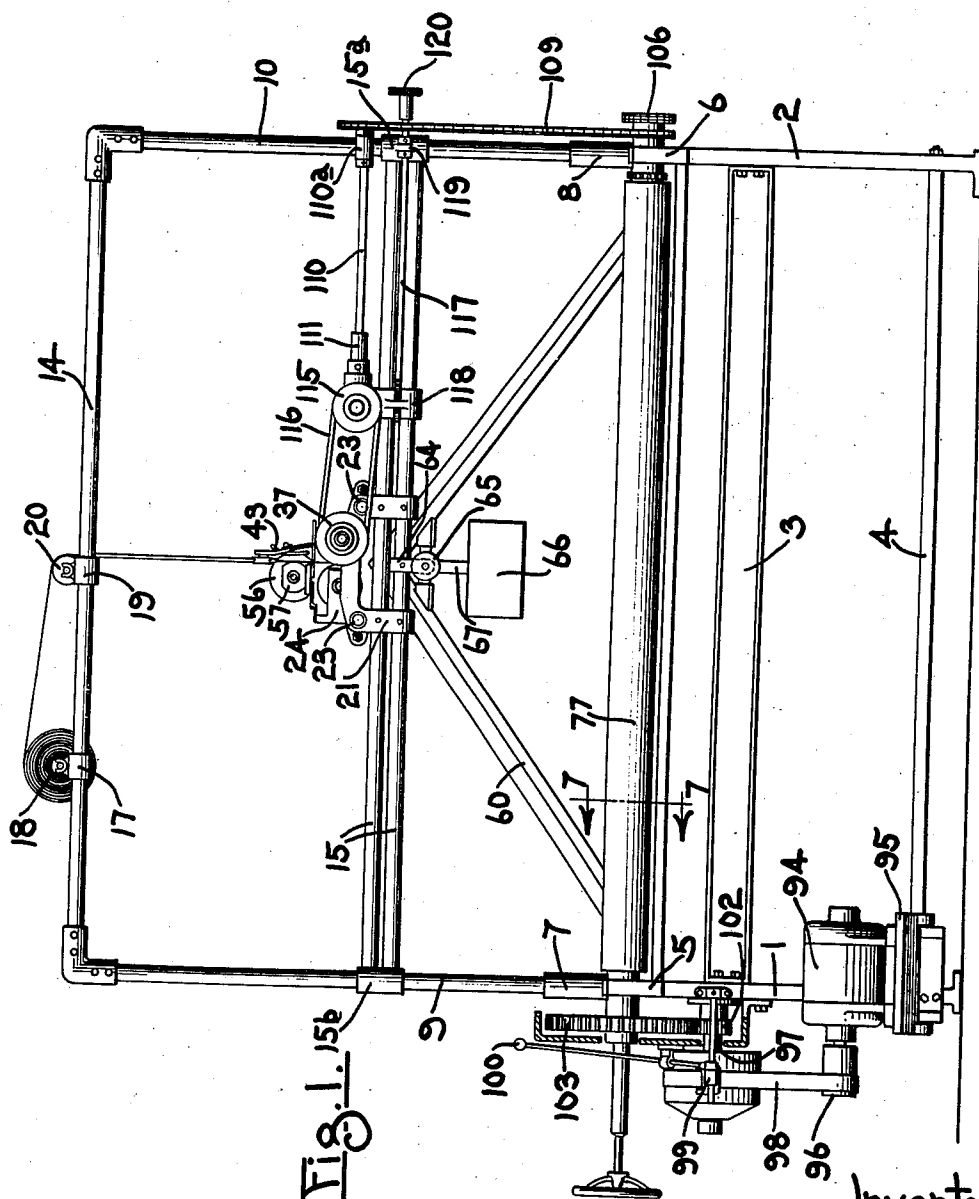
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2,305,997

FABRIC SLITTING AND ROLLING MACHINE

Filed March 11, 1942

5 Sheets-Sheet 1



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5 Sheets-Sheet 2

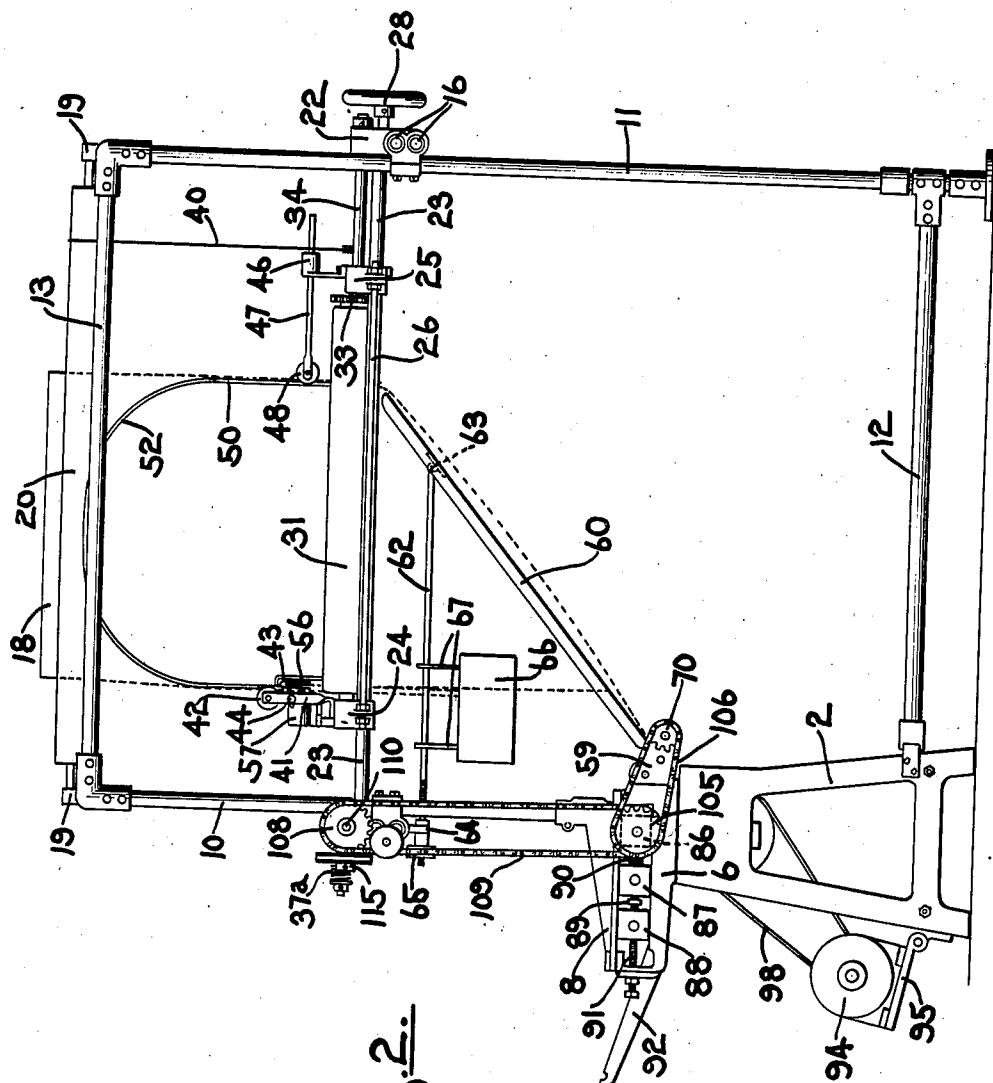


Fig. 2.

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5 Sheets-Sheet 3

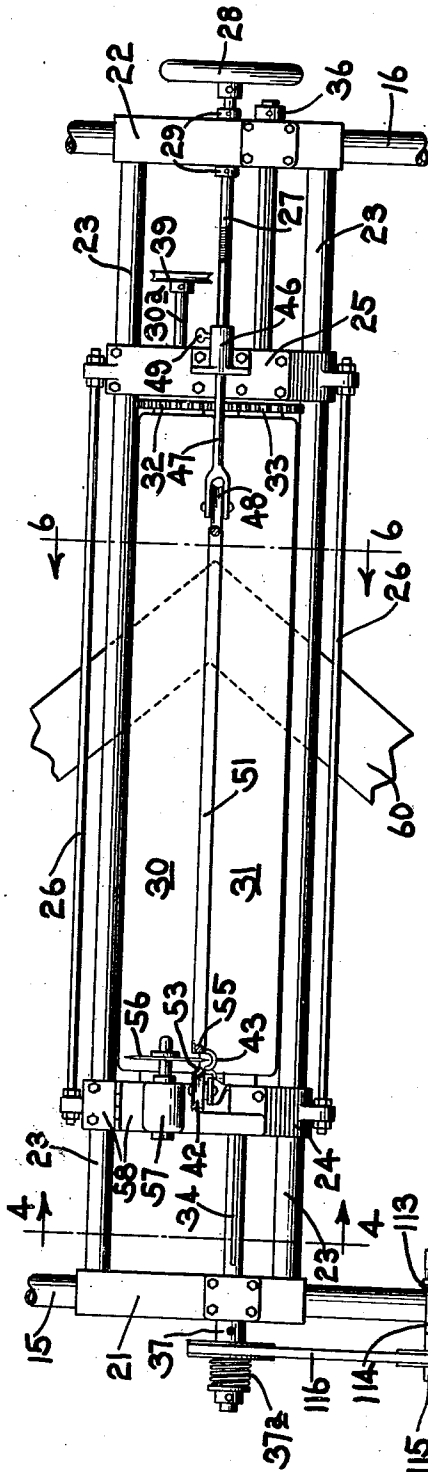


Fig. 3.

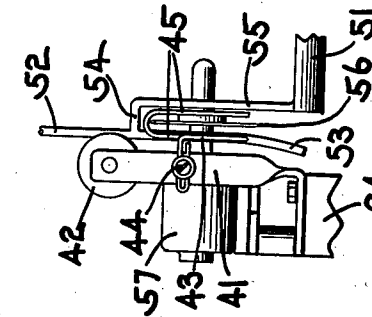


Fig. 5.

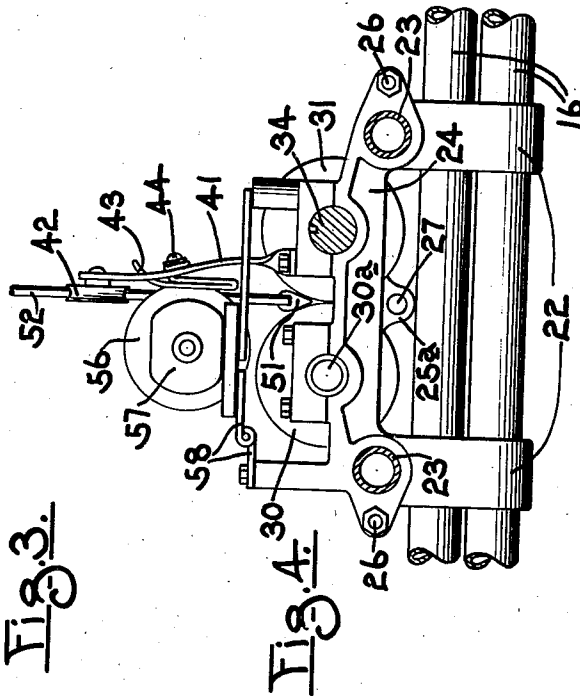


Fig. 4.

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5 Sheets-Sheet 4

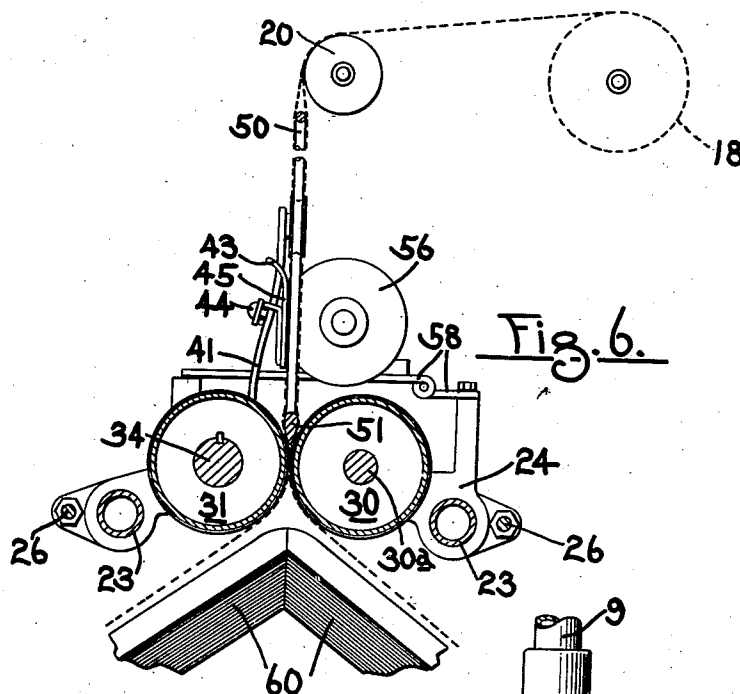


Fig. 6.

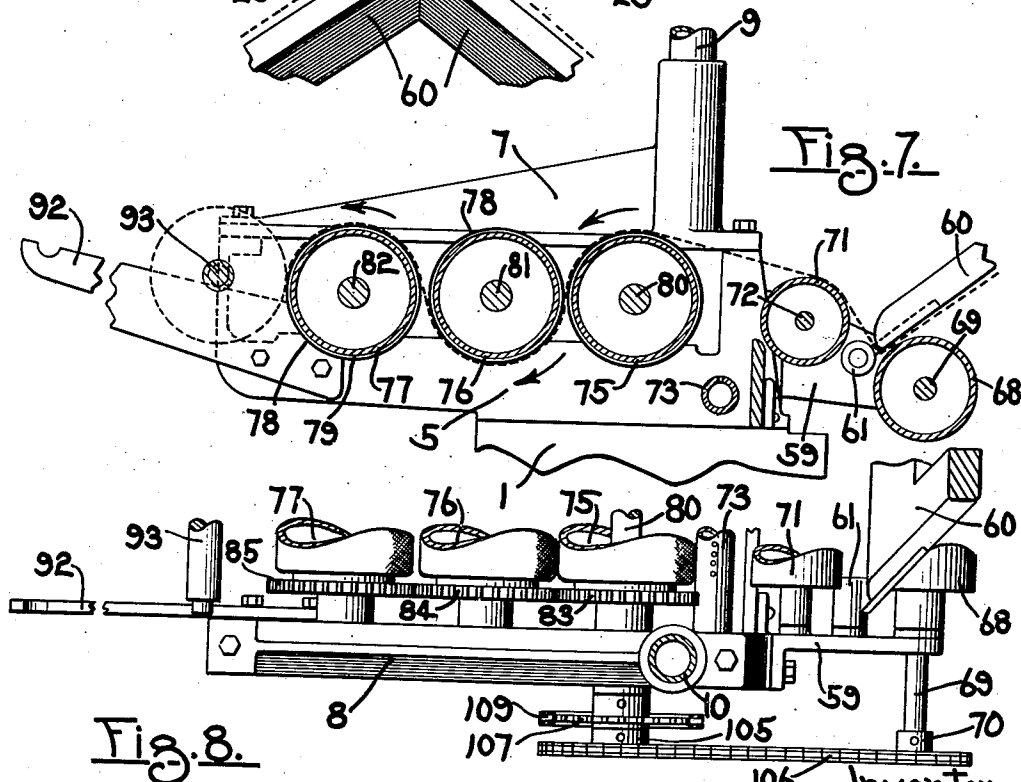


Fig. 8.

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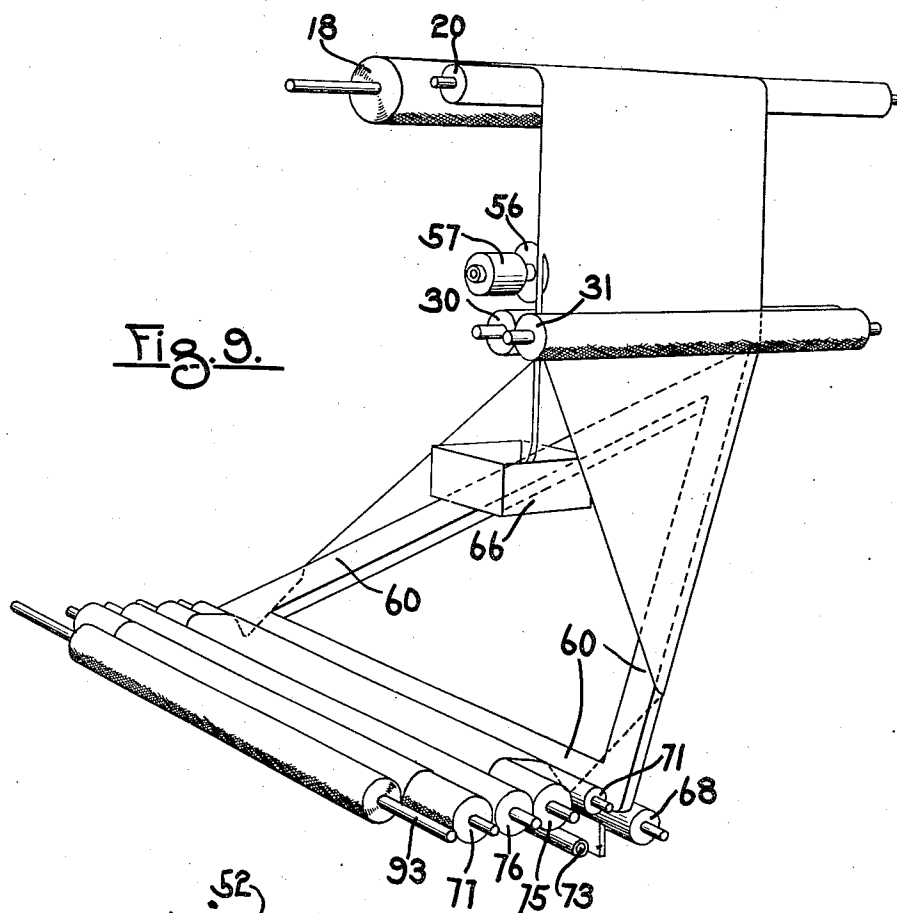
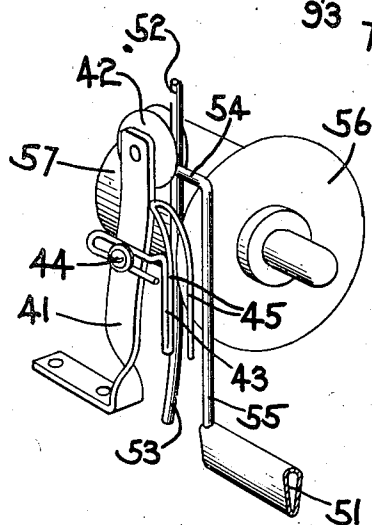
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FABRIC SLITTING AND ROLLING MACHINE

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5 Sheets-Sheet 5



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UNITED STATES PATENT OFFICE

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FABRIC SLITTING AND ROLLING MACHINE

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Application March 11, 1942, Serial No. 434,261

18 Claims. (Cl. 164—61)

This invention relates to cloth processing machines and more particularly to a machine for slitting tubular cloth and rolling it in a flat single thickness condition.

In the manufacture of cloth the fabric is sometimes knit or woven most expeditiously in the form of a tube. The tubular form is also more easily handled in some of the processing operations. It is frequently desirable to merchandise this cloth in a flat single thickness condition. The primary purpose of this invention is to slit a tube of cloth and to spread this cloth to a flat single thickness and to roll it into suitable rolls for merchandising or handling.

Another object of the invention is to provide means by which the relative speeds that the cloth is fed into the machine and taken out of the machine may be regulated so as to thereby control the tension on the cloth as it passes through the machine. Provisions are also made whereby the machine may be adjusted to handle various widths of cloth.

A further object of the invention is to provide means whereby the cutting disk may be moved to an out of the way position while the cloth is threaded through the machine. A still further provision is made for the steaming of the cloth before it is rolled into the roll in a single thickness condition.

Several other objects and purposes, with the novel construction and arrangement of parts for obtaining the same, will be apparent as an understanding of the invention is had from the following description taken in connection with the accompanying drawings, in which:

Fig. 1 is a front elevation of a machine made in conformity with this invention.

Fig. 2 is a side elevation of the machine.

Fig. 3 is a fragmentary plan view of the cloth slitting and feeding portions of the machine.

Fig. 4 is a vertical section along line 4—4 of Fig. 3, looking in the direction of the arrows.

Fig. 5 is a fragmentary side elevation of the slitting disk and adjacent parts.

Fig. 6 is a vertical sectional view taken along line 6—6 of Fig. 3, looking in the direction of the arrows.

Fig. 7 is a vertical sectional view taken along line 7—7 of Fig. 1, looking in the direction of the arrows.

Fig. 8 is a fragmentary plan view of the portion of the machine shown in Fig. 7.

Fig. 9 is a diagrammatic perspective view showing the location of the various vital parts of the machine, and

Fig. 10 is a perspective view of the slitting disk and the cooperating parts.

Like reference numerals refer to like parts throughout the several views of the drawings.

Referring to Figs. 1 and 2 of the drawings, the supporting framework for the working parts of the machine comprises vertical end standards 1 and 2 between which extend the horizontal stretcher 3 and the horizontal rods 4. Attached to these standards 1 and 2 are the bearing guides 5 and 6 which in turn support the members 7 and 8. These members 7 and 8 are provided with sockets for receiving and supporting the vertical front frame posts 9 and 10. Vertical posts 11 are provided at the rear corners of the machine and the horizontal bars 12 extend between the posts 11 and the standards 1 and 2. Other bars 13 are located at the upper corners of the machine and extend between the vertical posts 9 and 10 and the vertical posts 11. Bars 14 are provided at the upper forward and rear corners of the framework and extend between the posts 9 and 10 and also between the two posts 11. A pair of parallel horizontal tubes 15 are attached to the vertical posts 9 and 10 by suitable brackets 15a and 15b. Other horizontal parallel tubes 16 are mounted by means of suitable brackets in substantially the same plane as the tubes 15 and extend between the two posts 11 at the rear of the machine.

Two bearings 17 are mounted on the bars 14 upon which the roll of flattened tubular cloth 18 is rotatably mounted. Another pair of bearings 19 are also mounted on the bars 14 which rotatably support the guide roller 20 over which the cloth moves as it is drawn through the machine.

After the cloth passes the guide roller 20 it moves into a mechanism which holds it while it is being slit along one edge. This structure is supported on two supporting members 21 and 22.

The member 21 is mounted on the parallel tubes 15 and the member 22 is mounted on the parallel tubes 16. These members 21 and 22 are rigidly fastened to their respective parallel tubes. Hollow rods 23 are rigidly supported between the supporting members 21 and 22 upon which a carriage is slidably mounted. This carriage comprises bearing members 24 and 25 which are held spaced from each other by means of the stretcher rods 26 and are slidably mounted on the rods 23 for adjustment for various widths of cloth. The carriage is held in its various adjustable positions by a downwardly extending ear 25a into which a screw-threaded shaft 27 is threaded. The shaft 27 extends to the rear of the machine where it is journaled in the supporting member 22 being held

from endwise movement by collars 29, and has a hand wheel 28 attached.

Two closely associated rollers 30 and 31 extend between the bearing members 24 and 25 of the carriage. Gears 32 and 33 are attached to the ends of the rollers 30 and 31 so that these rollers will rotate together. The roller 30 is provided with a shaft 30a which is journaled in the bearing members 24 and 25 and the roller 31 is mounted on a grooved shaft 34 and is provided with a spline which fits into the groove of the shaft. The shaft 34 extends through the bearing members 24 and 25 and also extends through and is journaled in the supporting members 21 and 22 near its respective ends, being provided at its forward end with a pulley 37 and at its rear end with a collar 36 which prevents endwise movement of the shaft. The shaft 30a projects beyond the bearing member 25 and is provided with a pulley 39 and a belt 40 passes around this pulley and also around the guide roller 20 causing it to rotate simultaneously with the roller 30.

A bracket 41 is mounted on the bearing member 24 and a grooved pulley 42 is rotatably mounted at the upper end thereof. A wire guard 43 is also mounted on this bracket 41 where it is attached by the screw 44. This wire guard consists primarily of a return bent portion forming vertical spaced legs 45. These legs are for the purpose of holding the cloth in the path of the rotating knife as it cuts the folded edge of the cloth. A supporting bracket 46 is attached to and extends upwardly from the upper side of the bearing member 25 and has an opening through which a rod 47 is slidably mounted. The inner end of the rod 47 is bifurcated to receive the grooved pulley 48. A thumb screw 49 in the bracket 46 holds the rod 47 to its adjusted position.

A spreader 50 is provided to be inserted into the tube of fabric and to be located immediately above the rollers 31 and 30. This spreader comprises a lower horizontal bar 51 and an arch-shaped stiff wire member 52 extending upwardly from the bar and having one of its ends directly attached to it. The other end of the arch member 52 terminates in a pair of spaced legs 53 and 55 joined by the cross member 54, the leg 55 being attached to the bar 51. These spaced legs 53 and 55 straddle the edge of the cutting disk 56 which extends between them so that it may operate upon the cloth as it passes over the spreader.

The cutting disk 56 is fixed to the shaft of a motor 57 which is mounted on the bearing member 24 by means of the hinged members 58. The motor and disk are hingedly mounted so that the cutting disk may be moved out of the way while the spreader and cloth are being put into the machine.

A pair of brackets 59 are attached to and extend rearwardly from the bearing guides 5 and 6 and an inverted V-shaped or triangular flattener member 60 is pivotally attached at its base thereto by means of the members 61 which are pivotally mounted on the brackets 59 and are attached to the flattener 60. The apex or upper end of the spreader 60 is supported by a rod 62 which is pivotally attached to the flattener at 63. The forward end of the rod 62 is screw-threaded and passes through the bracket 64 and the internally threaded hand wheel screws on to the outer end of the rod 62 and bears against the bracket 64 to adjust the apex of the flattener relative to the rollers 30 and 31. A basket 66 having arms 67

is hung on the rod 62 to receive the strip of fabric separated from the tube during the slitting operation.

A roller 68 on a shaft 69 journaled in the brackets 59 having a sprocket 70 at its outer end is provided to support the cloth in its flattened condition as it passes under the lower straight edge of the flattener 60. An idler roller 71 on a shaft 72 which is freely rotatably mounted in the brackets 59 holds the cloth against the lower edge of the flattener 60 and transmits it to the adjacent rollers.

A steam pipe 73 having openings in its top side extends across the machine between the bearing guides 5 and 6 at the rear of a roller 75 and is for the purpose of injecting steam into the cloth at this point.

After leaving the roller 71 the flattened cloth extends over and under rollers 75, 76 and 77 which are in the same horizontal plane. These rollers are each covered with a fabric 78 which is padded as at 79 and are respectively mounted on shafts 80, 81 and 82. Attached to each of said shafts are the intermeshing gears 83, 84 and 85 which cause simultaneous rotation of the rollers. The shafts 80, 81 and 82 are journaled at each end in bearing blocks 86, 87 and 88, respectively. The two rollers 76 and 77 are held with a small space between them by the screw-threaded stud 89 between the bearing blocks 87 and 88 and screwed into one of them. The rollers 75 and 76 are yieldably held separated by a spring 90 between the bearing blocks 86 and 87 and the space between them is adjusted by screws 91 passing through the end of each of the bearing guides 5 and 6 and abutting against the bearing blocks 88.

Inclined supporting arms 92 are attached to each of the bearing guides 5 and 6 and extend forwardly and upwardly from the machine. A rod 93 rolls on the arms 92 and the cloth is rolled in flat condition on the rod. The contact of the outer surface of the roll of cloth against the roller 77 causes the roll of cloth to rotate and as the roll becomes larger the rod 93 advances outwardly on the arms 92.

A motor 94 mounted on a pivoted platform 95 attached to the standard 1 drives the machine. This motor has a pulley 96 which drives a stub shaft 97 through the belt 98 and the clutching mechanism 99. The clutching mechanism is operated by the lever 100. The stub shaft 97 carries a pinion 102 meshing with a gear 103 which is attached to the shaft 80 on which the roller 75 is mounted. The roller 68 is driven from the shaft 80 by a sprocket 105 and a chain 106 passing around sprocket 105 and a sprocket 70 on shaft 69.

The rollers 30 and 31 are driven at speeds variable to the speed of the rollers 75, 76 and 77 by a sprocket 107 on the driven shaft 80 and another sprocket 108 on the shaft 110 which is driven from sprocket 107 by chain 109. The sprocket 108 is attached to the end of shaft 110, which is rotatably mounted in a bearing bracket 110a attached to the frame post 10. The inner end of the shaft 110 has a splined and telescoping connection with the hub 111 of a bevel gear 112 driven from the shaft 110 and in turn drives a bevel gear 113 mounted on a short shaft 114 mounted in a sliding bracket 118. This shaft 114 also has attached a pulley 115 which drives the grooved shaft 34 through the belt 116 and the split V-pulley 37.

The bracket 118 is slidably mounted on the tubes 15 and is moved by the adjusting rod 117

screwed into the bracket at one end and having its other end rotatably secured at 119 to the frame of the machine. A hand wheel 120 on the rod 117 serves to rotate the rod and to slide the bracket on the tubes 15.

The pulley 37 which drives the grooved shaft 35 is split in a plane at right angles to its axis and the two halves are pressed together by a spring 37a. This type of pulley for providing a variable speed drive is well known in the art. The V-belt 116 rides in the V-groove of the pulley which is formed between the two separable parts. The parts are moved together by the spring 37a as closely as the tension on the belt 116 will permit and the closer the parts are moved together the greater will be the circumference of that part of the V-groove on which the belt rides. By moving the bracket 118 either toward or away from the pulley 37 the tension of the belt 116 on the pulley is decreased or increased causing the split parts of the pulley to move toward or away from each other and altering the effective circumference of the pulley upon which the belt operates or rides and thereby varying the speed of rotation of the shaft 34 relative to the driving shaft 116.

In the operation of the machine a roll of flattened tubular cloth is located in the roller supports 17. The cloth is passed over the roller 29 and downwardly over the spreader 50. The cloth and spreader will be located properly by the grooved disks 42 and 48 which engage the edges of the flattened tube. The cloth passes between the rollers 30 and 31 which grip it and feed it downwardly, the cloth being held flatly in its double thickness condition until it passes through these rollers. As the cloth passes the cutting disk 56 the vertical fingers 45 of the wire guard will hold the cloth in the path of the cutter so that a small strip of cloth will be cut from one edge. The point of the V-shaped flattener is located immediately below the rollers 30 and 31 and is also located inside and at the fold of the cloth. As the cloth passes downwardly it passes under the flattener and is spread to a flat single thickness and then moves beyond the lower straight edge of the flattener in this condition. Before the cloth moves on to the roll 75 steam is injected into it from the pipe 73 to aid in removing wrinkles as it passes over the subsequent rollers.

From the lower edge of the flattener 60 the cloth passes over the idler roll 71 and over and under the rollers 75, 76 and 77 which are driven and which drive the cloth at this finishing end of the machine and flatten it removing wrinkles and creases. From the roller 77 the cloth is wrapped around the rod 83 and is formed in a roll on the rod being rotated by contact with the cloth roll with the surface of the roller 77.

The cloth is driven at two locations on the machine, at its entrance end by the rollers 30 and 31 and at the finishing end by the rollers 75, 76 and 77. The latter rollers are driven at a fixed rate of speed but the speed of the rollers 30 and 31 may be varied as described and thereby the tension on the cloth between the two sets of driving rollers can be varied and can be caused to pass through the machine in a loose condition or it can be stretched if desired and this variation may be adjusted while the machine is operating by manipulation of the hand wheel 120 which moves the bracket 118.

The position of the flattener 60 is substantially fixed transversely of the machine but the carriage carrying the rollers 30 and 31 and the cutter 56 may be moved relative to the flattener to ac-

commodate different widths of cloth by manipulation of the hand wheel 28. This adjustment governs the position of the cutter relative to the edge of the flattened tube and controls the width of the strip of cloth which is cut from the tube in the slitting operation.

The other adjustments which have been provided produce the obvious results for which they are intended.

The invention is defined in the appended claims and is to be considered comprehensive of all forms of structure coming within their scope.

I claim:

1. A machine of the class described comprising, means for continuously feeding tubular fabric through the machine, means for slitting one side of said tube, a flattening device comprising a V-shaped frame having its apex located inside the tube adjacent the side opposite to that which has been slit and lying in a plane angular to the path of the fabric at the point where it is slit, and means for varying the location of the slitting means in a direction transverse to the fabric and relative to the apex of the flattening device.

2. The elements in combination defined in claim 1 in which the fabric enters the machine in flattened tubular condition and said slitting means operates adjacent one edge of the flattened tube.

3. The elements in combination defined in claim 1 combined with means located within the tube for spreading it into flattened condition adjacent said slitting means.

4. A machine of the class described comprising, means for slitting one side of a tubular fabric, means adjacent the slitting means for continuously driving the fabric, means following said driving means to spread the fabric into flat single thickness condition, means following said spreading means for continuously driving the fabric, means for driving both of said driving means and means for varying the relative speeds of said driving means.

5. The elements in combination defined by claim 4 in which said spreading means comprises an inverted V-shaped frame having its apex within the tube adjacent the side opposite to that which has been slit and lying in a plane inclined to the path of the fabric at the point where it has been slit.

6. A machine of the class described comprising, a pair of driving rolls between which flattened tubular fabric passes, means located ahead of said driving rolls for slitting said fabric adjacent one flattened edge of the tube, a flattening device comprising an inverted V-shaped frame having its apex located adjacent said rolls and within the tube adjacent the side opposite to that which has been slit, a second set of feeding rolls located at a position following said flattening device between which the flattened single thickness fabric passes and means for driving said respective sets of driving rolls.

7. The elements in combination defined by claim 6 in which the means for driving said respective sets of driving rolls includes means for varying the relative driving speeds of said respective sets of rolls.

8. The elements in combination defined in claim 6 combined with a bar extending between the spaced ends of said V-shaped spreader past which the flattened single thickness fabric passes.

9. A machine of the class described comprising, a carriage, a pair of driving rolls rotatably mounted in said carriage between which flattened tubular fabric passes, means for driving said rolls, a slitting device mounted on said carriage adapted

to slit said flattened tube near one of its edges, means mounted on said carriage for guiding the movement of said flattened tube in a direction parallel to the axes of said rollers, an inverted V-shaped flattening device having its apex adjacent said rollers within said tube opposite the edge which has been slit, and means for adjusting said carriage and the means mounted thereon relative to the apex of said flattening device in a direction parallel to the axes of said rollers.

10. The elements in combination defined in claim 9 combined with additional driving rollers at a location following said flattening device between which the flattened single thickness fabric passes and means for driving both of said sets of driving rollers at variable relative speeds.

11. A machine of the class described comprising, a pair of driving rollers between which flattened tubular fabric passes, means located ahead of said driving rollers for slitting said fabric adjacent one edge of the flattened tube, a flattening device located at a position following said driving rollers comprising an inverted V-shaped frame having its apex located adjacent said rollers and within the tube opposite the edge which has been slit and lying in a plane inclined to the axes of said rollers and means for varying the inclination of the plane of the flattening device.

12. The elements in combination defined in claim 11 combined with the second set of driving rollers located in a position following said flattening device and between which the flattened single thickness fabric passes and means for driving the same.

13. The elements in combination defined in claim 11 combined with the second set of driving rollers located in a position following said flattening device and between which the flattened single

thickness fabric passes and means for driving both sets of driving rollers at varying relative speeds.

14. A machine of the class described comprising, means for passing flattened tubular fabric continuously through the machine, means for cutting a narrow strip of fabric from one edge of the flattened tube as it passes through the machine, and means for spreading the fabric to a flat single thickness.

15. A machine of the class described comprising, means for passing tubular fabric continuously through the machine, means for slitting a side of said tubular fabric, a V-shaped frame having its apex located within the tube and means for passing the fabric past the base of the frame for flattening the fabric.

16. The elements in combination defined in claim 15 in which said slitting means operates adjacent an edge of the flattened tube and the apex of the V-shaped frame is located adjacent the opposite edge of the tube.

17. The elements in combination defined in claim 15 in which said slitting means operates adjacent an edge of the flattened tube and the apex of the V-shaped frame is located adjacent the opposite edge of the tube and said frame lies in a plane inclined to the path of the fabric at the point where it is slit.

18. The elements in combination defined by claim 4 in which said spreading means comprises an inverted V-shaped frame having its apex within the tube adjacent the side opposite to that which has been slit and lying in a plane inclined to the path of the fabric at the point where it has been slit and means to vary the inclination of the plane of the V-shaped frame.

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