May 6, 1930. E. F. MAAS 1,757,935

FABRIC FEEDING DEVICE

Filed June 21, 1927 4 Sheets-Sheet 1

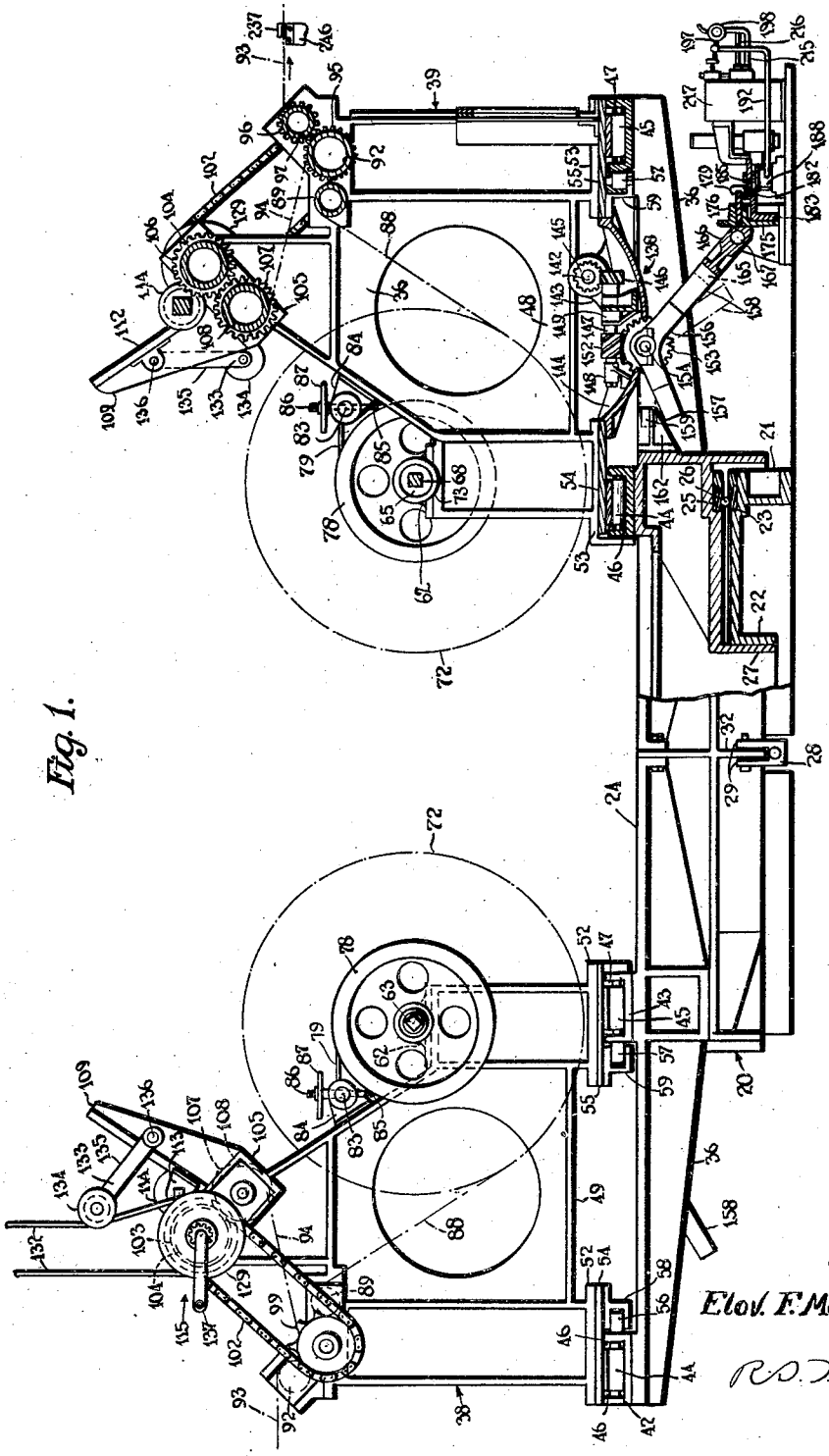


Fig. 1.

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FABRIC FEEDING DEVICE

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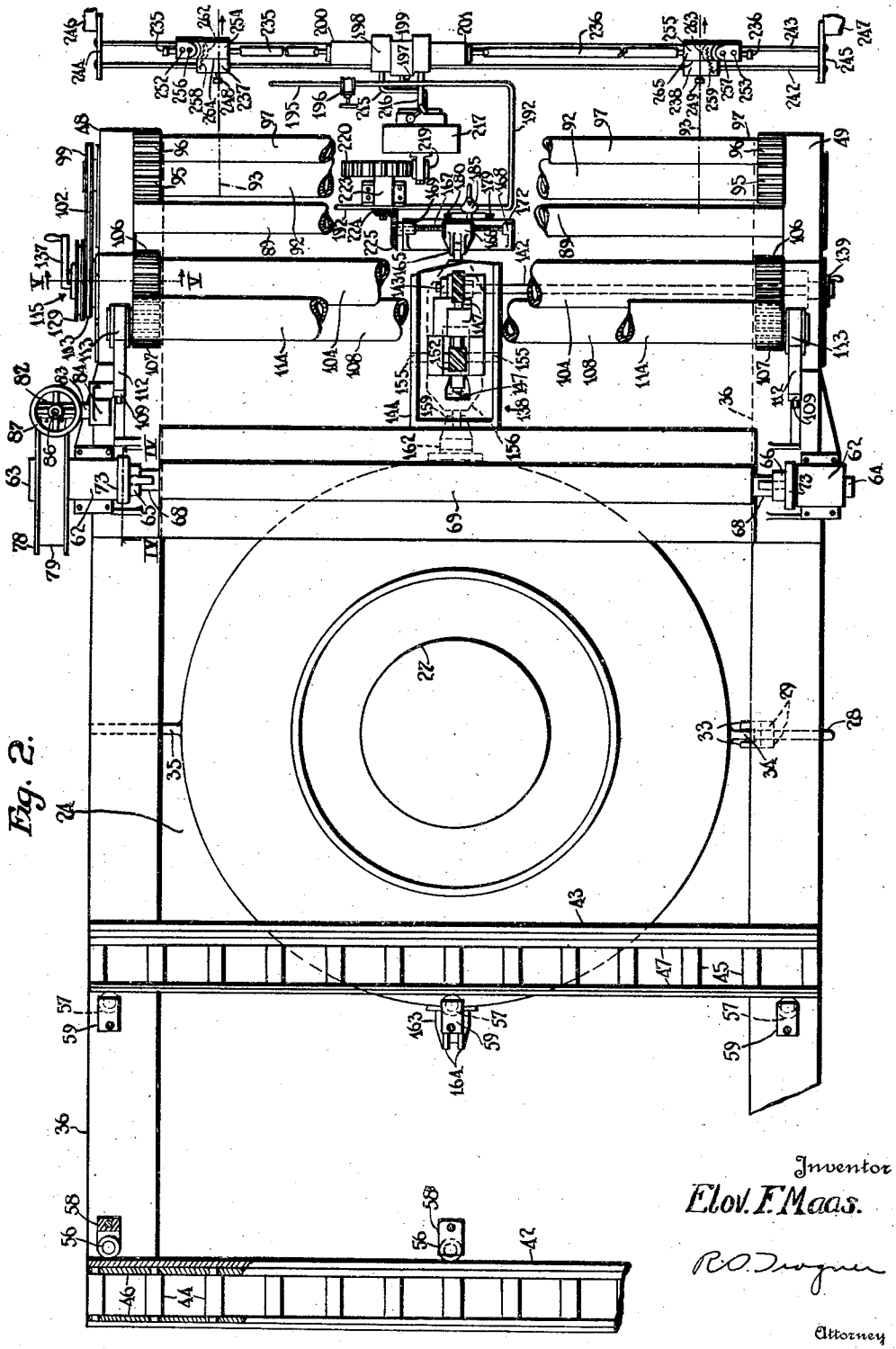


Fig. 2.

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FABRIC FEEDING DEVICE

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Fig. 3.

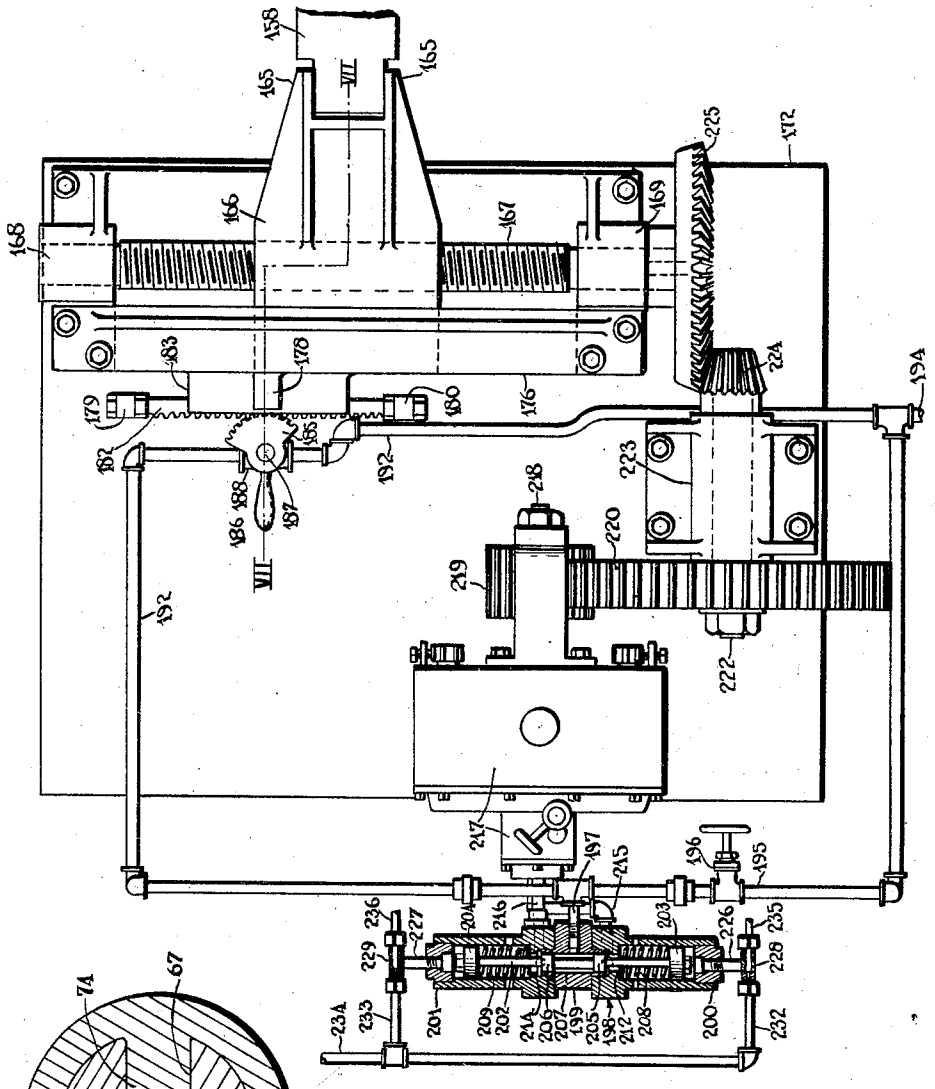
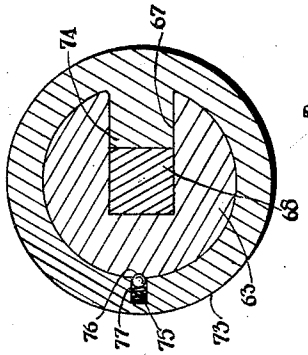


Fig. 4.



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FABRIC FEEDING DEVICE

Filed June 21, 1927 4 Sheets-Sheet 4

Fig. 5.

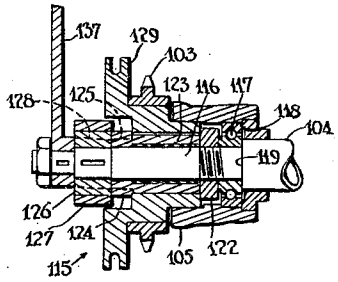


Fig. 6.

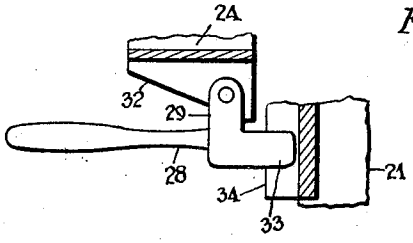


Fig. 7.

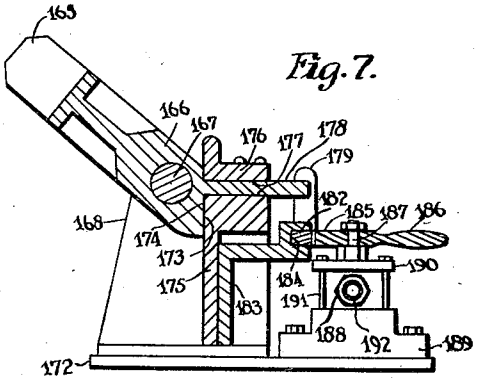


Fig. 8.

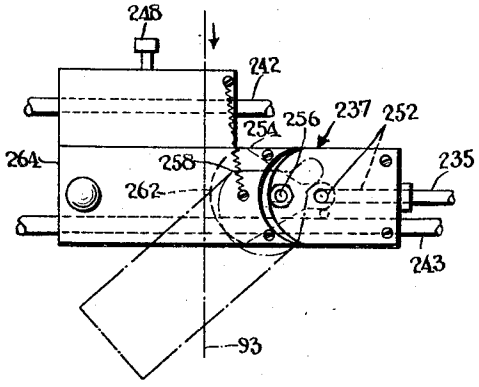


Fig. 10.

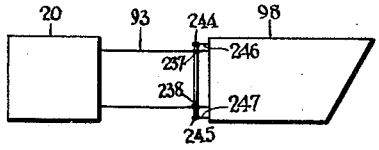
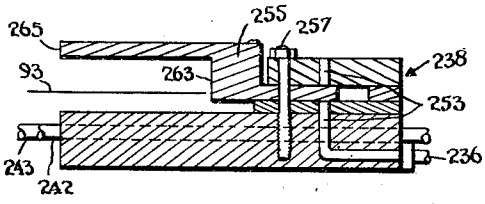


Fig. 9.



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Patented May 6, 1930 1,757,935

UNITED STATES PATENT OFFICE

ELOV F. MAAS, OF AKRON, OHIO, ASSIGNOR TO THE GOODYEAR TIRE & RUBBER COMPANY, OF AKRON, OHIO, A CORPORATION OF OHIO

FABRIC-FEEDING DEVICE

Application filed June 21, 1927. Serial No. 200,493.

My invention relates to machines for manipulating rolls of flexible material and it has particular relation to a machine which is adapted to facilitate the unwinding of rolls of sheet material which has been wound within the convolutions of an interposed protective liner composed of non-adhesive material.

Fabric feeding machines of this character are employed generally in conjunction with bias cutters or calendering machines employed in the preparation of material for use in manufacturing articles composed entirely or partially of fabric.

One object of my invention is to provide a fabric feeding device having improved operating characteristics.

Another object of my invention is to provide a machine of the above designated character which is substantially automatic in its operation.

A further object of my invention is to provide a fabric feeding device which is adapted to maintain the fabric stock in aligned relation with respect to the bias cutter in conjunction with which it is adapted to be employed.

Another object of this invention is to provide a fabric feeding device so designed that a roll of rubberized fabric together with a liner within which the fabric is wound is adapted to be unrolled and the fabric supplied to a cutting machine free from wrinkles and injurious distortion.

In preparing rubberized goods embodying a fabric reinforcing medium, the textile material generally is incorporated into a rubber product by a process of calendering, which operation serves to impregnate the fabric with rubber. The rubber impregnating operation is generally performed, either on a train calender or a suitable spreading mechanism. By reason of the adhesive properties which characterize unvulcanized rubber, it is of paramount importance that the treated fabric be protected from engagement with other plastic bodies. To this end it is common practice to interpose between adjacent layers of rubberized stock a layer of fabric of substantially the same width as the stock itself. The fabric layer employed for this purpose is usually designated as a "liner".

With this precaution the difficulties encountered in handling treated stock wound in the form of a roll are, to a large measure, overcome. However, when it becomes necessary to separate the liner from the stock, considerable force is required, which, if not applied evenly, tends to distort not only the rubberized product, but also the liner. Such distortion is objectionable, first, because stock which has been strained and distorted cannot be cut accurately on a bias cutter, thus resulting in a considerable waste; and second, because a liner which has been distorted is likely to wrinkle, thereby involving difficulties when again brought into contact with a plastic material.

One of the greater problems incidental to the unwinding of material of the character designated lies in preventing the rubberized stock and liner from becoming injured by distortion and wrinkles. Also the material cannot be properly cut or measured when it is distorted or wrinkled. Besides failing to obviate these disadvantages previously known machines have required an attendant, at all times to be present to operate them. An additional difficulty incidental to the use of the previously known machines is that lateral variations occurring in the roll of the stock during the original winding-up process reappear when that stock is unwound and fed to a bias cutter. According to my invention, these several disadvantages are obviated, as will be apparent from this specification.

For a better understanding of the invention reference may now be had to the accompanying drawings forming a part of the specification, of which:

Fig. 1 is a side elevational view, partially in cross-section, illustrating a fabric feeding device embodying the principles of my invention;

Fig. 2 is a plan view of the structure illustrated by Fig. 1, portions thereof being broken away for the sake of clearness;

Fig. 3 is a plan view, on a larger scale, of aligning elements embodying parts of the invention;

Fig. 4 is a cross-sectional view taken substantially along the line IV—IV of Fig. 2;

Fig. 5 is a cross-sectional view, on a larger scale, taken substantially along the line V—V of Fig. 2;

Fig. 6 is a fragmentary view, partially in cross-section, showing a fastening device embodied in my invention;

Fig. 7 is a cross-sectional view, on a larger scale, of an actuating mechanism, the view being taken substantially along the line VII—VII of Fig. 3;

Fig. 8 is a plan view, on a larger scale, of a valve controlling device;

Fig. 9 is a cross-sectional view of a device similar to the device shown by Fig. 8; and

Fig. 10 is a diagrammatical view illustrating the relative arrangement of a machine embodying my invention and a bias cutter.

In practicing my invention, I provide a fabric feeding device 20 comprising a stationary base 21 having a central cylindrical portion 22 and an annular race ring 23 adjacent its outer periphery. A platform 24, having a race ring 25 complementary to the race ring 23, rests upon roller bearings 26 disposed between the race rings and is maintained in axial alignment with the base 21 by means of an integral cylindrical bearings portions 27 that is disposed snugly within the cylindrical portion 22.

The platform 24 is thus rotatably mounted upon the base 21 about a vertical axis. In order to lock the platform in a stationary predetermined position, a lever 28 having bifurcated portions 29 is pivoted to a flange 32 of the platform. As best shown in Figs. 2 and 6, the lever has a pair of fingers 33 adapted to straddle either of a pair of diametrically opposite lugs 34 and 35 that are formed integrally with the base 21. By actuating the lever 28, the fingers are moved from their normal position of straddling the lugs 34 and 35 and the platform and base can be relatively rotated 180° and again locked against relative rotation.

The platform 24 is composed of two oppositely disposed pairs of arms 36 which support two so-called fabric feeding units 38 and 39, one of which is adapted to be operated while the other is idle. The platform is symmetrically constructed and the fabric feeding units 38 and 39 are identical in construction, and accordingly like reference characters will be employed to designate corresponding parts of both units.

Two channel elements 42 and 43 are supported transversely upon the arms 36 and are provided with rollers 44 and 45 journalled at their ends in bars 46 and 47, respectively. These rollers rest upon the bottom of the channels and are movable together with the bars 46 and 47 longitudinally of the channel elements. Parallel upright frames 48 and 49, having base portions 52 and 53, are secured together by means of elongate plates 54 and 55 which rest upon the respective rollers 44 and 45, and so support the units 38 and 39 that they may be moved upon the rollers transversely of the platform 24. A plurality of rollers 56 and 57 rotatably mounted upon brackets 58 and 59 secured to the plates 54 and 55 respectively, engage the flanges of the channel elements 42 and 43 and serve to guide the units in their movement transversely of the arms 36.

Oppositely disposed bearing brackets 62 mounted upon the frames 48 and 49 rotatably support stud shafts 63 and 64 which are provided with inwardly extending end portions 65 and 66 having slots 67 therein, that are adapted to receive axial shaft portions 68 of a shell 69 upon which a roll 72 of fabric and liner material is wound.

As best shown by Fig. 4, a collar 73 surrounds the end of the stud shaft 63 and is provided with an integral radially inwardly extending lug 74 which slidably engages the end of the shaft 68 and thereby maintains the shell 69 in axial alignment with the stud shafts 63 and 64. The collar 73 is maintained in close engagement with the shaft 63 by means of a coil spring 75 and a spherical member 76, both of which are disposed within a recess 77 in the collar opposite the lug 74. In order to move the collar axially, the spherical member must also be so moved as to compress the spring 75. This construction is provided for the purpose of facilitating the replenishing of rolls 72 that are wound upon the shells 69.

One end of the stud shaft 63 rigidly supports a brake drum 78 having a brake band 79 disposed thereabout, one end of the band being secured by means of a collar 82 mounted upon a rod 83. A bracket 84 that is bolted to each of the frames 48 and 49 rigidly supports the rod 83. The other end of the brake band is secured, as indicated at 85, to the lower end of a screw threaded bolt 86, which is disposed slidably through the rod 83 and which is threaded through a hand wheel 87. By turning the hand wheel, the brake band is either tightened or loosened about the drum 78 according to its direction of rotation.

A portion of the material constituting the roll 72 is unwound therefrom and extends upwardly, as indicated at 88, to an idler roller 89 journalled at each end in the frames 48 and 49. The material is directed over the idler roller 89, and thence beneath a second roller 92 which is also journalled in the frames 48 and 49. The component parts of the roll of material 72 include a relatively wide strip of rubberized fabric 93 and a relatively wide fabric liner 94 within the convolutions of which the rubberized fabric is wound.

A pair of gears 95 are secured adjacent the opposite ends of the roller 92 inside the frame

members 48 and 49 and are intermeshed with similar gears 96 rigidly mounted upon a roller 97 which also is journalled at its ends in the frames 48 and 49. The rubberized fabric 93 is trained over the roller 97 and from this roller it is directed to a bias cutter 98 diagrammatically illustrated by Fig. 10.

It will be observed that the surfaces of the rollers 92 and 97 are very close together and that the rubberized fabric 93 and the liner 94, while under tension, are separated along a line between the contiguous surfaces, or at the so-called nip, of the two rollers. Owing to the fact that the fabric 93 and liner 94 positively engage the rollers 97 and 92, respectively, after the fabric and liner have been separated, the line of separation is maintained uniform, and substantially parallel with the axes of the rollers. This arrangement prevents the fabric and liner from becoming distorted, wrinkled, or unevenly separated and is therefore in better condition to be fed to a bias cutter than it otherwise would be.

One end of the roller 92 is provided with a sprocket 99 which has a chain 102 disposed thereabout, the latter being also disposed about a second sprocket 103 that is rigidly secured to one end of a roller 104. This roller is journalled adjacent its ends in a bearing bracket 105 rigidly mounted upon the frames 48—49 and is disposed parallel to the rollers 92 and 97. Two gears 106, mounted adjacent the ends of the roller 104, engage similar gears 107 which are rigidly secured adjacent the ends of a knurled roller 108. If desirable, all of the rollers 89, 92, 97, 104 and 108 may also be knurled. The latter roller is disposed parallel to and immediately adjacent the roller 104 and is journalled at its ends in the bracket 105. The ratio between the gears 106 and 107, the sprockets 99 and 103 and the gears 92 and 97 is such that the peripheral speed of all of the rollers is substantially the same.

The bracket 105 is provided with an integral projection 109 and has an inclined surface 112 for supporting a journal bearing 113 slidable thereon. A shell 114 having its ends rotatably mounted in the journal bearings 113, is adapted to receive the unwound liner 94 and to rewind it. Thus, it will be observed that the liner wound upon the shell 114 rests by gravity upon the roller 104, and as the size of the liner roll increases upon the shell 114, the journal bearings 113 will slidably move upwardly upon the inclined surface 112 of the bracket.

A supplemental winding device 115 for rotating the roller 104 and for taking up slack in the liner 94, is mounted upon one end of the roller in conjunction with the sprocket wheel 103. A reduced axial portion 116 of the roller 104 is supported within a ball bearing 117 that is disposed in an opening 118 in the bracket 105. The ball bearing is confined within the opening between a shoulder 119 of the roller and a collar 122 threaded upon the reduced portion of the roller. A sleeve 123 rotatably mounted upon the reduced portion 116 also abuts against the collar 122 and is provided with an outer enlarged portion 124 which is splined, as indicated at 125. The sleeve 123 also abuts a collar 126 keyed or otherwise rigidly secured adjacent the outer end of the reduced portion 116. An annular locking device 127 is splined, as indicated at 128, upon the collar 126 and is adapted to slide inwardly until the splined portions thereof intermesh with the splined portions 125 of the sleeve 123.

The sprocket 103 is rigid with or forms an integral part of a pulley 129 which is rigidly secured to the sleeve 123. While the annular locking ring 127 is in the position shown by Fig. 5, the pulley 129 and sprocket 103 are together relatively rotatable with respect to the roller 104. However, by moving the locking ring inwardly until its splined portions intermesh with the splined portions 125 of the sleeve 123, the roller and pulley are locked together for concurrent rotation. A belt 132 is trained about the pulley and is driven by a suitable source of power not shown.

In order to provide proper tightening of the belt 132 about the pulley 129, a belt tightener 133 is provided which comprises a roller 134 journalled upon the end of an arm 135 and is adapted to rest against the belt 132. The arm 135 is pivoted to the bracket 105, as indicated at 136.

If desirable, the operation of the power driven pulley 129 may be dispensed with and a manually operated crank 137 is secured to the outer end of the roller 104 for the purpose of winding the liner 94 thereon. Either the pulley 129 or the crank 137 is operated only temporarily while the fabric rolls 72 are being placed upon the machine and while the fabric 93 is being directed to the bias cutter 98 preparatory to the operation of the latter.

When the fabric 93 is moving away from one of the units 38 or 39 after passing over the roller 97, it must be maintained in proper alignment with the bias cutter 98 to which it is directed. In order to insure proper adjustment, by moving either of the units laterally upon the rollers 44—45, an adjusting device 138 is provided which is secured to the frame members 54—55. This device includes, and is adapted to be manually operated by, a hand wheel 139 rigidly secured to one end of a shaft 142 that is journalled in the frame member 49. The other end of the shaft is mounted in a journal bearing 143 of a bracket 144 that is connected transversely to the plates 54—55.

A spiral gear 145 rigidly secured to the

shaft 142 adjacent the bearing 143 meshes with a similar spiral gear 146 that is secured to one end of a relatively short shaft 147 disposed at right angles to the shaft 142. This short shaft is adapted to rotate in bearings 148 and 149 forming a part of the bracket 144, and is provided with an intermediate worm 152 which meshes with a spiral gear 153 rigidly mounted upon a shaft 154.

As best shown by Fig. 2, the shaft 154 is disposed at right angles to the shaft 147 and is journalled as indicated at 155 in the sides of the bracket 144. A bell crank lever 156, having a pair of angularly disposed arms 157 and 158, is rigidly secured at its angular portion upon the shaft 154. The arm 157 is adapted to be moved between a pair of fingers 159 of a lug 162 that is rigidly secured to the rotatable platform or base portion 24. A second lug 163 located diametrically opposite the lug 162 and having fingers 164 is constructed and mounted in the same manner as the lug 162. By rotating the hand wheel 139, the lever 156 can be so pivoted in a vertical plane that the arm 157 will be moved toward or away from the fingers 159. When the arm is moved until it is disposed between the fingers 159, the unit 39 is locked against lateral movement upon the rollers 44—45. The other arm 158 is adapted to be moved between a pair of fingers 165 of a block 166 that is internally screw threaded. This block is threaded upon a horizontally disposed screw threaded shaft 167 that is journalled adjacent its ends in bearing brackets 168 and 169 supported upon a base member 172. One side of the block is provided with a guiding surface 173 (Fig. 7) that is adapted to slide upon an abutting guiding surface 174 of a web 175 forming a part of the bearing brackets 168 and 169. The upper portion of the web 175, together with a bar 176 that is mounted upon the brackets 168 and 169, provides a guide 177 between, and beyond which, an integral finger 178 of the block projects. The portion of this finger extending beyond the bar 176 is disposed between two lugs 179 and 180 that are secured to opposite ends of a rack 182. The rack is rectangular in cross-section and an angular plate 183 secured to the web 175 slidably supports the rack within a horizontally disposed rectangular guiding groove 184 formed in one of the angular portions of the plate. A segmental gear 185, having a handle 186 extending oppositely from the geared portion thereof meshes with the rack and is rigidly mounted upon a valve stem 187 that controls a valve 188. Brackets 189 and clamping members 190 and 191 support the valve upon the base 172.

Rotation of the shaft 167 causes the block 166 to move horizontally therealong and after the block has been moved a limited distance in either direction, the finger 178 engages one of the lugs 179 or 180, thereby causing operation of the valve stem 187. Also the valve stem may be manually operated by manipulating the handle 186.

The valve 188 forms a connection in a pipe line 192 which receives fluid under pressure from a main supply conduit 194. A section 195 of the pipe 194, having a normally closed valve 196 therein, communicates from the high pressure line 194 to a conduit 197, which is connected to a relay valve 198. The pipe line 192 is also connected to the conduit 197. The relay valve comprises a central cylindrical portion 199 which is positively connected to two oppositely disposed cylindrical casings 200 and 201. The three cylinders are axially aligned and a piston rod 202 has two pistons 203 and 204 secured to the respective ends thereof, and two spaced relatively smaller pistons 205 and 206 are secured to the central portion of the rod within a restricted central bore 207 of the casing 199. The outer ends of two coil springs 208 and 209 surrounding the opposite end portions of the piston rod 202 engage the pistons 203 and 204 respectively, while the inner ends thereof engage shoulders 212 and 214 formed within the cylinders 200 and 201.

Two conduits 215 and 216 connected to the cylinders 200 and 201 respectively, are also connected to a fluid motor 217, having a drive shaft 218 rigidly supporting a pinion 219. Fluid admitted under pressure to the motor 217 through the conduit 215 drives the shaft 218 in one direction, while fluid admitted under pressure through the conduit 216 drives the shaft in the opposite direction.

A relatively large gear wheel 220 meshing with the pinion 219 is rigidly mounted upon one end of a shaft 222 that is rotatably mounted in a bearing bracket 223 bolted to the base 172. A relatively small bevel gear 224 rigidly secured to the other end of the shaft 222 intermeshes with a larger bevel gear 225 that is rigidly secured to one end of the screw threaded shaft 167.

The opposite ends of the relay valve 198 are provided with short conduits 226 and 227 which are connected to valves 228 and 229 respectively, having fluid passages therein so restricted that fluid can pass therethrough only in relatively small volumes. These valves have conduits 232 and 233 respectively communicating with a common pipe line 234 which supplies fluid under relatively lower pressure than the pressure of the fluid supply through the pipe 194. Conduits 235 and 236, also connected to the valves 228 and 229 respectively, lead to two valve controlling devices comprising blocks 237 and 238 (Figs. 2, 8 and 9) which are mounted upon rods 242 and 243. The ends of each of the rods are supported upon brackets 244 and 245 that are rigidly secured to frame members 246 and 247 supported adjacent the bias cutter 98. The blocks 237 and 238 are adapted to be slidably

adjusted along the rods 242 and 243 and they can be secured in any desirable position thereon by means of set screws 248 and 249.

The conduits 235 and 236 communicate with openings 252 and 253 in the blocks 237 and 238 which are normally closed by lever valve closures 254 and 255 pivotally mounted upon the blocks by means of bolts 256 and 257. Relatively small springs 258 and 259 tend to maintain the lever closures in such position that the openings 252 and 253 are normally closed. Shoulder portions 262 and 263 and overlying portions 264 and 265 of the levers are provided for the purpose of receiving the edges of the fabric material 93.

As best shown by Figs. 2, 8 and 9, the fabric 93 travels in the direction indicated by the arrows. In the event the fabric is deflected from its proper course toward the bias cutter 98, it engages one of the shoulder portions 262 or 263. Assuming that the fabric engages the portion 262, the lever 254 is thereby pivoted until the opening 252 has been uncovered, thereby permitting fluid under pressure from the valve 228 to escape therefrom. It will be observed that under normal conditions the fluid pressure from the pipe 234 through the valves 228 and 229 to the respective pistons 203 and 204 is equalized.

In the operation of the machine described, a roll of material 72 is mounted upon the shell 69 and is trained over the rollers 89 and 92. The fabric 93 is separated from the liner 94 and is trained over the roller 97, while the liner 94 is directed about the rewinding roller 114.

After the fabric has been so positioned, the circular platform 24 is rotated upon the base 21 until the fabric is substantially in alignment with the bias cutter 98. Until the elements of the machine are moved to the position just described, the outer end of the arm 157 is locked between the fingers 159 of the lug 162. By manually operating the hand wheel 139, the arm and fingers are disengaged from each other and the outer end of the other arm 158 is moved between the fingers 165 of the block 166.

The motor 217 may be operated to move the block 166 into proper alignment with the arm 158, or the unit 39 may be moved laterally upon the rollers 44 and 45, until proper alignment of these elements with the bias cutter 98 is effected. The brake band 79 serves to impart proper resistance to the unwinding of the roll 72 and to prevent idling of the shell 69 upon its bearing. By connecting the fabric 93 to the bias cutter and commencing operation thereof, the fabric is drawn from the fabric feeding device.

After the devices 237 and 238 have been so adjusted and the unwinding operation has been commenced, the fabric is drawn from the apparatus under tension in the direction indicated by the arrows shown by Figs. 1, 2 and 8. In the event there is irregularity within the convolutions of the fabric constituting the roll 72 or if there are other influences which tend to deflect the fabric from a uniform straight course toward the bias cutter, the edges thereof will engage one of the shoulders 262 or 263. Assuming that one edge of the fabric engages the shoulder 262, the pressure will be diminished upon the outer side of the piston 203 of the relay valve mechanism, and the undiminished pressure upon the outer side of the other piston 204 will move the piston rod 202 in such direction as to establish communication of fluid under pressure between the pipe connection 197 and the pipe connection 194 through the bore 207 to the central cylinder 199. This admission of fluid under pressure will operate the fluid motor 217 which turns the screw threaded shaft 167, thereby moving the block 166, together with the lever 156 and the unit 39, in a horizontal direction upon the rollers 44—45. When the unit 39 has been moved sufficiently to disengage the edge of the fabric from the shoulder portion 262, the opening 252 is again closed and the fluid pressure is equalized in opposite directions against the outer surfaces of the pistons 203 and 204. The pistons 203—204 and 205—206 will then move back to their normal positions thereby arresting the flow of fluid to the fluid motor which will accordingly cease operation. The lugs 179 and 180 are provided as a safety means for automatically arresting operation of the fluid motor in the event the unit 39 is moved beyond certain limits. When the finger 178 engages one of the lugs 179 or 180, the segmental gear 185 is rotated and closes the valve 188.

From the foregoing description, it will be apparent that engagement of one edge of the fabric 93 with the device 237 energizes the fluid motor automatically to move the unit in one direction while engagement of the other edge of the fabric with the other device 238 causes the unit to be moved automatically in the opposite direction.

While one of the units 38 or 39 is being operated, the other one, which is disposed on the opposite side of the platform 24, may be replenished with another roll of material 72 and prepared for the unwinding operation. Thus practically continuous operation of the bias cutter may be insured by having a roll of material upon one of the units at the time the other roll is exhausted ready to be directed to the bias cutter.

From the foregoing description it will be apparent that my invention provides for an economic method of manipulating rolls of fabric and that proper feeding of the fabric to bias cutters or other like machines can be accomplished with a minimum delay and with maximum efficiency.

Although I have illustrated but one form which my invention may assume and have described in detail but a single application thereof, it will be apparent to those skilled in the art that it is not so limited but that various minor modifications and changes may be made therein without departing from the spirit of my invention or from the scope of the appended claims.

What I claim is:

1. A fabric feeding device comprising a rotatable support, movable means thereon for supporting a roll of fabric material, means for actuating the movable means and means for connecting the latter rigidly to the actuating means and to the rotatable support, alternately.

2. A fabric feeding device comprising a rotatable base having a plurality of transversely movable units mounted thereon, means for supporting a roll of flexible material on each unit, means for unwinding the material from the rolls, and means actuated by the unwinding material for controlling the position of the movable units.

3. A fabric feeding device for a bias cutter comprising a support, a rotatable member mounted on the support, a plurality of independently movable frames mounted on the rotatable member, each frame being provided with means for unwinding a roll of material wound within the convolutions of a liner, means adjacent one side of the support for actuating either frame on the rotatable member, and means for rewinding the liner.

4. A fabric feeding device for a bias cutter comprising a rotatable support, a plurality of independently movable frame members mounted upon the support, each member being provided with means for unwinding a roll of material wound within the convolutions of a liner, means for rewinding the liner, fluid operated means having a mechanism for engaging the edge of the material, and means operatively connected to the fluid operated means and energized thereby for adjusting the position of the frame members.

5. A fabric feeding device for a bias cutter comprising a rotatable support, a plurality of independently movable frame members mounted upon the support, each member being provided with means for unwinding a roll of material wound within the convolutions of a liner, means for rewinding the liner, fluid operated means having mechanism for engaging the edge of the material, a fluid motor energized by movement of the material against the mechanism for adjusting the position of the frame member and a relay valve connected to the fluid operated means and being responsive to actuation of the mechanism to control the operation of the motor.

6. In a fabric feeding device having means for rotatably supporting a roll of material having a liner wound therein, means for winding up the liner, a set of parallel rollers rotatable at substantially uniform peripheral velocities and having the material directed therebetween, one of said rollers being adapted to receive the material and direct it in one direction and the other roller being adapted to receive the liner and direct it to the winding means in substantially the opposite direction.

7. In a fabric feeding device having means for rotatably supporting a roll of material having a liner wound therein, means for winding up the liner, a plurality of juxtapositioned uniformly rotatable parallel rollers having the material directed therebetween whereby the material engages and follows one roller and the liner engages and follows another roller.

8. A fabric feeding device for a bias cutter comprising means for unwinding a roll of material wound within the convolutions of a liner, means for rewinding the liner, means associated with the two first mentioned means for separating the fabric and liner along a substantially straight line transversely thereof.

9. A fabric feeding device comprising a supplying reel or supporting a roll of fabric wound within the convolutions of a liner, means for unwinding the roll, means for rewinding the liner, means engaging the fabric transversely substantially along a straight line for separating the liner and fabric along such line, and driving connections operatively interconnecting all of said means.

In witness whereof, I have hereunto signed my name.

Signed at Akron, in the county of Summit, and State of Ohio, this 18 day of June, 1927.

ELOV F. MAAS.