

Nov. 29, 1932.

C. C. GATES

1,889,546

MATERIAL RACK

Filed Dec. 4, 1931

3 Sheets-Sheet 1

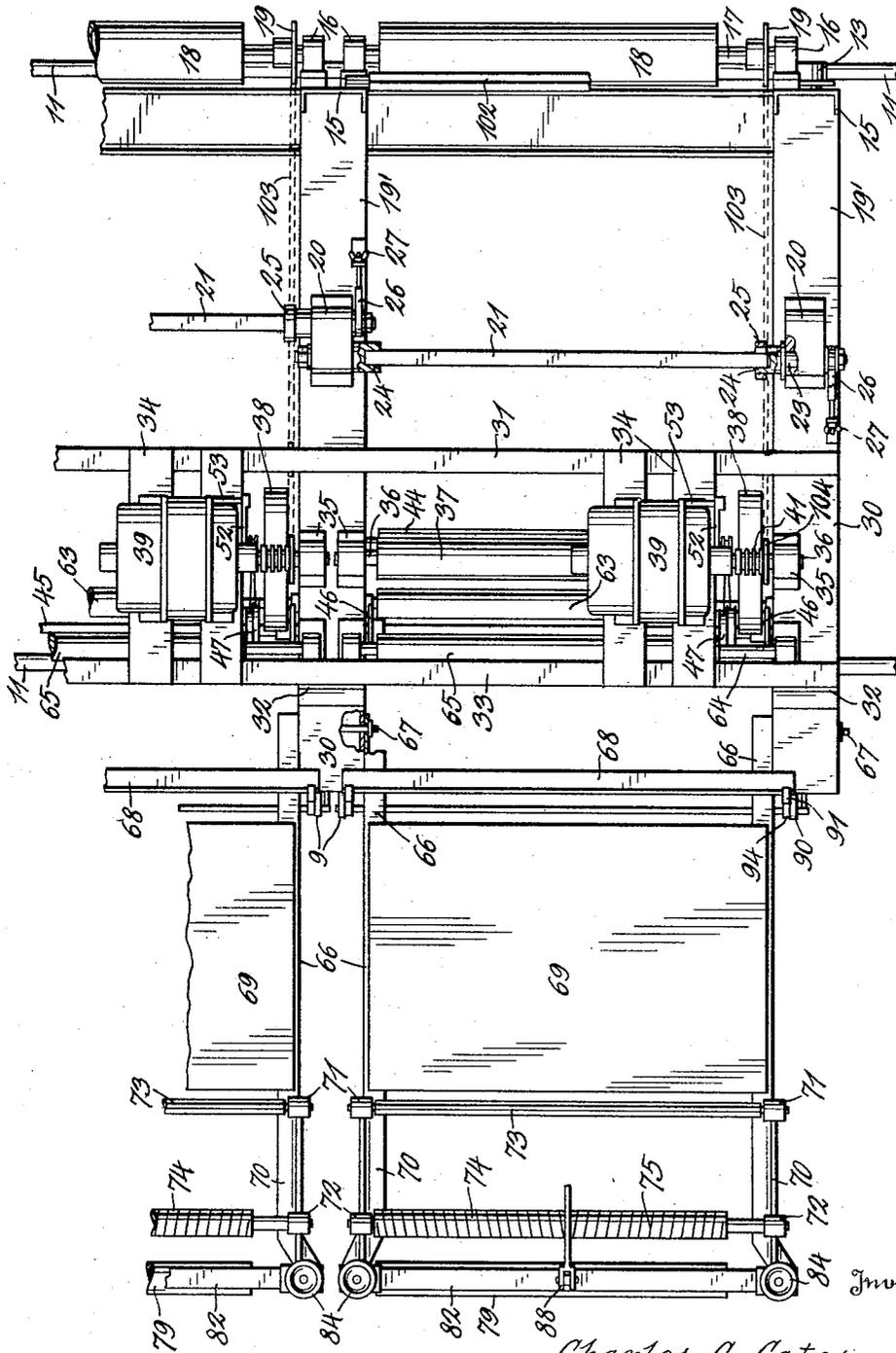


Fig. 1.

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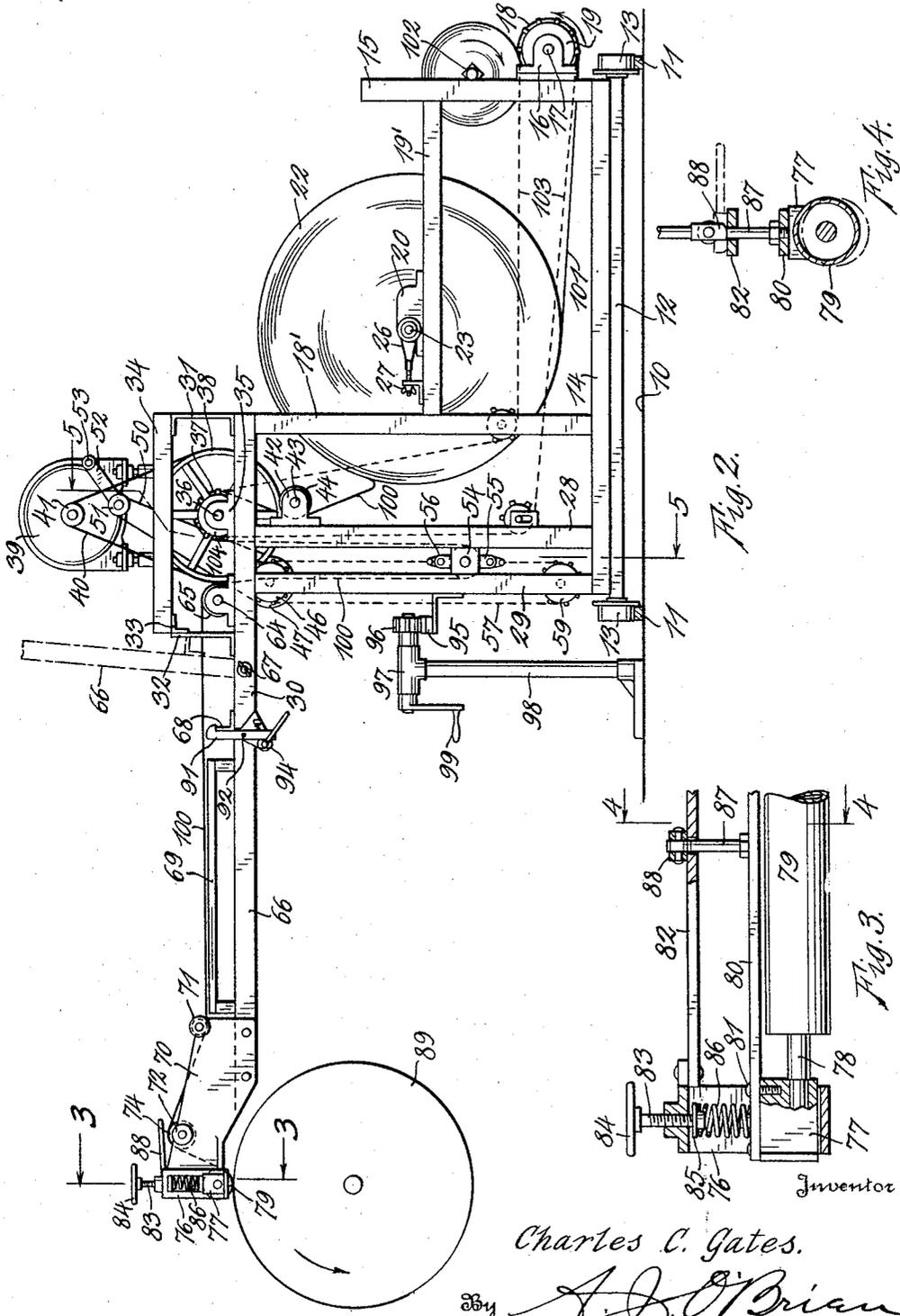
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MATERIAL RACK

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3 Sheets-Sheet 2



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3 Sheets-Sheet 3

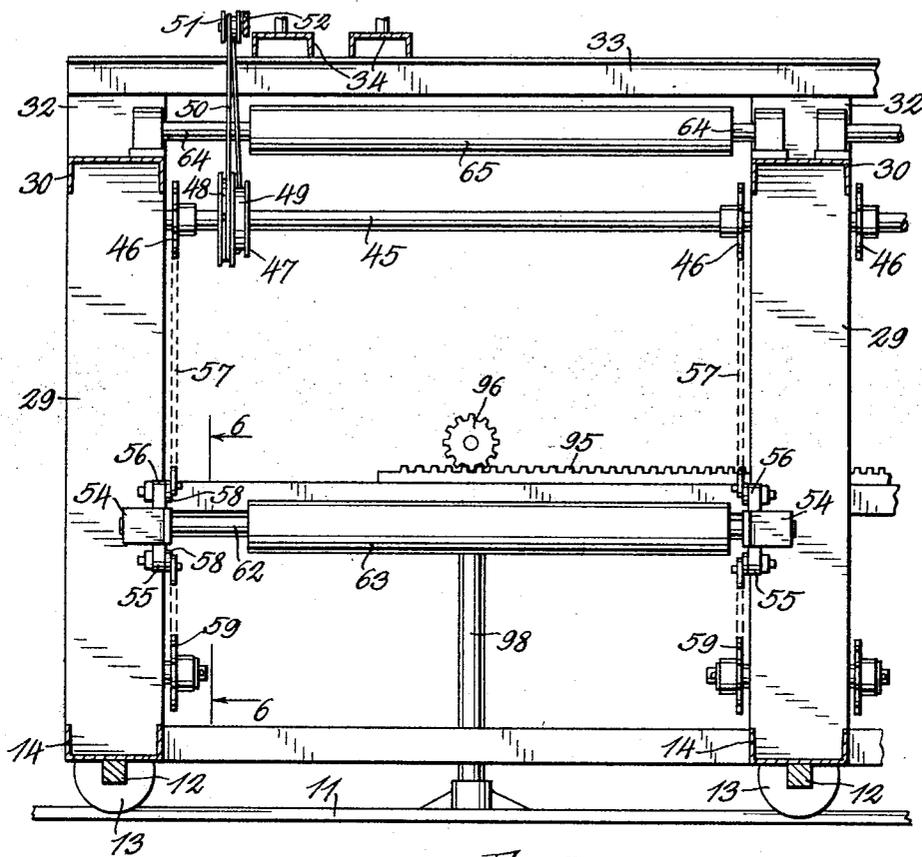


Fig. 5.

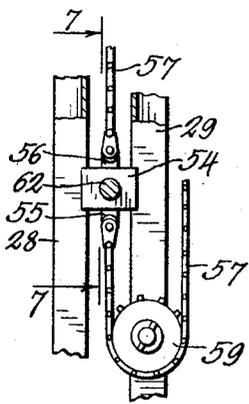


Fig. 6.

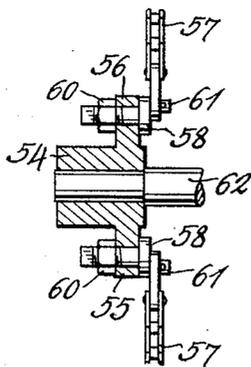


Fig. 7.

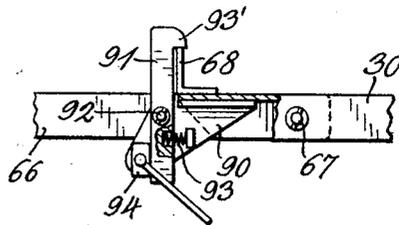


Fig. 8.

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MATERIAL RACK

Application filed December 4, 1931. Serial No. 579,065.

This invention relates to improvements in material racks and has reference more particularly to a material rack adapted for use in connection with belt making machinery of the type described and claimed in my co-pending application Serial No. 579,063 filed December 4, 1931.

In the manufacture of rubberized fabric belts, as well as many other articles made from rubberized fabric, it is necessary to employ fabrics of specifically different kinds which are applied successively to the article as it is being constructed. In order to have the different materials available so that a shift can be made from one to the other without undue loss of time and expenditure of labor, a material rack has been devised which is so constructed that two or more different materials can be supported thereby in proper relation to the machine with which it cooperates.

An object of this invention is to produce a material rack which shall have means for delivering the material to the cooperating machine at a certain specified tension and in this way the articles constructed will all be alike so far as the tension of the material is concerned.

In order to describe the invention so that it can be readily understood, reference will be had to the accompanying drawings in which the preferred embodiment thereof has been illustrated, and in which:

Fig. 1 shows a top plan view of the improved machine;

Fig. 2 is a side elevation thereof;

Fig. 3 is a section taken on line 3—3 of Fig. 2, and shows the resilient adjusting device for a roller;

Fig. 4 is a section taken on line 4—4, Fig. 3, and shows a cam means for raising and lowering the roller;

Fig. 5 is a section taken on line 5—5, Fig. 2;

Fig. 6 is a section taken on line 6—6, Fig. 5, and shows the manner in which the bearing

for the movable roller is supported and guided;

Fig. 7 is a section taken on line 7—7, Fig. 6; and

Fig. 8 is a view partly in elevation and partly in section showing a latching device.

In the drawings reference numeral 10 indicates the surface on which the machine is supported and reference numeral 11 indicates rails on which the machine is movably mounted. Located underneath the framework are two transversely extending axles 12 to the outer ends of which flanged wheels 13 are rotatably secured. These wheels are supported on the rails 11 in the manner shown quite clearly in Figs. 2 and 5. The frame consists of a lower rectangular framework comprising channel irons 14 that are connected at their ends so as to form a rectangular structure and arranged with the flanges extending upwardly in the manner shown in Fig. 5.

Extending vertically from one end of the rectangular framework are two supports 15, one at each corner. Secured to the rear surface of the webs of the channel iron supports 15 are two bearings 16 in which a shaft 17 is journaled. Carried by shaft 17 is a roller 18 and a sprocket wheel 19. The function performed by this roller will be referred to hereinafter. Extending upwardly from the opposite side members of the rectangular frame and spaced some distance from the vertical supports 15, are channel irons 18' and these are connected with the supports 15 by means of horizontal channel irons 19'. Secured to the upper surfaces of members 19' are bearings 20 which are so constructed that they support opposite ends of the rectangular shaft 21 on which the roll of material is supported for rotation. Rotatably mounted in each bearing 20 is a member 23 which has a rectangular socket 25 for the reception of one end of shaft 21. One of these members has a slidable ring 25 and is

provided with an opening in one side through which the end of the shaft can be removed and inserted. The function of ring 25 is to hold the shaft in place while the roll turns. One of the members 23 that is associated with shaft 21 is provided with a brake mechanism comprising a strap 26 that surrounds a circular portion thereof and whose tension can be adjusted by means of a wing nut 27. This brake mechanism is intended to provide sufficient friction to prevent the roll from accelerating and turning faster than actually necessary. Spaced a short distance from the vertical supports 18' are two channel beam supports 28 that extend upwardly to the same height as supports 18' and extending upwardly from the corners of the rectangular frame 14 are two other channel beam supports 29. Secured to the upper ends of supports 18', 28 and 29 are channel iron beams 30 that lie horizontally or in planes parallel with the plane of the frame 14. Extending transversely between the ends of the channel irons 30 and directly above the supports 18' is a channel iron 31 and at the front of the supports 29 angle brackets 32 extend transversely of members 30 and secured to the upper ends of the vertical flanges of these angle brackets is a smaller angle iron 33. The upper flanges of the channel iron 31 and the angle iron 33 are connected by horizontal channel irons 34. In the construction illustrated, the several parts of the frame are electrowelded instead of being secured by rivets or bolts, but it is to be understood that any other means of securing the members of the frame can be used if desired. Secured to the upper surface of the horizontal channel irons 30 are bearings 35 in which shaft 36 is rotatably mounted. This shaft carries a roller 37 and has secured to one end a pulley 38. Supported on the channel irons 34 is a motor 39 that is connected with the pulley 38 by means of belts 40. The motor shaft is provided with a grooved pulley 41 with which the V-shaped driving belts 40 cooperate. Located below the shaft 36 and secured to the rear surface of the supports 28 are bearings 42 in which a shaft 43 is journaled. This shaft carries a roller 44, which is an idler and merely serves to properly position the fabric in a manner which will more fully appear as the description proceeds. A shaft 45 is mounted for rotation between the two vertical supports 29 and this has secured to opposite ends thereof sprocket wheels 46 and adjacent the sprocket wheel, located at the side where the motor is located, is a drum 47 having two surfaces of different diameters, the larger of which has been indicated by reference numeral 48 and the smaller by reference numeral 49. The flexible cable 50 has its opposite ends secured to the drums 48 and 49, while the bight of this cable passes about a

pulley 51 secured to an arm 52 that turns about the axis of a shaft 53. The arm 52 is part of a speed regulating mechanism that is connected with the motor and so arranged that when it moves in one direction, the speed of the motor will be increased and when it moves in the opposite direction, the speed of the motor will be decreased. When shaft 45 is rotated in such a direction that the cable unwinds from the small drums and winds onto the large drum, the bight will be shortened, thereby moving the arm 52 downwardly and if shaft 45 rotates in the opposite direction, the cable will be unwound from the large drum and wound onto the small drum, thereby lengthening the bight and permitting the arm 52 to move upwardly under the influence of the spring. The differential action just described is taken advantage of for the purpose of regulating the speed in a manner which will be hereinafter more fully explained.

Located between the adjacent surface of the two pair of vertical supports 28 and 29 are bearings 54. These bearings are provided with lugs 55 and 56, one of which is secured to the lower surface and the other to the upper surface. Sprocket chains 57 have their ends connected to lugs 55 and 56 by means of an adjustable crank disk 58. These sprocket chains pass over the sprocket wheels 46 and thence downwardly and around the sprocket wheels 59 and therefore if bearings 54 are moved upwardly, the action of the sprocket chains rotates shaft 45 in such a direction that the cable 50 will be unwound from the large drum and wound onto the small drum and if the bearings 54 are moved downwardly the cable will be wound onto the large drum and unwound from the small drum. The function served by this arrangement will appear more fully as the description proceeds.

Referring now to Fig. 7, it will be seen that the crank disks 58 are held in adjusted position by means of nuts 60. Since the ends of the chains are connected to the crank pins 61, it is apparent that by rotating these crank disks, the horizontal position of the shaft 62 can be adjusted. A roller 63 is secured to shaft 62. Two bearings are located a short distance to the front of bearings 35 and a shaft 64 is mounted for rotation in these bearings. A roller 65 is carried by shaft 64.

Pivotaly connected with the front ends of the horizontal channel irons 30 are angle irons 66. These are held in place by means of pivots 67. An angle iron 68 extends across the top of the angle irons 66 and projects over the upper surfaces of the channel irons 30 as shown in Figs. 1 and 2. Since the angle iron 68 is located to the front of the pivots 67, it serves as a stop which limits the downward movement of members 66. A platform 69 is supported on the members 66 in the

manner shown in Fig. 2. Secured to the outer surfaces of angle irons 66 are plates 70 and these are provided with bearings 71 and 72, in which the rollers 73 and 74 are rotatably mounted. Roller 73 has a plain cylindrical outer surface, but roller 74 is provided with helical ridges 75 that are wound in opposite directions from the center. These ridges may be formed by winding a wire around the outer surface of the roller, or they may be formed integral with the roller as may be desired. At the front ends of the plates 70 are vertical guides 76. Located in the openings in these guides are bearings 77 in which the ends of shaft 78 are journaled. Shaft 78 is provided with a roller 79. A bar 80 connects the two bearings at the opposite ends of shaft 78 and is secured to these bearings by means of screws 81. A bar 82 connects the two guides in the manner shown in Fig. 3. Screws 83 having hand wheels 84, pass through a threaded opening in the upper end of the guides and are provided at their lower ends with flanges 85 against which the upper ends of the helical compression spring 86 abut. By adjusting the screws 83, the tension of the springs can be adjusted to any extent desired. A bolt 87 has its lower end connected with the bar 80 and its upper end extends through an opening in bar 82 and terminates a short distance above the upper surface of the latter. A cam 88 is pivotally connected to the upper end of bolt 87 and so arranged that when it occupies the position shown in dotted lines in Fig. 4, springs 86 are free to function, but if the cam is moved to the full line position shown in Fig. 4, the roller 79 is raised and held in raised position against the tension of the springs 86. In Fig. 2, a drum 89 has been shown which is located directly underneath the roller 79. This drum forms part of a belt building machine and is not part of the machine that is being described in this application. By means of the springs 76 and the adjusting screws 83, the pressure that is exerted by roller 79 against the surface of roller 89 can be adjusted. For the purpose of holding the assembly comprising the angle iron 66 in the position shown in Fig. 2, a latch has been provided. This latch is shown most clearly in Fig. 8 from which it will be seen that a bracket 90 is secured to the inner surface of the web of the channel beams 30 and pivoted to this bracket is a latching member 91 that can be turned about the pivot 92. A spring 93 tends to rotate this latching member in a clockwise direction so as to hold it in such a position that the projecting portion 93' extends over the vertical flange of the angle iron 68. A cam 94 is provided on the opposite side from that engaged by the spring 93 and when this cam is in the position shown in Fig. 8, the latching member is in operative position but by rotating the cam through

ninety degrees, the latching member can be moved to inoperative position, after which the portion comprising members 66 can be turned about pivots 67 into the position shown by dotted lines in Fig. 2. Secured to the vertical supports 29 is a rack 95 and this is engaged by a pinion 96 secured to a shaft that is journaled in bearing 97 that in turn is supported on the upper end of a pipe or other support 98, whose lower end is fastened to the floor. The pinion 96 can be rotated by means of a crank 99 and when this pinion is turned, the material rack can be moved transversely.

From Fig. 1 it will be seen that this machine is composed of two or more sections, each of which is a duplicate of the other and by moving the rack transversely, any of the several materials carried by the rack can be brought into the proper position for use.

Let us now assume that the machine has been constructed in the manner described and that a roll of material 22 is supported on shaft 21. The material employed for making belts, tires and other similar rubber articles, is usually rubberized fabric of some kind and the layers are separated by means of heavy canvas because if this were not done, they would adhere when rolled and this is prevented by the canvas separator as intimated.

In the drawings the rubberized fabric has been indicated by reference numeral 100, while the canvas strip has been indicated by reference numeral 101. The fabric, after it has left the roll 22, is passed upwardly in front of roller 44, thence over roller 37 from which it extends downwardly and passes beneath the roller 66 that is supported by bearings 54 and after having passed roller 66, it is extended upwardly over roller 65 and thence forwardly on top of the table 69 underneath the roller 73 over the roller 74 and thence downwardly underneath the roller 79. The canvas 101, after the fabric has been separated from it, passes rearwardly and around the roller 18 and is connected to a square shaft 102 that is laid on top of roller 18. A sprocket chain 103 connects the sprocket wheel 19 on shaft 17 with a sprocket wheel 104 on shaft 36. When the motor is operating it turns the roller 37 and pulls the fabric from the roll 22. If the fabric is wound onto the drum 89 at the same speed at which it is unwound from the roll 22, the bearings 54 will remain stationary, but if it is wound onto the drum 89 faster than it is unwound from the roll 72, bearings 54 will move upwardly and in so moving the motor regulator will be adjusted to increase the speed of the motor and in this way the motor will unwind the material from the roller as fast as it is wound onto the drum. If the material is not wound onto the drum as fast as it is unwound from the roll, bearings 54 will move down-

wardly and this will decrease the speed of the motor.

It is apparent that the tension of the fabric is controlled by the weight of bearings 54 and roller 63 and therefore as long as this roller is floating the tension will remain constant, and since the speed of the motor is controlled by the position of bearings 54 an automatic regulation of the fabric tension is assured at all times. Where belts are made, it is customary to apply to the roller 89 two or more layers of bias cut rubberized fabric, after which one or more layers of latex-treated cord fabric is put in place and this cord fabric is then covered with bias cut rubberized fabric. The material rack contains rolls of rubberized fabric, as well as cord fabric and either one of these can be brought into position in the manner above explained.

From the foregoing description it will be seen that by means of the construction described, it is possible to supply fabric to a manufacturing machine under constant tension and therefore the quality of the manufactured article will remain the same at all times as distinguished from articles manufactured by machinery in which the tension of the fabric is different at different times.

Having described the invention what is claimed as new is:

1. A mechanism for use in supplying a strip of fabric, or the like, under a predetermined tension to another machine comprising, in combination, a frame, means on the frame for supporting a roll of material, one side of the frame having a projecting arm, two rollers carried by the arm and mounted for rotation about spaced horizontal axes, means comprising a variable speed motor for turning the roller nearest the material, the other roller being freely rotatable, a third roller located below the other two and movable towards and away from them, the third roller being supported by a loop of material that depends from the two upper rollers and are supported by them, a speed control mechanism associated with the motor and means operated by the vertically movable roller for moving the speed control device in a direction to increase the speed of the motor when the supporting loop shortens and for decreasing the speed when the loop lengthens, said means comprising a drum having two sections of different diameters, means for turning the drum when the third roller moves in a vertical direction, and a flexible member having one end connected with the larger section and the other with the smaller section, the bight of the flexible member being connected with the motor speed controller.

2. In an apparatus of the class described, in combination, a drum mounted for rotation, means for delivering material to the drum under a predetermined tension, said means comprising a frame, means for sup-

porting a roll of material, an arm projecting from one side of the frame and terminating above the drum, a roller rotatably secured to the outer end of the arm and resting on the drum, spring means for forcing the roller downwardly onto the drum, a pair of rollers connected with the arm and mounted for rotation about spaced parallel axes, a variable speed device for turning the roller that is nearest to the material roll, the other roller being freely rotatable, a floating roller located beneath the pair of rollers, a fabric or the like extending over the pair of rollers and looped down between them, said fabric extending underneath the floating roller and serving to support the same, the fabric extending from the freely rotatable roller of the pair to the rotatable drum so as to be forced against the latter by the spring pressed roller at the end of the arm, and means operated by the upward movement of the floating roller for increasing the speed of the driven roller and by its downward movement for decreasing the speed of the driven roller.

3. A device in accordance with claim 2 in which the arm has a hinge between the end roller and the pair of rollers whereby it can be folded when desired.

4. A device in accordance with claim 2 in which the variable speed device comprises an electric motor.

5. A device in accordance with claim 2 in which the pressure between the drum and the roller on the end of the arm can be adjusted and in which means is provided for removing the pressure to facilitate the adjustment of the material.

6. A device for feeding a strip of fabric to another machine and for maintaining it at a constant predetermined tension, comprising a frame having means for rotatably supporting a roll of fabric, two drums mounted for rotation above and to one side of the axes about which the fabric roll rotates, the two drums having their axes parallel to each other and to the axis of the roll, means comprising a variable speed motor for turning the drum nearest the fabric roll, the other drum being freely rotatable, the fabric passing from the roll over the driven drums, thence downwardly and over the other drum whereby a downwardly extending loop or bight is formed, a roller located in the bight, the ends of the roller being journaled in floating bearings, a double pulley rotatably supported, said pulley having two sections of different diameter, means for turning the pulley in one direction when the material loop shortens and for turning it in the opposite direction when the loop lengthens, a flexible member having one end secured to the small section of the double pulley and the other end secured to the large section whereby when the double pulley is rotated

in one direction the bight of the flexible member will be shortened and when it is turned in the other direction it is lengthened, and a motor speed control device connected with the bight of the flexible member whereby the speed of the motor will vary with the length of the bight which in turn is controlled by the position of the roller that is supported by the material loop.

In testimony whereof I affix my signature.
CHARLES C. GATES.

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